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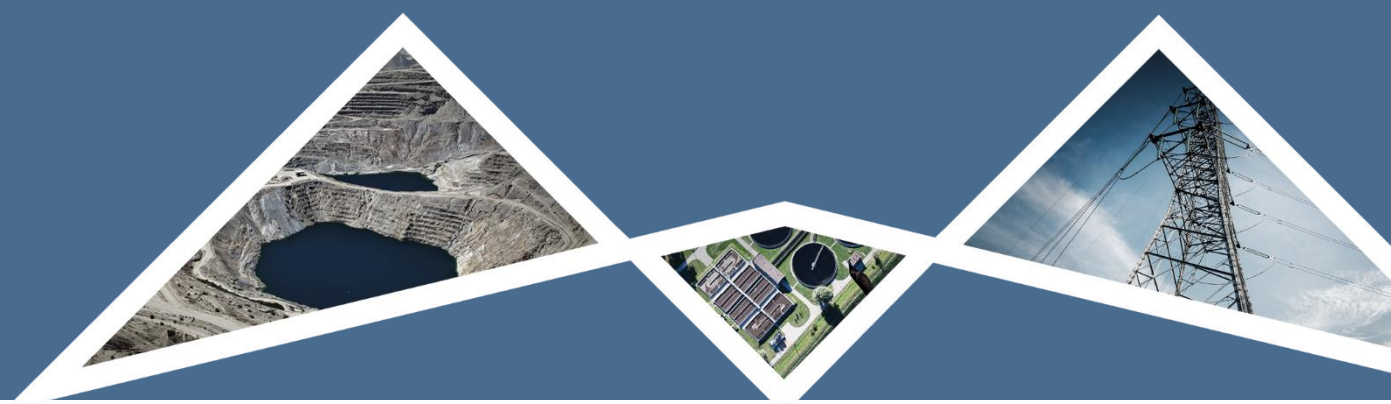
SCOPING REPORT

PROPOSED GLENCORE LYDENBURG SOLAR PHOTOVOLTAIC FACILITY AT THE LYDENBURG SMELTER, MPUMALANGA PROVINCE

FEBRUARY 2024



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REVISION DATE:	REV #	DESCRIPTION
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2024/02/09	**REVISION 2**	**Scoping Report for Public Review**

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List of Abbreviations

AEL	Air Emissions License
BA	Basic Assessment
BPG	Best Practice Guideline
CA	Competent Authority
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DFFE	Department of Forestry, Fisheries and Environment

DWS	Department of Water and Sanitation
DMRE	Department of Mineral Resources and Energy
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment
EIMS	Environmental Impact Management Service (Pty) Ltd
EMPr	Environmental Management Programme Report
GHG	Greenhouse Gas
GIS	Geographical Information System
I&APs	Interested and Affected Parties
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
KPI	Key Performance Indicator
LED	Local Economic Development
MP DARDLEA	Mpumalanga Province Department of Agriculture Rural Development and Environmental Affairs
MR	Mining Right
MPRDA	Mineral and Petroleum Resources Development Act
NDP	National Development Plan
NEMA	National Environmental Management Act
NEMAQA	National Environmental Management: Air Quality Act
NFA	National Forests Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act
PDP	Provincial Development Plan

PPP	Public Participation Process
PV	Photovoltaic
RE	Renewable Energy
REDZ	Renewable Energy Development Zones
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAWS	South African Weather Service
SDF	Spatial Development Framework
SEMA	Specific Environmental Management Act
SPLUMA	Spatial Planning and Land Use Management Act
SWMP	Stormwater Management Plan
TCLM	Thaba Chweu Local Municipality
TSF	Tailings Storage Facility
UIF	Unemployment Insurance Fund

1 EXECUTIVE SUMMARY

Glencore is responsibly sourcing the commodities that advance everyday life. Glencore's current portfolio of minerals enables the transition to a low-carbon economy, while meeting society's energy needs as it progresses through the transition. The transition away from fossil fuels by the energy-intensive mining sector towards renewable, clean energy sources is at the top of the global Glencore agenda. The focus is not only to reduce the sector's carbon footprint as a whole, but also to ensure energy availability for the growing mining economies.

Although the mining sector contributes to global carbon emissions, it is also leading a just transition to a low-carbon economy by deploying new clean energy technology within its operations, as well as by mining critical minerals and metals which a low-carbon economy needs.

As part of this transition, Glencore Lydenburg Smelter, an operation by Glencore South Africa (Pty) Ltd (the applicant) wishes to develop a Solar Photovoltaic (PV) Energy Generation Facility at the Lydenburg Smelter. The generation capacity will be up to 300 megawatts (MW). The electricity generated from the facility will be used at the Lydenburg smelter or will be wheeled to other Glencore operations. Other possible infrastructure will include an on-site substation / switching station, access roads, energy storage system and an 132kV power lines. The proposed PV facility is located in Thaba Chweu Local Municipality (Ward 12 and 13), Ehlanzeni District Municipality, Mpumalanga Province. It was determined that an Environmental Authorization (EA) is required for the proposed activities at the PV facility. A full Environmental Impact Assessment (EIA) process is being undertaken in support of the application for EA. This report aims to comply with the requirements of Appendix 2 of the Environmental Impact Assessment Regulations, 2014, promulgated under the National Environmental Management Act (NEMA- Act 107 of 1998) and fulfils the requirements of a Scoping Phase Report.

1.1 PURPOSE OF THE SCOPING REPORT

The purpose of the scoping process is to:

- To provide a project description and identify the policies and legislation that are relevant to the activity;
- To motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- To identify and confirm the preferred activity and technology alternatives through an impact and risk assessment and ranking;
- Where appropriate, to identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process including 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;
- To identify the key issues to be addressed in the assessment phase;
- To 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
- To 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.

1.2 REQUIRED AUTHORISATIONS

In terms of section 24(2) of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA), the Minister and/or any MEC in concurrence with the Minister may identify activities that require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations

were promulgated in December 2014 (as amended) in terms of Section 24(5) and Section 44 of NEMA, Act 107 of 1998. In terms of the EIA Regulations, 2014 as amended, the following listed activities (discussed in detail in **Section 3.3**) are triggered:

- Listing Notice 1 (GNR 983): Activity 11.
- Listing Notice 2 (GNR 984): Activities 1, 4 and 15.
- Listing Notice 3 (GNR 985): Activities 4, 12 and 14.

Any person wishing to exercise a water use other than those defined in Schedule 1 of the National Water Act, or an existing lawful use, or a use promulgated by a General Authorisation, requires a water use licence. The activities described below are water uses defined in terms of Section 21 of the National Water Act (NWA Act 36 of 1998) and need authorisation, which includes licensing. The triggered Section 21 activities are;

- (c) impeding or diverting the flow in a watercourse; and
- (i) altering the bed, banks, course or characteristics of a watercourse.

1.3 PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) for the proposed project will be undertaken in accordance with the requirements the NEMA in line with the principles of Integrated Environmental Management. The PPP commenced on the 23rd of November 2023 with an initial notification and call to register to Interested and Affected Parties (I&APs). The comments received from I&APs during the initial call to register and commenting period to date have been captured in the Public Participation Report in **Appendix C**, and a summary of the issues raised and sections addressing the issues is presented in **Section 7.6**.

Comments received during this Scoping Report review period will also be collated and added to the Public Participation Report and the summary in **Section 7.6** and updated accordingly for inclusion in the finalised Scoping Report to be submitted to the Competent Authority (CA). Should the CA accept the Scoping Report, an EIA Report including and Environmental Management Programme (EMPr) will then be compiled and presented for public comment as part of the EIA process during which time further stakeholder engagement will take place.

This Scoping Report will be made available for public review and comment for a period of 30 days from the 23rd of February 2024 to the 26th of March 2024. Contact details are provided below:

- Environmental Impact Management Services (Pty) Ltd (EIMS)
- P.O. Box 2083 Pinegowrie 2123
- Phone: 011 789 7170 / Fax: 086 571 9047
- Contact: Jolene Webber
- Email: lydenburgpv@eims.co.za

1.4 PROJECT ALTERNATIVES AND ENVIRONMENTAL IMPACT ASSESSMENT

A scoping assessment was undertaken to identify all the potential risks and impacts associated with each phase of the proposed PV project as well as potentially feasible alternatives. Each of the identified risks and impacts at the various project phases were assessed. The assessment criteria (see **Section 9.1** for the EIMS Impact Assessment Methodology) include the nature, extent, duration, magnitude / intensity, reversibility, probability, cumulative impact, and irreplaceable loss of resources.

After considering the broad range of alternative types that exist (i.e., location, process, technology, and activity options), layout and demand alternatives were the only reasonable options identified. Layout information is still being finalized and potential layout alternatives will be assessed in the EIA phase once these become available.

Various impacts have been identified in relation to the proposed project and these have been subjected to a scoping level impact assessment. No impacts were determined to have a high final significance. The following impacts were determined to have a potentially moderate positive / negative final significance (see Section 9.2 for full list of identified impacts and the significance of each):

- Negative Impacts:
    - Impact on terrestrial biodiversity;
    - Impacts on avifauna;
    - Impacts on homestead within the northern portion of the proposed development site;
    - Impacts on agriculture;
    - Job Losses (Decommissioning Phase).
- Positive Impacts:
    - Employment Creation (Construction and Operational Phases);
    - Rehabilitation after decommissioning of the facility; and
    - Reduced impacts on carbon footprint.

The identified potential impacts of moderate to high significance will be further assessed during the EIA phase of the project. Potential mitigation measures have been identified and will be refined based on input from the Environmental Assessment Practitioner (EAP), public consultation, and specialist assessments during the EIA phase of the project. The associated EMPr will identify appropriate mitigation mechanisms for avoidance, minimisation and / or management of the negative impacts and enhancement of the positive impacts.

2 INTRODUCTION

Glencore (Pty) Ltd (the applicant) is one of the world's largest globally diversified natural resource companies. Glencore's four coal operations are located in the coal-rich province of Mpumalanga, while ferroalloys mines and smelters can be found across the northern part of South Africa, in the North West Province and Limpopo.

Glencore proposes to develop a Photo Voltaic (PV) facility in Lydenburg, Mpumalanga Province. Subsequently, Glencore has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as the independent Environmental Assessment Practitioner (EAP) to assist with undertaking the required authorisation processes (including the statutory public participation), and to compile and submit the required documentation in support of application for Environmental Authorisation (EA) in accordance with the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) Environmental Impact Assessment (EIA) Regulations, 2014 as amended. The proposed project involves the development of a PV facility with a capacity of up to 300 megawatts (MW) to provide power to Lydenburg smelter or will be wheeled to other Glencore operations. Other possible infrastructure will include an on-site substation / switching station, access roads, energy storage system and 132kV power lines. The proposed project is located on Portion 143 of Farm 30 Potloodspruit, Portions 114, 457 and 471 of Farm 31 Townlands of Lydenburg, Portion 1 of Lydenburg Smelter Erf 6099, Lydenburg Smelter Erf 2540 and Lydenburg Smelter Erf 2541 within Thaba Chweu Local Municipality (Ward 12 and 13), Ehlanzeni District Municipality, Mpumalanga Province. The electricity generated from the facility will be used at the Lydenburg smelter or will be wheeled to other Glencore operations.

2.1 REPORT STRUCTURE

This report has been compiled in accordance with the 2014 NEMA EIA Regulations, as amended. A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in **Table 1** below.

Table 1: Report Structure

Environmental Regulation	Description – NEMA Regulation 982 (2014) as amended	Section in Report
Appendix 2(2)(a):	Details of – i. The Environmental Assessment Practitioner (EAP) who prepared the report; and ii. The expertise of the EAP, including a curriculum vitae;	**Section 2**
Appendix 2(2)(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;	**Section 2.9**
Appendix 2(2)(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 a land where the property has not been defined, the coordinates within which the activity is to be undertaken;	**Section 3.3**
Appendix 2(2)(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;	**Sections 3** and **3.3**
Appendix 2(2)(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;	**Section 3.3**

Environmental Regulation	Description – NEMA Regulation 982 (2014) as amended	Section in Report
Appendix 2(2)(f):	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	**Section 4**
Appendix 2(2)(g):	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including – i. Details of all alternatives considered; ii. Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts – aa. Can be reversed; bb. May cause irreplaceable loss or resources; and cc. Can be avoided, managed or mitigated; vi. The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; vii. Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii. The possible mitigation measures that could be applied and level of residual risk; ix. The outcome of the site selection matrix; x. If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and xi. A concluding statement indicating the preferred alternatives, including preferred location of the activity;	**Sections 6, 7, 8** and **9**
Appendix 2(2)(h):	A plan of study for undertaking the environmental impact assessment process to be undertaken, including – i. A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; ii. A description of the aspects to be assessed as part of the environmental impact assessment process; iii. Aspects to be assessed by specialists;	**Section 11**

Environmental Regulation	Description – NEMA Regulation 982 (2014) as amended	Section in Report
	iv. A description of the proposed method of assessing the environmental aspects, including a description of the proposed method assessing the environmental aspects to be assessed by specialists; v. A description of the proposed method of assessing duration and significance; vi. An indication of the stages at which the competent authority will be consulted; vii. Particulars of the public participation process that will be conducted during the environmental impact assessment process; and viii. A description of the tasks that will be undertaken as part of the environmental impact assessment process; ix. Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored;	
Appendix 2(2)(i)	An undertaking under oath or affirmation by the EAP in relation to – i. The correctness of the information provided in the report; ii. The inclusion of comments and inputs from stakeholders and interested and affected parties; and iii. Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	**Section 12**
Appendix 2(2)(j):	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	**Section 12**
Appendix 2(2)(k):	Where applicable, any specific information required by the competent authority; and	No additional requirements have been received from the competent authority to date.
Appendix 2(2)(l):	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	No additional required matters were identified in terms of these sections of the Act.

2.2 ASSUMPTIONS AND LIMITATIONS

The following assumptions have been made in the undertaking of the scoping process:

- The application is limited to the proposed Glencore Lydenburg Smelter site in Lydenburg, Mpumalanga Province;
- The information provided by the applicant is accurate, adequate, unbiased, and no information that could change the outcome of the scoping process has been withheld;
- The information presented in this report was the most accurate and relevant at the time of compilation of the report;
- The preliminary site sensitivity verification and desktop assessments are sufficient for the scoping phase and the information that will be obtained from the specialist studies for this project during the EIA Phase will be accurate, objective and sufficient for the level of assessment required;
- Detailed assessment of the positive and negative environmental impacts of the proposed PV facility will be undertaken during the Environmental Impact Assessment phase;
- In accordance with the Protection of Personal Information Act (Act 4 of 2013), personal information (emails, contact numbers, address) are blanked out and/or excluded during the Public Participation and only provided to the competent authority officials; and
- Personal information of I&APs made available to the competent authority shall only be used by the authorities to confirm or obtain information regarding this specific project.

2.3 PURPOSE OF THE REPORT

The purpose of the scoping phase is to gather information on the proposed site and establish an understanding of the study area and the receiving environment. This phase will also determine how the proposed activities will potentially impact on the environment. The Assessment of alternatives e.g., activity, location, design, etc. will be considered in this report. The report will further identify any Interested and Affected Parties in the study area, engage with such parties and relevant authorities and identify environmental issues and potential impacts. This Scoping report is intended to guide the EIA process and the required specialist studies by:

- Providing an overview of the legal requirements with regards to the proposed PV facility;
- Provide a project description of the proposed PV facility as well as the anticipated environmental and social impacts that will be further investigated in the EIA phase;
- Setting the scope for the EIA process as well as the Terms of Reference (ToR) for the proposed specialist studies; and
- Outlining the approach and methodologies to be used in the Scoping and EIA phase including the impact assessment methodology.

2.4 THE SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT REQUIREMENTS

The list of activities applied for in terms of the NEMA EIA Regulations 2014 as amended are discussed in **Section 3.3**. These listed activities triggered by the proposed development of PV facility must follow the required Environmental Impact Assessment process as required by the NEMA EIA Regulations 2014, as amended, as set out in Government Notice Regulations 982 in Government Gazette No. 40772 of 7 April 2017. Based on these Regulations, a Scoping and EIA process must be followed. The Application Form will be submitted to the competent authority, the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA). The MDARDLEA is the relevant Competent Authority as per the 2014 NEMA EIA Regulations application procedures as the applicant is a private company and the proposed development of a PV facility in Lydenburg (Mpumalanga Province) is in line with the identified activities which the Member of the Executive

Council of the National Department of Forestry, Fisheries and the Environment (DFFE) has delegated to provincial departments.

2.5 THE SCOPING PHASE

The Scoping and EIA process must be undertaken in accordance with the 2014 EIA Regulations No. 982, as amended. The main objectives of the current Scoping Phase, in terms of the regulatory requirements stipulated in *Appendix 2* of the 2014 EIA Regulations, are to:

a) identify the relevant policies and legislation relevant to the activity;

b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;

d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;

e) identify the key issues to be addressed in the assessment phase;

f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Once the Draft scoping process is complete, a Final Scoping Report must be prepared detailing the scope of the EIA required for the proposed activities. This Scoping Report has been compiled in accordance with the requirements set out in Appendix 2 of the 2014 EIA Regulations, as amended, which outlines the contents of a Scoping Report and provides the requirements necessary for undertaking the Public Participation Process. A final scoping report will be prepared and submitted to the competent authority (MDARDLEA) for review and decision making. The competent authority will communicate the decision within 45-days of submission of the final scoping report. The decision can either be an acceptance or rejection of the scoping report. The process can only proceed into the EIA Phase upon the receipt of approval of the scoping report. It must be noted that the approval may be issued with recommendations and/or requirements for the EIA Phase.

2.6 DETAILS OF THE EAP

EIMS has been appointed by Glencore (Pty) Ltd (the applicant) as the Independent EAP to assist in preparing and submitting the EA application, Scoping and EIA Reports, and undertaking a Public Participation Process (PPP) in support of the proposed PV Facility. The contact details of the EIMS consultant who compiled this Scoping Report are as follows:

- Name of the consultant: Mr. Vukosi Mabunda
- Tel No.: 011 789 7170
- Fax No.: 086 571 9047
- E-mail address: lydenburgpv@eims.co.za

2.7 EXPERTISE OF THE EAP

EIMS was appointed by Glencore (Pty) Ltd to assist in preparing and submitting the Environmental Authorisation application form, the Scoping and Environmental Impact Assessment Reports and to conduct the required public participation process in support of the proposed Lydenburg Solar PV facility. EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS is an independent specialised environmental consulting firm offering the full spectrum of environmental management services across all sectors within the African continent. EIMS has successfully completed many hundreds of assignments over the years with an excess of 28 years' experience in conducting EIA's for both the government and private sector. Please refer to the EIMS website (www.eims.co.za) for examples of EIA documentation currently available.

In terms of Regulation 13 of the NEMA EIA Regulations (GNR 982) 2014 as amended, an independent EAP, must be appointed by the applicant to manage the application for an Environmental Authorisation (EA). EIMS and the compiler of this report are compliant with the definition of an EAP as defined in Regulations 1 and 13 of the NEMA EIA Regulations, as well as Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

- Objective and independent;
- Has expertise in conducting EIA's;
- Comply with the NEMA, the environmental regulations and all other applicable legislation;
- Considers all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

The contact details of the EIMS consultant (EAP) who compiled this Report are presented in **Table 2.**

Table 2: Details of the Environmental Assessment Practitioner

EAP:	**Mr. Vukosi Mabunda**
Tel No:	+27 11 789 7170
Fax No:	+27 86 571 9047
E-mail:	vukosi@eims.co.za
Professional Registrations:	• Registered Environmental Assessment Practitioner with Environmental Assessment Practitioner Association of South Africa – EAPASA (Reg. No: 134178) • Professional Natural Scientist with the South African Council for Natural Scientific Professions – SACNASP (Reg. No: 2019/867).

This Scoping Report was prepared by Vukosi Mabunda, a Registered EAP employed by EIMS. His CV is included as **Appendix B** of this report. Mr Vukosi Mabunda is currently an Environmental Assessment Practitioner and a Geographic Information Systems (GIS) Specialist with 6 years' working experience. Vukosi is a Registered Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA). He is one of the few dual registered professionals with SACNASP as a Professional Geospatial Scientist and Professional Environmental Scientist. Vukosi has dual professional background in Geographic and Environmental Sciences with a Master of Science Degree in Geography obtained in 2021 from the University of Johannesburg. In addition to his experience in Environmental Compliance Monitoring and applications for Water Use License Applications, Vukosi has successfully completed numerous environmental impacts assessments for both linear and footprint developments as indicated in his CV (**Appendix B**).

2.8 SPECIALIST CONSULTANTS

One of the objectives of a scoping report is to identify the required specialist assessment to be undertaken during the EIA Phase. Based on a review of the National Web-Based Environmental Screening Tool Report, EAPs

Site Sensitivity Verification and review of available information, the following specialist assessments have been pre-identified as necessary assessments required during the EIA phase:

- Agricultural Impact Assessment (compliance statement);
- Terrestrial Biodiversity Impact Assessment;
- Aquatic Biodiversity and Wetland Impact Assessment; and
- Heritage Impact Assessment including a Palaeontological Impact Assessment.

Preliminary impacts were assessed according to the EIMS pre-defined impact significance rating methodology (**Section 9**).

2.9 DESCRIPTION OF THE PROPERTY

Table 3 provides a description of the property details and size of the proposed PV facility footprint as well as the distance to the nearest towns. The proposed project will be located within the mine area. See **Figure 1** for the locality of the proposed PV facility.

Table 3: Locality details

Property	The proposed project is located on: Portion 143 of Farm 30 Potloodspruit; Portion 114 of Farm 31 Townlands of Lydenburg; Portion 457 of Farm 31 Townlands of Lydenburg; Portion 471 of Farm 31 Townlands of Lydenburg; Lydenburg Smelter Portion 1 of Erf 6099; Lydenburg Smelter Erf 2540; and Lydenburg Smelter Erf 2541.
Property ownership	All properties are owned by the applicant (Glencore Pty Ltd)
21-digit Surveyor General Code	T0JT00000000003100099, T0JT00000000003100080, T0JT00000000003100103, T0JT00000000003100114, T0JT00000000003100143, T0JT00000000003100457, and T0JT00000000003100471
Application Area (Ha)	The directly affected properties comprise an area of 3 750 000m^2 (375ha) for Site. The exact footprint of the PV facility infrastructure will be confirmed in the EIA phase.
Magisterial District	Thaba Chweu Local Municipality (Ward 12 and 13), Ehlanzeni District Municipality, Mpumalanga Province.
Distance and direction from nearest towns	The site is located approximately 2km north of Lydenburg town central area. The Southern Section Center Point is 25° 4'26.76"S; 30°28'0.83"E and the Northern Section Center Point 25° 3'20.54"S; 30°28'17.19"E.
Surrounding land uses	The study area is separated into two portions by the CMI Smelter, namely, the southern section and the northern section with the CMI Smelter in the center (see **Figure 1**). The area surrounding the study area is largely open veld to the east and west, industries and residential areas to the south, homesteads, and small lodging establishment to the north. See **Figure 2** for a map of the landcover in and around the proposed development sites.

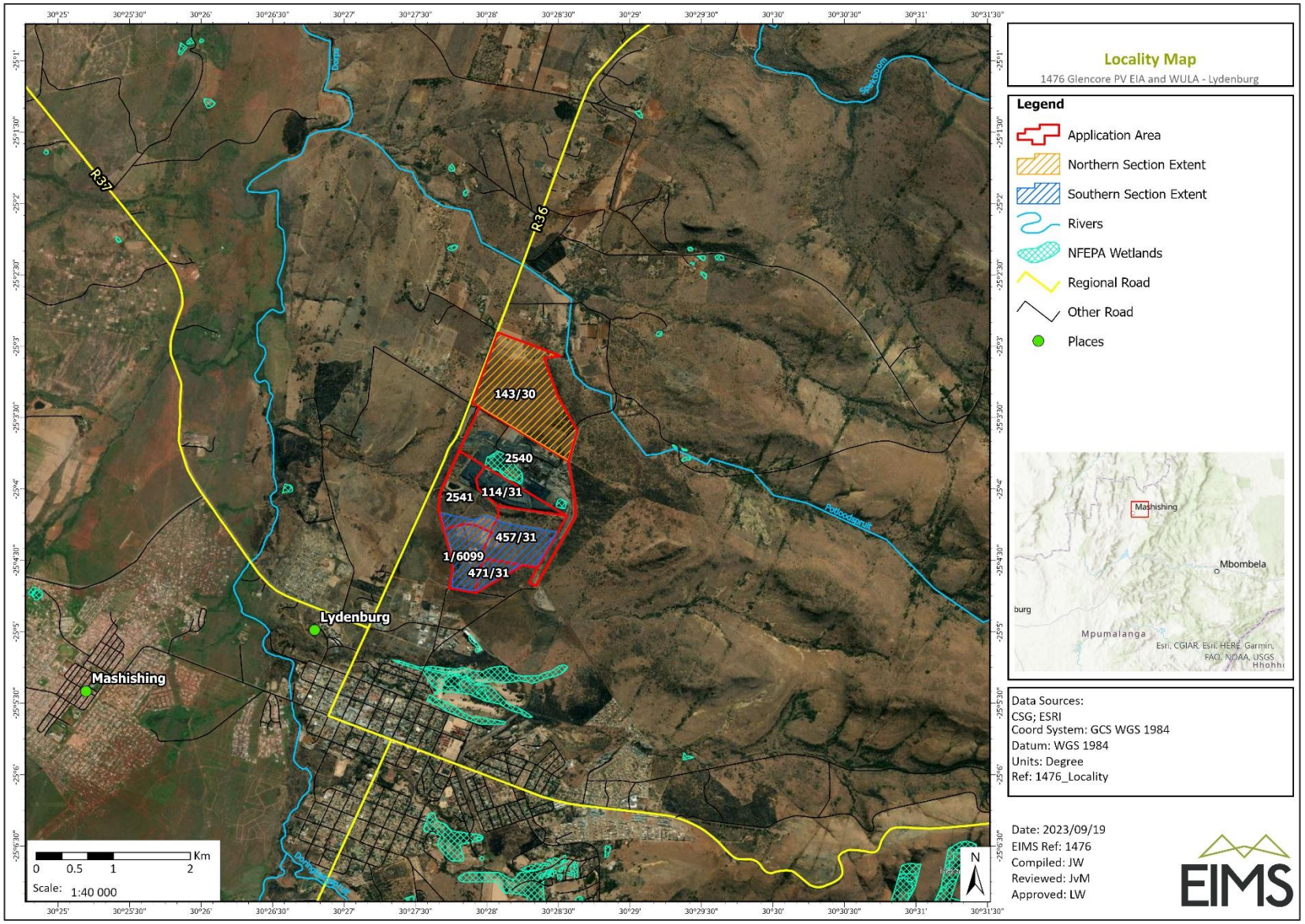

Figure 1: Aerial imagery indicating the proposed PV facility location

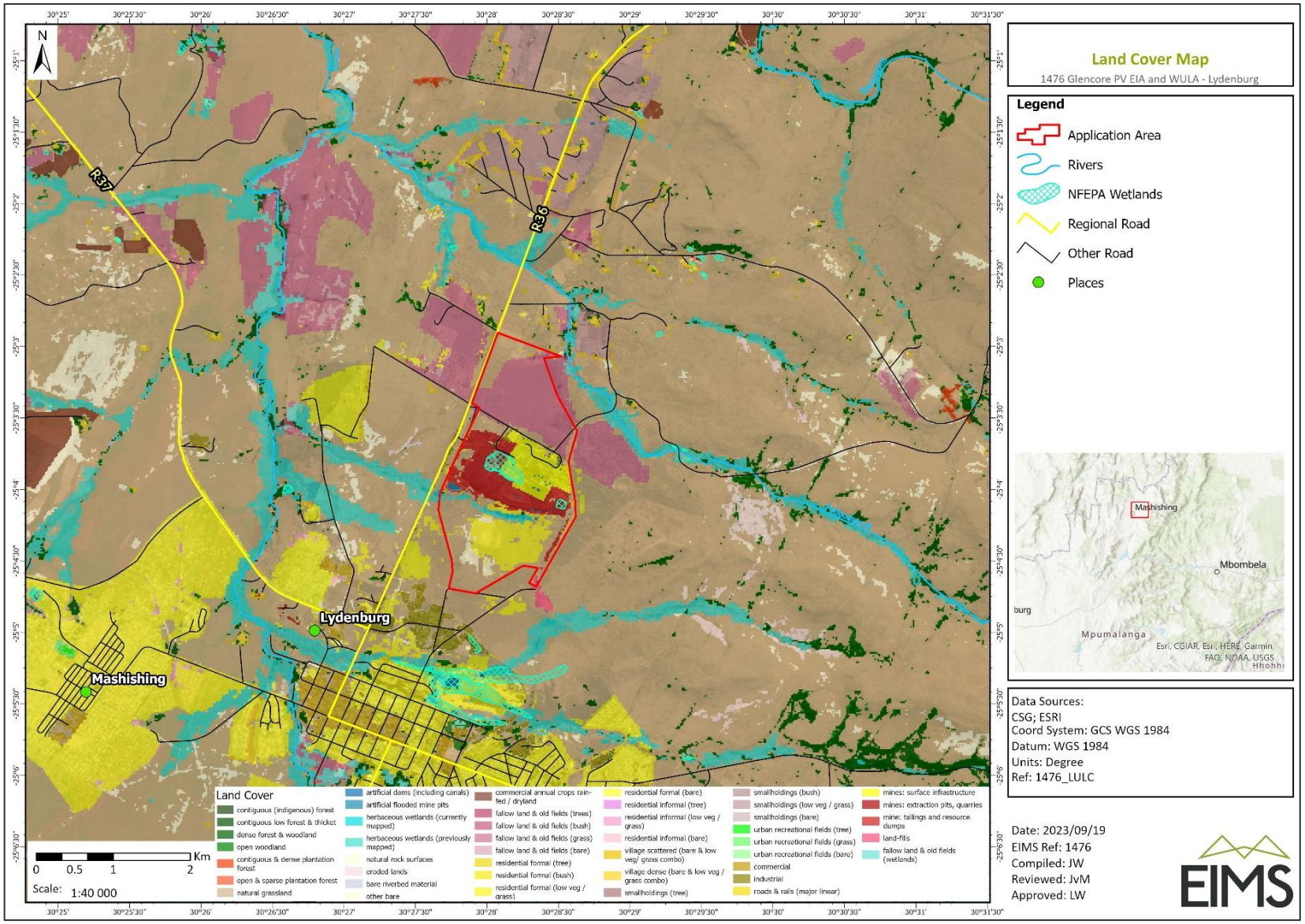

Figure 2: Land cover in and around the proposed PV sites (based on 2020 DFFE EGIS landcover data)

3 DESCRIPTION AND SCOPE OF THE PROPOSED PROJECT

The section below provides a detailed description for the proposed project. Most of the key information presented in this chapter was obtained from the applicant. The aim of the project description is to describe the proposed activities planned to take place at the PV facility project area. Furthermore, the project description is designed to facilitate the understanding of the proposed project related activities which are anticipated to lead to the preliminary impacts identified and assessed in this Scoping Report, and for which management measures have been, or will be designed.

3.1 PROJECT DESCRIPTION

The applicant proposes the development of a Solar Photovoltaic (PV) Energy Generation Facility at the Lydenburg CMI Smelter. The generation capacity will be up to 300MW. The electricity generated from the facility will be used at the Lydenburg smelter or will be wheeled to other Glencore operations. The proposed PV facility is located in Thaba Chweu Local Municipality (Ward 12 and 13), Ehlanzeni District Municipality, Mpumalanga Province. The proposed facility will include the following infrastructure:

- PV Panels;
- Power line connection (132kV);
- Access roads;
- On-site substation / switching station; and
- Possibly an on-site energy storage facility.

The project may also require extension of the Eskom / main intake substation and the main substation will require additional bays – which in turn necessitate the yard to be extended. Further detail as to the exact infrastructure proposed will be described in the EIA report once this information becomes available. At the EIA stage more detailed infrastructure layouts should be available and potential alternative layout options may be assessed.

A PV plant is designed to produce bulk electrical power from solar radiation. The solar power plant uses solar energy to produce electrical power. Therefore, it is a conventional power plant. Solar energy can be used directly to produce electrical energy using solar PV panels or alternatively using concentrated solar energy. When using concentrated solar energy, the radiation energy of solar is first converted into heat (thermal energy) and this heat is used to drive a conventional generator. This method is difficult and not efficient to produce electrical power on a large scale. Hence, to produce electrical power on a large scale, solar PV panels are used, similar to the design of the proposed PV Facility. The major components of the solar photovoltaic system are listed and discussed in **Table 4**.

Table 4: Major components of the solar photovoltaic system

Component	Description
Photovoltaic (PV) panel	A PV system consists of PV panels (**Figure 3**) that encase the solar cells. PV panels or Photovoltaic panel is a most important component of a solar power plant. It is made up of small solar cells. This is a device that is used to convert solar photon energy into electrical energy. Generally, silicon is used as a semiconductor material in solar cells. The typical rating of silicon solar cells is 0.5 V and 6 Amp and it is equivalent to 3 W power. The number of cells is connected in series or parallel and makes a solar module.
Inverter	The output of the solar panel is in the form of Direct Current (DC). The most of load connected to the power system network is in the form of Alternating Current (AC). Therefore, an inverter is used to convert DC output power into AC power in solar power plants

Component	Description
Energy storage devices	Various types of energy storage devices are available i.e. Mechanical, electromagnetic, electrochemical and thermal. These systems are used to store energy generated by the solar power plants to be used at a later stage. The storage components need to meet the demand and variation of the load. This component is used especially when the sunshine is not available. These devices are managed with an energy management system to enable maximum effective utilisation of the available energy.
System balancing component	It is a set of components used to control, protect and distribute power in the system. These devices ensure that the system working in proper condition and utilize energy in the proper direction. And it ensures maximum output and security of other components of a solar power plant.

Figure 3: Representative example of a stationary photovoltaic array (MIT, 2020)

3.2 PHOTO VOLTAIC PRINCIPLE

Solar cells (**Figure 3**) are solid-state semiconductor devices that convert light into direct-current electricity. The top layer of the panels is made from a mixture of silicon and phosphorous mixture, which gives it a negative charge. The inner layer, which constitutes the majority of the panel, is a mix of silicon and boron, giving it a positive charge. Where these negative and positively charged layers meet, an electric field (called a junction) is created. A top protective and anti-reflective layer of glass is applied to the surface of the PV panels, to protect the sensitive PV layers below and to prevent photons from reflecting off the panel resulting in lost energy. As the sun's light (photons) hits the solar cell, they are absorbed into the junction, which "pushes" electrons in the silicon out of the way. When sufficient photons are absorbed, the electrons are pushed past the junction and flow freely to an external circuit (see **Figure 4**).

The panels will be mounted on metal frames with a height of approximately 3-5 m above the ground, supported by rammed, concrete or foundations. The facility will either be a fixed PV facility where the solar panels are stationary; or a tracking PV facility where the solar panels rotate to track the sun's movement.

In photovoltaic technology the power conversion source is via photovoltaic modules that convert light directly to electricity. This differs from the other large-scale solar generation technology, concentrated solar power, which uses heat to drive a variety of conventional generator systems. Solar panels produce DC electricity, so solar parks need conversion equipment to convert this to AC, which is the form transmitted by the electricity grid. This conversion is done by inverters. To maximise their efficiency, solar power plants also incorporate maximum power point trackers, either within the inverters or as separate units. These devices keep each solar array string close to its peak power point (refer to **Figure 4**).

A fundamental characteristic of a photovoltaic system is that power is produced only while sunlight is available. For systems in which the photovoltaics is the sole generation source, storage is typically needed since an exact match between available sunlight and the load is limited to a few types of systems. By far the most common type of storage is chemical storage, in the form of a battery. Batteries store and produce energy as needed. In PV systems, they capture surplus energy generated by PV systems to allow the storage of energy for use later in the day. The proposed PV facility may also include an energy storage component.

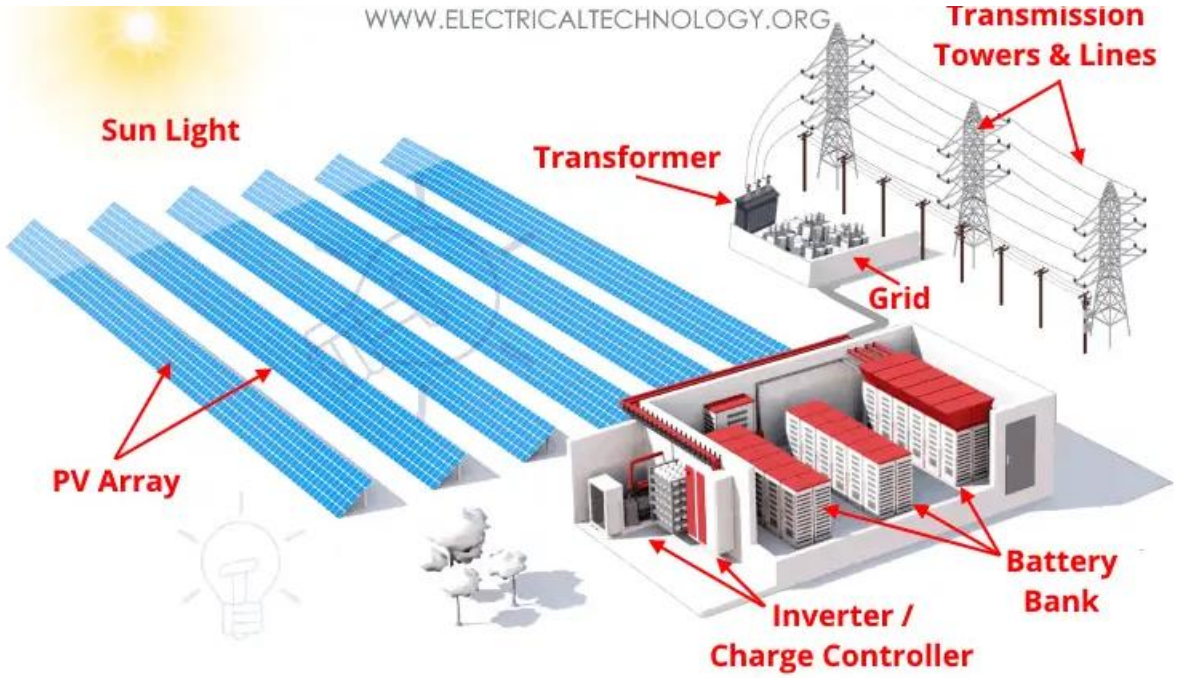

Figure 4: Example of Proposed PV Facility process (Electrical Technology, 2021)

It is important to note that this project is not planned to form part of the Renewable Energy Independent Power Producer Procurement (REIPPP) programme. The electricity generated by this facility will serve to provide electricity to Lydenburg CMI Smelter plant and will not service any other local users in the surrounding area. A minimal amount of water (up to 500kl/month) will be used for the washing of panels.

3.3 LISTED AND SPECIFIED ACTIVITIES TRIGGERED

In terms of Section 24(2) of NEMA, the Minister and/or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in 2014 and amended in 2021 in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 and consist of the following:

- *Regulation 982* provide details on the processes and procedures to be followed when undertaking an Environmental Authorisation process (also referred to as the EIA Regulations);
- *Listing Notice 1* (Regulation 983) defines activities which will trigger the need for a Basic Assessment process;

- *Listing Notice 2* (Regulation 984) defines activities which trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then an EIA process will be required; and
- *Listing Notice 3* (Regulations 985) defines certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas.

The above regulations were assessed to determine whether the proposed project will trigger any of the above listed activities, and if so, which Environmental Authorisation Process would be required. The triggered listed activities presented in **Table 5** will require authorisation in terms of GNR 984 Listing Notice 2 of the NEMA EIA Regulations 2014 as amended. A Scoping and EIA process is required in line with all the requirements of the NEMA EIA Regulations, 2014, as amended.

Table 5: NEMA Listed Activities Relevant to Project

Listing Notice	Activity Description	Applicability
GN.R. 983, Activity 11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	The study area is located outside urban areas or industrial complexes and entails the development of an 132kV powerline associated with PV facility (extension of Eskom Substation).
GN.R. 984, Activity 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	The proposed project involves the development of a PV facility with a capacity of up to 300MW to provide power for the mining operations.
GN.R. 984, Activity 4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	The infrastructure associated with the proposed development also entails the establishment of an energy storage facility which will likely contain dangerous goods and may exceed 500 cubic metres threshold stored in containers.
GN.R. 984, Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed Solar PV facility will require clearing of indigenous vegetation. The proposed study area is 375ha. Although the proposed development will not cover the entire site extent, it is likely that 20ha or more of vegetation clearance will be required.

Listing Notice	Activity Description	Applicability
GN.R. 985, Activity 4	The development of a road wider than 4 meters with a reserve less than 13.5 meters. f. Mpumalanga i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas, where such areas comprise indigenous vegetation.	There are proposed internal service and/or maintenance roads wider than 4m whereas the proposed development is located within an ecological support area protected area buffer, a National Protected Area Expansion Strategy (NPAES) and within 5km from the Lydenburg Nature Reserve.
GN.R. 985, Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. f. Mpumalanga i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	The study area will require clearance of 300m^2 or more of indigenous vegetation within an ecological support area protected area buffer and within a National Protected Area Expansion Strategy (NPAES).
GN.R. 985, Activity 14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; f. Mpumalanga i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies;	PV facility construction may occur within 32m of a watercourse and is located within an ecological support area protected area buffer, a National Protected Area Expansion Strategy (NPAES) and within 5km from the Lydenburg Nature Reserve.

Listing Notice	Activity Description	Applicability
	(bb) National Protected Area Expansion Strategy Focus areas; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation.	

4 NEED AND DESIRABILITY OF THE PROPOSED PROJECT

The needs and desirability analysis component of the "Guideline on need and desirability in terms of the EIA Regulations (Notice 819 of 2014)" includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development's ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.). The needs and desirability analysis for the proposed PV facility are presented in this section.

4.1 PHOTOVOLTAIC FACILITY PROJECT BENEFITS

The proposed PV facility will allow for favourable economic impacts on the local economy. The construction phase will create approximately 200 (20 skilled and 180 unskilled) new employment opportunities (excluding indirect opportunities). Around 20 unskilled opportunities will be created in the operational phase with 10 skilled employees to be recruited.

The main aim of the proposed PV facility is to enable the applicant to provide electricity for their own use at the smelter as well as allowing them to reduce their relative carbon footprint. Based on the analysis provided, it can be concluded that the proposed PV facility is in accordance with national energy planning policy with respect to renewable energy which has links to climate change, environmental impact and energy security/flexibility considerations. Moreover, the concept of a solar energy project is broadly supported in local economic planning documents. Considered as a whole, the IDP and SDF recognise the importance of integrated and diversified development. The concept of a solar energy project is thus broadly supported.

Current energy supply in South Africa is primarily coal-based and, although these resources will last for more than a century if used at current rates, large power plants will need to be replaced over the next 30 years. Coal and other fossil fuels, including oil, produce Carbon Dioxide when burned to produce energy. It is now widely accepted that climate change, partially caused by human-generated Carbon Dioxide, is to blame for the higher-than-usual incidence of extremely damaging weather experiences (e.g., storms, droughts, melting polar icecaps). Local air pollution is strongly related to energy supply options, with coal and oil products being major contributors to urban and rural air pollution. One of the primary reasons for promoting renewable energy developments is the desire to make South Africa compliant with international treaties regarding climate-change effects. Renewable energy options are a sustainable energy supply option that can significantly reduce reliance on fossil fuels. Other advantages include employment creation, proximity to point-of-use, minimal demand for water and less reliance on concentrated sources of energy. Greater use of renewable energy would also reduce South Africa's economic vulnerability to the variable costs of imported fuels. International and local communities are increasingly trying to find ways to shift economies towards greater reliance on renewable energy. Greater uptake of renewable energy would furthermore reduce the global risk of climate change, one of the factors taken into account in designing the conservation network in South Africa.

4.2 NEED AND DESIRABILITY ANALYSIS

The needs and desirability analysis component of the "*Guideline on need and desirability in terms of the Environmental Impact EIA Regulations (Notice 819 of 2014*)" includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage sites, opportunity costs, etc.). **Table 6** below presents the needs and desirability analysis undertaken for the proposed project.

Table 6: Needs and desirability analysis for the proposed PV Facility

Ref No.	Question	Answer
1	**Securing ecological sustainable development and use of natural resources**	
1.1	How were the ecological integrity considerations taken into account in terms of: Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Systems, Conservation Targets, Ecological drivers of the ecosystem, Environmental Management Framework, Spatial Development Framework (SDF) and global and international responsibilities.	Based on desktop information including the National Web-Based Environmental Screening Tool Report, the study area was assessed to be located within 32m of wetland, an Ecological Support Area (ESA) protected area buffer, a National Protected Area Expansion Strategy (NPAES) and within 5km from the Lydenburg Nature Reserve. After further desktop analysis of the proposed project area, as well as a site visit, a terrestrial biodiversity assessment (flora, fauna and avifaunal), wetlands and aquatics assessments were considered necessary and should be undertaken during the EIA Phase. These studies will assist in identifying any Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Areas, Conservation Targets and Ecological drivers of the ecosystem. Where sensitive species or ecosystem drivers were identified, relevant mitigation measures were put forward to prevent or minimise the impacts. The findings and impact assessment will be discussed during the EIA Phase. The proposed development aligns with the Thaba Chweu Local Municipality (TCLM) Spatial Development Framework (SDF) and Integrated Development Plan (IDP) which both aim to build growth within the municipality through renewable infrastructure and projects.
1.2	How will this project disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to baseline ecological information in **Section 8**, and the impact assessment and mitigation measures in **Section 9** of this Scoping Report. It is not anticipated that there will be areas of ecological importance that will be identified by the specialists. However, should the ecologists identify such areas of species of conservation concern, then best environmental practices will be recommended (mitigation hierarchy). As stipulated in the mitigation hierarchy, the EAP / Ecologist will recommend to first avoid adverse impacts, then minimize impacts that cannot be avoided, and lastly offset, or compensate for, unavoidable impacts.
1.3	How will this development pollute and / or degrade the biophysical environment? What measures were explored to either avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to the alternatives considered for this project in **Section 6**, the baseline ecological information in **Section 8**, and the impact assessment and mitigation measures in **Section 9** of this Scoping Report. The proposed development site has been largely disturbed by the surrounding mining activities from the smelter plant. The main impact on the biophysical environment will likely be clearance of vegetation which may be habitats for certain species. Specialist studies will be undertaken to identify such impacts and provide mitigation measures. The best environmental practices will also be recommended (mitigation hierarchy). As stipulated in the mitigation hierarchy, the EAP / Ecologist will recommend to first avoid adverse impacts, then minimize impacts that cannot be avoided, and lastly offset, or compensate for, unavoidable impacts.

Ref No.	Question	Answer
1.4	What waste will be generated by this development? What measures were explored to avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and / or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	No significant amount of waste will be generated from the construction and operation of the PV facility. This development will possibly generate various general and hazardous waste, the majority of which will be generated during the construction phase. The general waste will be stored in designated areas and through the process of recovery and recycling, the volume of general waste being disposed to landfill will be minimised. The hazardous portion of the waste stream will also be adequately stored prior to disposal at a suitably licenced hazardous waste disposal facility. Salvageable materials will be delivered to the existing salvage yard and existing municipal waste management facilities will be used for disposal.
1.5	How will this project disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	According to the DFFE Screening Tool, the study area is located within a very high archaeological and cultural heritage theme sensitivity. Based on the PalaeoMap from SAHRIS, the Palaeontological Sensitivity of the proposed area of the project footprint occurs in an area with high palaeo-sensitivity. Although no deep drilling or excavations will be required for construction of the PV facility, due to the extent of the development footprint and the very high archaeological and cultural heritage as well as the very high palaeo-sensitivity, Heritage and Palaeontological Impact Assessment studies are considered necessary and should be undertaken during the EIA Phase. Preliminary impacts were assessed according to the EIMS pre-defined impact significance rating methodology (**Section 9**). Detailed specialist studies will be undertaken in the EIA phase. The conclusions of these studies, and the identified preliminary impacts and associated mitigation measures will be further assessed in the EIA phase and the results thereof included in the EIA Report and accompanying EMPr. Any potential benefits and motivation for the proposed project is presented in this section.
1.6	How will this project use and / or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	The proposed PV facility is a renewable energy resource-based project. The proposed development aligns with the Thaba Chweu Local Municipality SDF and IDP which both aim to build growth within the municipality through renewable infrastructure and projects. It is noted that due to the nature of this project, no non-renewable resources will be depleted, apart from a small amount of water to be used for the cleaning of the panels.
1.7	How will this project use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impacts on the	The project area has been transformed/disturbed from its original state by the surrounding mining land-use and the subsequent disturbance since. The project area should have an overall low environmental sensitivity however this will be confirmed in the EIA phase once detailed specialist investigations have been conducted.

Ref No.	Question	Answer
	ecosystem jeopardise the integrity of the resource and / or system considering carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	One of the main benefits of the proposed PV facility is that the plant will generate energy that produces no greenhouse gas emissions from fossil fuels and reduces some types of air pollution, thus positively affecting the surrounding environment.
1.7.1	Does the proposed project exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e., de-materialised growth)?	The PV facility will reduce dependency on resources as the electricity generated will be used at the mine. This will lower the dependency on the Eskom grid for the mine.
1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used?	PV panels are used to replace other sources of electricity that usually have a much greater environmental impact. The main component of most PV modules is silicon. This isn't intrinsically harmful, but the manufacturing process does involve toxic chemicals that need to be carefully controlled and regulated to prevent environmental damage. Solar PV panels have a roughly 30-year lifetime. A large stock of raw materials and other valuable components are projected as PV panel wastes on end of life. These wastes may be recycled or used for repurposing solar PV panels.
1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	PV panels are used to replace other sources of electricity that usually have a much greater environmental impact. The proposed PV facility will generate up to 300MW of electricity from renewable energy source immediately south and north of the smelter where the electricity is required. It will, therefore, reduce dependency on the Eskom grid and serve to provide the mine with the required electricity.
1.8	**How were a risk-averse and cautious approach applied in terms of ecological impacts**	
1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Refer to **Section 2.2**.
1.8.2	What is the level of risk associated with the limits of current knowledge?	The level of risk is low due to the location of the proposed project, within the vicinity of the mine.
1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	Sufficient information was gathered prior to the onset of this process to indicate that positive impacts will outweigh low risk for the proposed project. The proposed project will positively influence the local economy through job creation.

Ref No.	Question	Answer
1.9	**How will the ecological impacts resulting from this development impact on people's environmental right in terms following?**	
1.9.1	Negative impacts: e.g., access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr. In summary, due to the nature of the proposed project it should not negatively affect amenity, water quality, cause nuisance or have significant negative environmental impacts as per **Section 9** of this report, however this will be further quantified in the EIA phase once detailed specialist investigations have been completed.
1.9.2	Positive impacts: e.g., improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr. The main positive impacts will be to the local economy as a result of job creation as well as the generation of clean renewable energy.
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.)?	Refer to baseline ecological information in **Section 8**, and the impact assessment and mitigation measures in **Section 9** of this Scoping Report. These sections will be further expanded in the EIA Report and EMPr. The proposed project is expected to have a minimal negative effect on human wellbeing and livelihoods. No eco-system services or ecological services are expected to be significantly impacted on in the area surrounding the proposed facility based on the terrestrial biodiversity assessment conducted for the project.
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Refer to **Section 6** for details of the alternatives considered, as well as this section of the Scoping Report for the advantages and disadvantages of the proposed activity. This aspect will be further expanded on in the EIA Report.

Ref No.	Question	Answer
1.13	Describe the positive and negative cumulative ecological / biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2	**Promoting justifiable economic and social development**	
2.1	**What is the socio-economic context of the area, based on, amongst other considerations, the following?**	
2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks or policies applicable to the area.	The municipality has identified renewable energy generation (particularly solar technologies) as potential opportunities in the utilities sector for the LED in the 2022 - 2027 IDP. Therefore, solar development is supported in terms of the municipality's current local planning tools.
2.1.2	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	According to the latest Spatial Development Framework for the TCLM the safeguarding of existing resources and creating opportunities for renewable energy development have been identified as strategies to achieve high growth in the municipality.
2.1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	The preferred location for the facility is within the mine area and is surrounded by existing mine infrastructure. The proposed project aligns with the surrounding land uses as it falls within the mine area and the electricity generated will be used at the mine.
2.1.4	Municipal Economic Development Strategy ("LED Strategy").	The municipality has identified renewable energy generation (particularly solar technologies) as potential opportunities in the utilities sector for the LED in the 2022 - 2027 IDP. The proposed PV facility will create job opportunities for the local community as far as reasonably possible.
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	Job creation for local residents as far as reasonably possible. Most of the unskilled job opportunities will be during the construction phase of the project. Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	The proposed development aligns and compliments the LM KPI4: local economic to help create job opportunities for local contractors and SMMEs.

Ref No.	Question	Answer
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Refer to the public participation process undertaken to date in **Section 7** of this Scoping Report. Public participation and consultation will continue during the EIA phase as described in **Section 11**. Furthermore, refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. The impacts will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	The proposed facility will create some job opportunities. The facility will be required as long as mining continues as is therefore considered sustainable.
2.5	**In terms of location, describe how the placement of the proposed development will:**	
2.5.1	Result in the creation of residential and employment opportunities in close proximity to or integrated with each other.	The proposed project location is close to several towns and residential areas and will prioritise job opportunities for the local community as far as reasonably possible.
2.5.2	Reduce the need for transport of people and goods.	The close proximity of the preferred development location to residential areas will reduce the need for transportation of potential local employees. It is expected that transport of goods will mostly be kept locally.
2.5.3	Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	The proposed project will have no significant effect on public transport.
2.5.4	Compliment other uses in the area,	The PV facility is located within the mining area and is expected to compliment the mining land use as the power generated will be used at the mine.
2.5.5	Be in line with the planning for the area.	Refer to item 2.1.2 of this table (above).
2.5.6	For urban related development, make use of underutilised land available with the urban edge.	Not applicable. The proposed PV facility will be situated outside an urban area.

Ref No.	Question	Answer
2.5.7	Optimise the use of existing resources and infrastructure.	There are no foreseen existing infrastructure on the proposed site location which will be used for the PV facility. However, the proposed facility will use existing natural resources (solar energy).
2.5.8	Opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement).	Refer to **Section 3** of this Scoping Report.
2.5.9	Discourage "urban sprawl" and contribute to compaction / densification.	The size of the proposed development is small in scale and as such urban sprawl is not expected because of the development. The town of Lydenburg is located in close proximity to the site for the PV facility and employment from these surrounding communities is recommended where possible.
2.5.10	Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs.	Refer to items 2.5.7 to 2.5.9 of this table (above).
2.5.11	Encourage environmentally sustainable land development practices and processes.	Effort will be made towards being environmentally sustainable in the long term.
2.5.12	Consider special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.).	See item 1.7.3 of this table (above).
2.5.13	The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential).	The proposed project will allow for contribution to the local, regional and national Gross Domestic Product (GDPs), and also to the local communities through employment of workers and local contractors.
2.5.14	Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area.	See item 1.5 of this table (above).
2.5.15	In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The proposed project will contribute to other infrastructure projects in the area, specifically other infrastructure at the mine itself.
2.6	**How was a risk-averse and cautious approach applied in terms of socio-economic impacts**	

Ref No.	Question	Answer
2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Refer to **Section 2.2** of this report.
2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	The level of risk is low as the project is not expected to have far reaching negative impacts on socio-economic conditions should the recommended mitigation and management measures be implemented and adhered to.
2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	As the proposed project is a new development a cautious approach has been applied. An extensive public participation process was undertaken to ensure that the local community and relevant authorities were notified of the proposed project.
2.7	**How will the socio-economic impacts resulting from this development, impact on people's environmental right in terms following:**	
2.7.1	Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr. In summary, local employment will be prioritised.
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr. The proposed development should have a minimal impact on human-wellbeing and ecosystem services due to the location (to be confirmed in the EIA phase). Human livelihoods could however be positively impacted because of employment opportunities. No indirect ecological impacts are expected as a result of socioeconomic impacts, there will likely be some direct ecological impacts. These impacts could be lowered if the proposed mitigation measures are carried out.
2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr. Additionally, see item 2.8 of this table (above).
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.

Ref No.	Question	Answer
	distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	The preferred alternative is considered the best practicable environmental option as it is located within the mine area.
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	By conducting a Scoping and EIA process, with an adequate public participation process, the applicant ensures that equitable access to the environment has been considered. Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.13	**What measures were taken to:**	
2.13.1	Ensure the participation of all interested and affected parties.	Refer to the public participation process undertaken to date in **Section 7** of this Scoping Report. Public participation and consultation will continue during the EIA phase as described in **Section 11**. Advertisements as well as site notices were distributed in and around the project area in English, Setswana and Afrikaans to assist in understanding the project. The notices and advertisements included contact details for easy access to the public participation specialist if any additional information is required by anyone from the public. The public is encouraged to participate and provide input which will then be recorded and submitted with the relevant reports to the competent authority. The scoping report will be made available on the at a local public place and the EIMS website after completion, and all registered I&APs will be notified of the report availability.
2.13.2	Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	
2.13.3	Ensure participation by vulnerable and disadvantaged persons,	
2.13.4	Promote community wellbeing and empowerment through environmental education, the raising of	

Ref No.	Question	Answer
	environmental awareness, the sharing of knowledge and experience and other appropriate means,	
2.13.5	Ensure openness and transparency, and access to information in terms of the process,	
2.13.6	Ensure that the interests, needs and values of all interested and affected parties were considered, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	
2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein will be promoted?	
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Refer to the public participation process undertaken to date in **Section 7** of this Scoping Report. Public participation and consultation will continue during the EIA phase as described in **Section 11**. Furthermore, refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. The impacts will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.15	What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Workers at the facility will be educated on a regular basis through toolbox talks on the environmental and health risks that may occur within their work environment, and adequate measures will be taken to ensure that the appropriate personal protective equipment is issued to workers based on the areas that they work in as well as the requirements of their job.
2.16	**Describe how the development will impact on job creation in terms of, amongst other aspects:**	
2.16.1	The number of temporary versus permanent jobs that will be created.	The expected travel distance for labourers is expected to be approximately 2km. It is expected that approximately 30 people will be employed from the first year of operation at the facility.

Ref No.	Question	Answer
2.16.2	Whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area).	
2.16.3	The distance from where labourers will have to travel.	
2.16.4	The location of jobs opportunities versus the location of impacts.	
2.16.5	The opportunity costs in terms of job creation.	
2.17	**What measures were taken to ensure:**	
2.17.1	That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.	The Scoping and EIA process requires governmental departments to communicate regarding any application. In addition, all relevant Departments and key stakeholders have been notified about the project by the EAP and registered as Interested and Affected Parties who will continue to be notified and engaged with regarding the project throughout the EIA process.
2.17.2	That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures.	The Scoping and EIA process requires governmental departments to communicate regarding any application. In addition, all relevant Departments and key stakeholders have been notified about the project by the EAP and registered as Interested and Affected Parties who will continue to be notified and engaged with regarding the project throughout the EIA process.
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Refer to the public participation process undertaken to date in **Section 7** of this Scoping Report. Public participation and consultation will continue during the EIA phase as described in **Section 11**. Furthermore, refer to the identified impacts, their assessment and recommended mitigation measures in Section 9 of this Scoping Report. The impacts will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. The impacts will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing,	This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.

Ref No.	Question	Answer
	controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	
2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Refer to **Section 6** for details of alternatives considered in this Scoping Report. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to the identified impacts, their assessment and recommended mitigation measures in **Section 9** of this Scoping Report. The impacts will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.

5 POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the governing legislation identified which may relate to the proposed project. The primary legal requirement for this project stems from the need for an EA to be granted by the competent authority, which is MDARDLEA, in accordance with the requirements of the NEMA. In addition, there are numerous other pieces of legislation governed by many acts, regulations, standards, guidelines and treaties on an international, national, provincial and local level, which should be considered in order to assess the potential applicability of these for the proposed activity. The key legislation applicable to this project is discussed in the subsections below. The discussion in this chapter is by no means an exhaustive list of the legal obligations of the applicant in respect of environmental management for the proposed PV facility. More detail on the legislative framework is presented below.

5.1 APPLICABLE NATIONAL LEGISLATION

The legal framework within which the proposed PV facility operates is governed by many Acts, Regulations, Standards and Guidelines on an international, national, provincial and local level. Legislation applicable to the project includes (but is not limited to) those discussed below.

5.1.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996

The constitution of any country is the supreme law of that country. The Bill of Rights in chapter 2 section 24 of the Constitution of South Africa Act (Act No. 108 of 1996) makes provisions for environmental issues and declares that: *"Everyone has the right -*

a) to 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 State must therefore respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate. The application for Environmental Authorisation for the proposed PV facility will ensure that the environmental right enshrined in the Constitution contributes to the protection of the biophysical and social environment.

5.1.2 THE ENVIRONMENT CONSERVATION ACT, 1989

The Environment Conservation Act (Act 73 of 1989 – ECA) was, prior to the promulgation of the NEMA, the backbone of environmental legislation in South Africa. To date the majority of the ECA has been repealed by various other Acts, however Section 25 of the Act and the Noise Regulations (GN R. 154 of 1992) promulgated under this section are still in effect. These Regulations serve to control noise and general prohibitions relating to noise impact and nuisance. Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.

5.1.3 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA Regulations, the applicant is required to appoint an EAP to undertake the EIA process, as well as conduct the public participation process towards an application for EA. In South Africa, EIAs became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant EA. On 21 April 2006, the Minister of Environmental Affairs and Tourism (now DFFE) promulgated regulations in terms of Chapter 5 of the NEMA. These regulations, in terms of the NEMA, were amended in June 2010 and again in December 2014 as well as April 2017 and June 2021. The 2014 NEMA EIA Regulations (as amended) are applicable to this project.

The objective of the EIA Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the listed activities that have been identified to be triggered by the proposed development. The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

In accordance with the provisions of Sections 24(5) and Section 44 of the NEMA the Minister has published Regulations (GN R. 982) pertaining to the required process for conducting EIAs in order to apply for, and be considered for, the issuing of an EA. These EIA Regulations provide a detailed description of the EIA process to be followed when applying for EA for any listed activity.

An environmental Scoping and Impact Assessment process is reserved for activities which have the potential to result in significant impacts which are complex to assess. Scoping and Impact Assessment studies accordingly provide a mechanism for the comprehensive assessment of activities that are likely to have more significant environmental impacts. **Figure 5** below provides a graphic representation of all the components of a full EIA process. The listed activities the proposed project triggers and consequently requires authorisation prior to commencement are detailed in **Section 3.3** (**Table 5**).

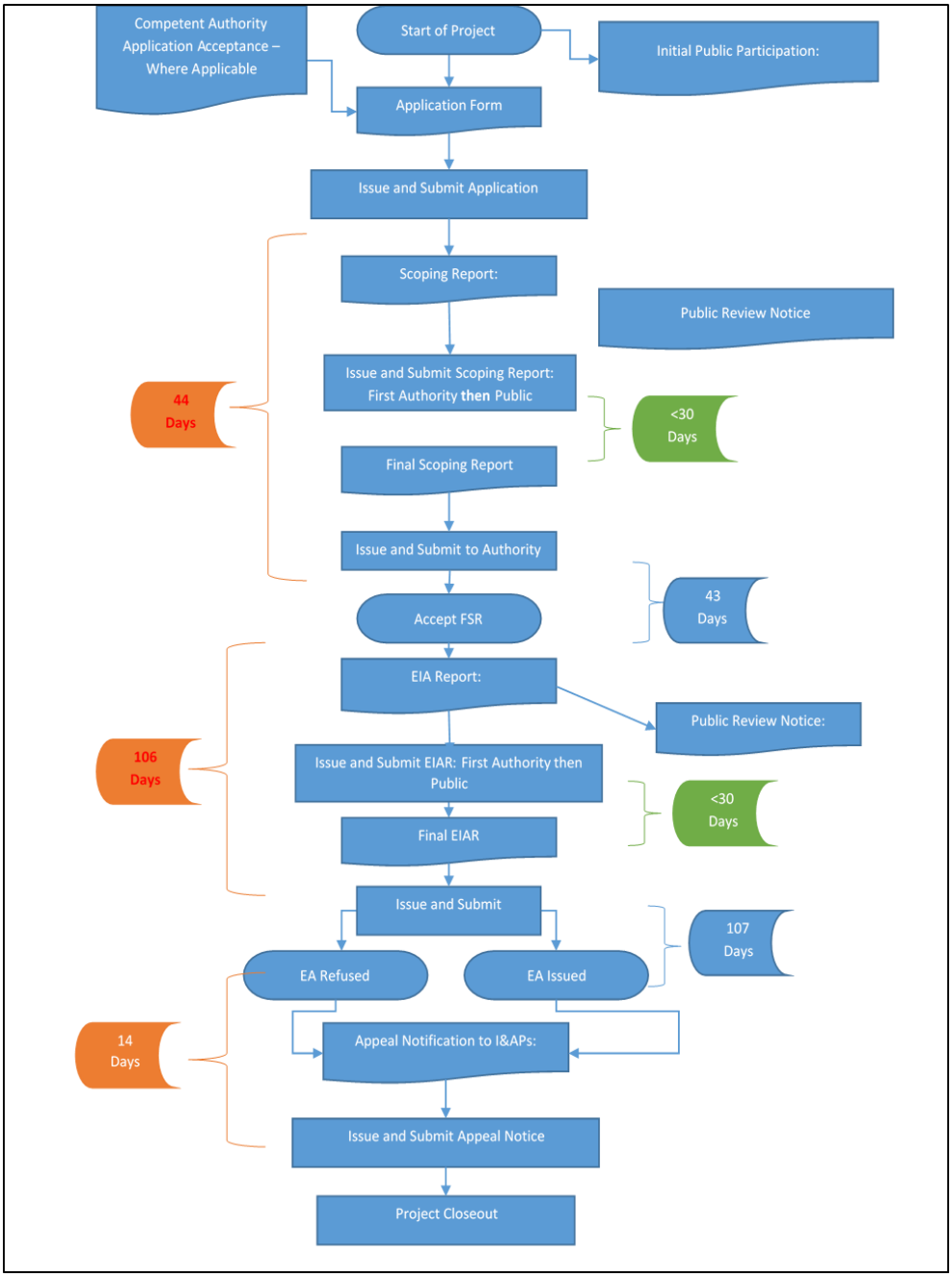

Figure 5: EIA process diagram

NEMA is the main Environmental Legislation in South Africa and other Specific Environmental Management Acts (SEMA's) support its objectives. Examples of SEMA's include the following:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);
- National Water Act, 1998 (Act No. 36 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004); and
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).

Some specific Environmental Management Legislation is discussed in **Sections 5.1.5 to 5.4.** The key principles of NEMA as outlined in Chapter 3 can be summarised as follows:

- sustainability must be pursued in all developments to ensure that biophysical and socio-economic aspects are protected; or
- there must be equal access to environmental resources, services and benefits for all citizens including the disadvantaged and the vulnerable. Adverse environmental impacts shall be distributed fairly among all citizens;
- environmental governance must include the participation of all interested and affected parties who must be catered for to allow their effective participation;
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably; and
- The polluter pays principle must be applied in all cases where any person has caused pollution or undertaken any action that led to the degradation of the environment.

5.1.4 NEMA ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 AS AMENDED

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities that require authorisation as these activities may negatively affect the environment. The Act requires that in such cases the impacts must be considered, investigated and assessed before their implementation, and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity. The NEMA EIA Regulations guide the processes required for the assessment of impacts of Listed Activities.

The requirement for the undertaking of Environmental Impact Assessments and Basic Assessments began in 1997 with the promulgation of the EIA Regulations under the Environment Conservation Act, 1989 (ECA) (Act No. 73 of 1989). These were followed by the 2006, 2010 and 2014 regulations. **Table 7** is a summary of the progression of the EIA regulations to date.

Table 7: Summary of the South African EIA regulations from inception to date

EIA Regulations	Government Gazette
EIA Regulations promulgated in terms of the ECA, Act No 73 of 1989	GNR 1182 & 1183: Government Gazette No 18261, 5 September 1997
Amendment of the ECA EIA Regulations	GNR 670 and GNR 672 of 10 May 2002, Government Gazette No 23401
2006 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 385, 386 and 387 Government Gazette No 28753, Pretoria, 21 April 2006
2010 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 543, 544, 545 and 546 Government Gazette No 33306, Pretoria, 18 June 2010
2014 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 982, 983, 984 and 985 Government Gazette No 38282, Pretoria, 04 December 2014
Current Amendment of the 2014 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 982, 983, 984 and 985 Government Gazette No 44701, Pretoria, 2021 as amended

The scoping and EIA process for the proposed NuVest chemical plant is undertaken in terms of the NEMA EIA Regulations, 2014, as amended.

5.1.5 THE NATIONAL WATER ACT, 1998

The National Water Act, 1998 (Act 36 of 1998 – NWA) makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The NWA also provides that the

responsible authority may require an assessment by the applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the NEMA EIA Regulations. A person may use water if the use is:

- Permissible as a continuation of an existing lawful water use (ELWU);
- Permissible in terms of a general authorisation (GA);
- Permissible under Schedule 1; or
- Authorised by a licence.

These water use processes are described in **Figure 6** below.

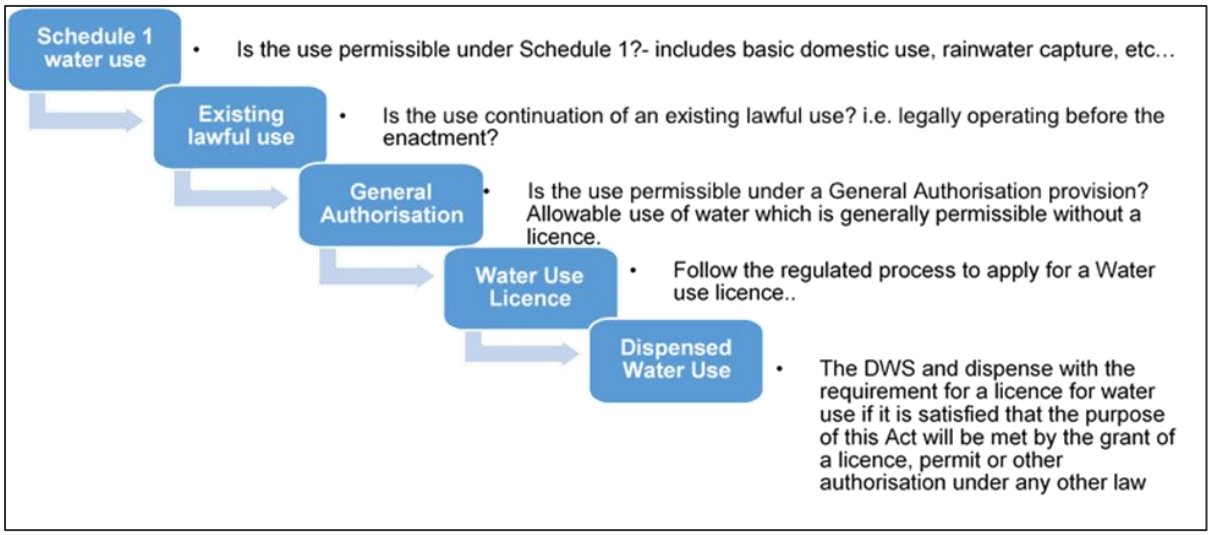

Figure 6: Authorisation processes for new water uses

The NWA defines 11 water uses. A water use may only be undertaken if authorised by the DWS. Water users are required to register certain water uses that took place on the date of registration, irrespective of whether the use was lawful or not. The water uses for which an authorisation or licence can be issued include:

a) Taking water from a water resource;

b) Storing water;

c) Impeding or diverting the flow of water in a watercourse;

d) Engaging in a stream flow reduction activity contemplated in section 36;

e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;

g) Disposing of waste in a manner which may detrimentally impact on a water resource;

h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

i) Altering the bed, banks, course or characteristics of a watercourse;

j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

k) Using water for recreational purposes.

The regulated area of a watercourse for section 21 activities of the Act water uses is similarly defined in terms of the Act as follows:

a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;

b) In the absence of a determined 1 in 100-year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or

c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

A review of the NWA Section 21 activities was undertaken to assess if the proposed development triggers any activity. Based on site preliminary assessment, the proposed development will trigger NWA Section 21(c) and (i) activities. Therefore, the proposed development requires a Water Use Authorisation, likely through a General Authorisation. The applicability and process to be followed will be confirmed with the competent authority for water resources (The Department of Water and Sanitation abbreviated as DWS) during the pre-application meeting. The process will only be initiated during the EIA Phase, after the wetland specialist has delineated the watercourse and/or wetland boundaries if any within the regulated areas from the proposed development site.

5.1.6 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008

The National Environmental Management: Waste Act, no 59 of 2008 (NEMWA) came into effect on the 1st of July 2009. The Waste Act places a general duty on a holder of waste to avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated; reduce, re-use, recycle and recover waste; where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner; manage the waste in such a manner that it does not endanger the health or the environment or cause a nuisance through noise, odour or visual impacts; prevent any employee or any person under his or her supervision from contravening the Act; and prevent the waste from being used for an unauthorised purpose. Section 16 of the NEMWA must also be considered which states the following:

1. A holder of waste must, within the holder's power, take all reasonable measures to-

a) "Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;

b) Reduce, re-use, recycle and recover waste;

c) Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;

d) Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;

e) Prevent any employee or any person under his or her supervision from contravening the Act; and

f) Prevent the waste from being used for unauthorised purposes."

These general principles of responsible waste management will be incorporated into the requirements in the EMPr to be implemented for this project. Waste can be defined as either hazardous or general in accordance with Schedule 3 of the NEMWA (2014) as amended. "Schedule 3: Defined Wastes" has been broken down into two categories – Category A being hazardous waste; and Category B being general waste.

In order to attempt to understand the implications of these waste groups, it is important to ensure that the definitions of all the relevant terminologies are defined:

- Hazardous waste: means "*any waste that contains organic or inorganic elements or compounds that may, owning to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles*."
- Residue deposits: means "*any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right*."

- Residue stockpile: means "*any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act*."
- General waste: means "*waste that does not pose an immediate hazard or threat to health or to the environment and includes – domestic waste; building and demolition waste; business waste; inert waste; or any waste classified as non-hazardous waste in terms of the regulations made under Section 69*."

Furthermore, the NEMWA provides for specific waste management measures to be implemented, as well as providing for the licensing and control of waste management activities. For this project based on the current proposed infrastructure, no Waste Management License is expected to be required. General waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard. The general principles of responsible waste management listed above will be incorporated into the requirements in the EMPr to be implemented for this project.

5.1.7 THE NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004

The National Environmental Management Biodiversity Act (Act No. 10 of 2004 – NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA as well as the protection of species and ecosystems that warrant national protection. Within the framework of this act, various regulations are promulgated which provide specific requirements and management measures relating to protecting threatened ecosystems, threatened or protected species as well as the control of alien and invasive species. A summary of these regulations is presented below.

5.1.7.1 NATIONAL LIST OF ECOSYSTEMS THAT ARE THREATENED AND NEED OF PROTECTION, 2011

The NEMBA provides for listing of threatened or protected ecosystems in one of the following categories:

- Critically Endangered (CR) ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
- Endangered (EN) ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
- Vulnerable (VU) ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and
- Protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.

5.1.7.2 THREATENED OR PROTECTED SPECIES REGULATIONS, 2007

The purpose of these regulations is to -

(a) further regulate the permit system set out in Chapter 7 of the Biodiversity Act insofar as that system applies to restricted activities involving specimens of listed threatened or protected species;

(b) provide for the registration of captive breeding operations, commercial exhibition facilities, game farms, nurseries, scientific institutions, sanctuaries and rehabilitation facilities and wildlife traders;

(c) provide for the regulation of the carrying out of a specific restricted activity, namely hunting;

(d) provide for the prohibition of specific restricted activities involving specific listed threatened or protected species;

(e) provide for the protection of wild populations of listed threatened species; and

(f) provide for the composition and operating procedure of the Scientific Authority.

5.1.7.3 ALIEN AND INVASIVE SPECIES LIST

This Act is applicable since it protects the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorised according to one of the following categories, and require control or removal:

- Category 1a Listed Invasive Species: Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combated or eradicated;
- Category 1b Listed Invasive Species: Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled;
- Category 2 Listed Invasive Species: Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be; and
- Category 3 Listed Invasive Species: Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

Based on desktop information including the National Web-Based Environmental Screening Tool Report, the study area was assessed to be located within an Ecological Support Area (ESA) protected area buffer, a National Protected Area Expansion Strategy (NPAES) and within 5km from the Lydenburg Nature Reserve. A Terrestrial Biodiversity Assessment (flora, fauna and avifaunal) was considered necessary and should be undertaken during the EIA Phase. The study will assist in identifying any Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Areas, Conservation Targets and Ecological drivers of the ecosystem as well as alien and invasive species. Where sensitive species or ecosystem drivers were identified, relevant mitigation measures were put forward to prevent or minimise the impacts. The findings and impact assessment will be discussed during the EIA Phase. It must be noted that permits for protected species under the NEMBA may also be required.

5.1.8 THE NATIONAL ENVIRONMENTAL MANAGEMENT AIR QUALITY ACT, 2004

The National Environmental Management: Air Quality Act (Act No. 39 of 2004 as amended – NEMAQA) is the main legislative tool for the management of air pollution and related activities. The Object of the Act is:

- To protect the environment by providing reasonable measures for –
    i. the protection and enhancement of the quality of air in the republic;
    ii. the prevention of air pollution and ecological degradation; and
    iii. securing ecologically sustainable development while promoting justifiable economic and social development; and
    iv. Generally, to give effect to Section 24(b) of the constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

The NEMAQA mandates the Minister of Environment to publish a list of activities which result in atmospheric emissions and consequently cause significant detrimental effects on the environment, human health and social welfare. All scheduled processes as previously stipulated under the Air Pollution Prevention Act (APPA) are included as listed activities with additional activities being added to the list. The updated Listed Activities and

Minimum National Emission Standards were published on the 22nd of November 2013 (Government Gazette No. 37054).

According to the NEMAQA, air quality management control and enforcement is in the hands of local government with District and Metropolitan Municipalities as the licensing authorities. Provincial government is primarily responsible for ambient monitoring and ensuring municipalities fulfil their legal obligations, with national government primarily as policy maker and co-ordinator. Each sphere of government must appoint an Air Quality Officer responsible for co-ordinating matters pertaining to air quality management. Given that air quality management under the old Act was the sole responsibility of national government, local authorities have in the past only been responsible for smoke and vehicle tailpipe emission control.

Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of the NEMAQA Published under GN 893 in GG 37054 of 22 November 2013 were assessed to determine if the proposed development triggers any of the identified activities. Based on the assessment, the proposed PV facility does not trigger any Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of the NEMAQA. However, any changes to the project description which may trigger such listed activities must be assessed thoroughly for the applicant to check applicability for an Atmospheric Emission Licence (AEL).

5.1.9 THE NATIONAL HERITAGE RESOURCES ACT, 1999

The National Heritage Resources Act (Act 25 of 1999 – NHRA) stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the NHRA states that, "*no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…*" The NHRA is utilised as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through the NEMA, the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) and the Development Facilitation Act (FDA) legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorisations are granted for a development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impact Processes required by the NEMA and MPRDA.

The NEMA 23(2)(b) states that an integrated environmental management plan should, "*…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*". A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be considered of in the EIA Regulations under the NEMA relates to the Specialist Report requirements (Appendix 6 of EIA Regulations 2014, as amended).

Section 38(1) of this Act states that: "...any person who intends to undertake a development categorised as...any development or other activity which will change the character of a site-

(i) exceeding 5 000 m^2 in extent; or
(ii) involving three or more existing erven or subdivisions thereof; or
(iii) involving three or more erven or divisions which have been consolidated within the past 5 years; or
(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(v) The rezoning of a site exceeding 10 000m^2 in extent; or
(vi) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development".

According to the national web-based environmental screening tool (DFFE Screening Tool Report), the proposed development is located within an area of *very high* relative archaeological and cultural heritage theme sensitivity. An assessment of the NHRA and preliminary project information revealed that the proposed development triggers Section 38(1) of the NHRA. Therefore, a Heritage Impact Assessment is required and will be undertaken in the EIA Phase. The South African Heritage Resources Agency (SAHRA), the Mpumalanga Provincial Heritage Resources Authority (MHRA) and Association of Southern African Professional Archaeologists (ASAPA) are I&APs in the project and will be provided with a copy of the report for review and comment.

5.1.10 THE NATIONAL DUST CONTROL REGULATIONS, 2013

Dustfall is assessed for nuisance impact and not for inhalation health impact. The National Dust Control Regulations (Department of Environmental Affairs, 2013) prescribes measures for the control of dust in residential and non-residential areas. Acceptable dustfall rates are measured (using American Standard Testing Methodology (ASTM) D1739:1970 or equivalent) at and beyond the boundary of the premises where dust originates. In addition to the dustfall limits, the National Dust Control Regulations prescribe monitoring procedures and reporting requirements. Dust will be generated during construction and will be managed in accordance with these Regulations.

5.1.11 THE NATIONAL GREEN HOUSE GASES EMISSION REPORTING REGULATIONS, 2017

Dustfall On 14 March 2014, the following six Green House Gases (GHGs) were declared as priority air pollutants in South Africa:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF_6)

National GHG Emission Reporting Regulations (Government Gazette No. 40762 of 3 April 2017), as amended (General Notice 994 in Government Notice 43712 of 11 September 2020), were published by the DFFE. A person identified as a Category A data provider in terms Annexure 1 of these regulations, must register their facilities using the online South African Greenhouse Gas Reporting System (SAGERS) (https://ghgreporting-public.environment.gov.za/GHGlanding/). Once registered the data provider must submit a GHG emissions inventory, activity data and report in the required format given under Annexure 3 of these regulations on an annual basis. All data must be provided annually, by the 31 March of the following year. Based on the EAPs preliminary assessment, the proposed PV facility will not trigger GHG listed activities. However, any changes to the project description which may trigger such listed activities, the applicant would need to quantify and report on the proposed plant's GHG emissions by the 31 March of each year.

5.1.12 THE NATIONAL NOISE CONTROL REGULATIONS, 1992

In terms of section 25 of the ECA, the National Noise Control Regulations (GN R. 154 – NCRs) published in Government Gazette No. 13717 dated 10 January 1992, were promulgated. The NCRs were revised under GN R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.

The NCRs will need to be considered in relation to the potential noise that may be generated mainly during the construction and decommissioning phases of the proposed project. The two key aspects of the NCRs relate to disturbing noise and noise nuisance.

Section 4 of the Regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the Regulations as "*a noise level which exceeds the zone sound level or if no zone*

sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more."

Section 5 of the NCRs in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as "*any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person.*" Noise nuisance is not anticipated as the proposed PV facility will not generate noise apart from some limited noise during construction activities.

5.1.13 THE NATIONAL VELD AND FOREST FIRE ACT, 1998

While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Solar PV Facility, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.

5.1.14 THE NATIONAL FORESTS ACT, 1998

A licence is required for the removal of protected trees in terms of the NFA, (Act 84 of 1998). It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals.

5.1.15 THE NATIONAL WEB-BASED ENVIRONMENT SCREENING TOOL, 2019

On the 5th of July 2019, The Department of Forestry, Fisheries and the Environment (DFFE) issued a Notice of the requirement to submit a report generated by the National Web-based Environmental Screening Tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and Regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended. The submission of this report is compulsory when applying for environmental authorisation in terms of Regulation 19 and Regulation 21 of the Environmental Impact Assessment Regulations, 2014 effective from the 4th of October 2019. The DFFE Screening Tool Report was generated on the 12th of July 2023. The Screening report is provided in **Appendix D** of this report. The main findings to be discussed from the screening report are listed below.

The following summary of the study area's environmental sensitivities were identified in the Environmental Screening Report. The environmental sensitivities for the proposed development footprint are indicated on **Table 8**.

Table 8: Environmental Sensitivity of Project Area

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

The information collected by the specialists and EAP's assessment may be used to confirm or dispute (as may be applicable) the environmental sensitivity ratings identified by the National Screening Tool. Although the

specialist studies will be undertaken during the EIA phase, the EAP has already undertaken a site sensitivity verification (**Appendix E**) and EAPs assessments/theme and sensitivity ratings identified by the Screening Tool are summarized in **Table 9** below.

Page 6 and 7 on the DFFE Screening Report indicates that certain Specialist Assessments must be undertaken for the proposed development. There is however an allowance of the EAP to motivate for the reasons for not including certain assessments in the assessment report. **Table 10** presents these Specialist Assessments/Studies as well as the motivations behind the EAP's decision of recommending or not recommending the undertaking of certain Specialist Assessments.

Table 9: Specialist Assessments/themes and Sensitivity Ratings identified by DFFE's Web-based Screening Tool

Assessment Theme	Sensitivity Rating (Screening Report)	Sensitivity Rating (Site Verification)	Response
Agriculture Theme	High	Medium	Relative Agricultural Sensitivity was assessed to be *Medium-Sensitive* by the Site Sensitivity Verification (SSV) attached as **Appendix E**. The SSV found that there are some minimal subsistence agricultural activities and homestead within the northern portion. However, based on the minimal footprint of the agricultural activities compared to the overall footprint of the proposed development and a review of previous agricultural studies undertaken for the smelter, agricultural sensitivity theme was assessed to be Medium. Based on the ARC-ISCW (2006) Soils Study, the soils were found to be shallow to moderately deep, red to brown, medium textured soils with rock outcrops in places. The soils along the stream are darker brown, with a heavier texture and signs of wetness lower in the profile. In addition, the soils are known to be possibly restricted depth in places, otherwise have favourable texture.
Animal Species Theme	High	Medium	Relative Animal Species Sensitivity was assessed to be *Medium-Sensitive* as the SSV found that the proposed development site has been transformed mainly due to the mining and small grazing activities which have disturbed the fauna habitats. Sections of thick intact vegetation, potential habitats of fauna species were noted in the area. Several fauna species were also noted during the site assessment. Therefore. animal species assessment is required. This will be covered by the terrestrial biodiversity assessment. Based on previous fauna studies undertaken for the smelter (Jasper Müller Associates, 2006), the grasslands were found to possess medium to high vegetation species diversity as well as a low percentage of invader species. This provides a greater variety of habitat for animal species. Even though the impacts on animal life is anticipated to be relatively *medium-low,* the extent of the site and potential presence of important biodiversity cannot be excluded. Therefore, this area is classified as moderately disturbed, with a medium ecological quality.
Aquatic Biodiversity Theme	Very High	Medium	Relative Aquatic Biodiversity Theme Sensitivity was assessed to be *Medium-Sensitive* as the SSV found that there are no pre-identified natural watercourses or wetlands within the proposed development footprint. However, there is an unknown watercourse which runs across the centre of the smelter property. Based on review of desktop information, it was also found that the study area is located at least 5km from the nearest strategic water source area. The Potloodspruit is however, located immediately adjacent boundary of the northern portion. In addition, the study area is located within an ESA: Important sub-catchments (DFFE Screening Report). Based on the aspects of the proposed development, it is anticipated that there will be medium-low impacts on the watercourse.
Archaeological and Cultural Heritage Theme	Very High	Medium	Relative Archaeological and Cultural Heritage Theme Sensitivity was assessed to be *Very Medium-Sensitive* as the SSV found that there are archaeological / physical cultural features (stonewall) within the study area. However, the previously identified stone wall is located in the thick intact vegetation between the control dam and the southern section where the development of the PV facility is proposed. A defined fence separates the stone wall and the proposed development footprint.

Assessment Theme	Sensitivity Rating (Screening Report)	Sensitivity Rating (Site Verification)	Response
Avian Theme	High	Medium	Relative Avian Theme Sensitivity was assessed to be *Medium-Sensitive*. Few avian species were noted within the study area. Although Lydenburg is a site known for low importance for threatened bird species, it also has a medium-low intrinsic biodiversity value in terms of specific species and a medium intrinsic biodiversity value in terms of important communities. In addition, the study area is approximately 4km from the Kruger to Canyon Biosphere Reserve known to have important bird species which can easily fly to and from the study area. Therefore, a medium sensitivity rating has been assigned for avian species.
Civil Aviation (Solar PV) Theme	Medium	Medium	Relative Civil Aviation Theme Sensitivity was assessed to be *Medium-Sensitive* as the Lydenburg Airport is located just 3.5km southwest of the proposed development site. The proposed project entails the development of large solar panels arrays to generate up to 300MW of electricity for the smelter. Solar panels do reflect light which may have an impact on civil aviation. Therefore, the construction of the PV facility within close proximity of the Lydenburg Airport was assessed to have a medium impact on Civil Aviation. The South African Civil Aviation Authority (SACAA) and the Air Traffic Navigation Services (ATNS) will be included as specific I&AP.
Defence Theme	Low	Low	Relative Defence Theme Sensitivity was assessed to be *Low-Sensitive* as there are no military bases / facilities present within the vicinity of the project site. The nearest military base is the Army Support Base, located approximately 100 km southeast of the project site.
Landscape (Solar) Theme	Very High	Moderate	Relative Landscape (Solar) Theme Sensitivity was assessed to be *Moderate-Sensitive* as the proposed project entails the development of a large-scale solar plant with an approximate transformation of approximately 375ha of land into an array of solar panels. Although the development will change the landscape as solar panels are highly visible and will change the character of the existing landscape, the area is already a mining area with high rise stockpiles and there is thick vegetation separating the site and the adjacent properties which will absorb the visual impacts.
Palaeontology Theme	High	Medium	Based on the PalaeoMap from SAHRIS, the Palaeontological Sensitivity of the proposed area of the project footprint occurs in an area with *high palaeo-sensitivity*. However, the study area is located on properties which have been significantly transformed and the proposed development only entails excavations of the topsoil and subsoils only. Although no deep drilling or excavations will be required for construction of the PV facility, due to the extent of the development footprint and the high palaeo-sensitivity rating from the DFFE Screening Tool, the relative Palaeontology Theme Sensitivity was assessed to be *Medium-Sensitive*.
Plant Species Theme	Medium	Medium	Relative Plant Species Sensitivity was assessed to be *Medium-Sensitive* as the SSV found that the proposed development site has been transformed mainly due to the mining and small grazing activities which have disturbed the floral habitats. Based on previous biodiversity studies undertaken for the smelter (Jasper Müller Associates, 2006), the grasslands were found to possess medium to high vegetation species diversity as well as a low percentage of invader species. This provides a greater variety of habitat for plant species. Even though the impact on floral species is anticipated to relatively *medium-low*, the extent of the site

Assessment Theme	Sensitivity Rating (Screening Report)	Sensitivity Rating (Site Verification)	Response
			and potential presence of important biodiversity cannot be excluded. Therefore, this area is classified as moderately disturbed, with a medium ecological quality.
RFI Theme	Medium	Low	Based on the DFFE Screening Tool Report, the proposed development site is located within 5 km of a Sentech High Power Terrestrial Broadcasting Facility. Solar panels do not emit any kind of radiofrequency waves, so they cannot affect broadcasting transmissions. Inverters, on the other hand, which are part of a solar system can create electromagnetic interference (EMI), also called RFI (Radio Frequency Interference). These EMIs can affect broadcasting transmissions. However, through the use of filtering and EMR/RFI reduction equipment, manufacturers have learned how to minimise the noise coming from inverters and therefore reduce interference with broadcasting transmissions. Subsequently, relative RFI Sensitivity was assessed to be *Low-Sensitive*.
Terrestrial Biodiversity Theme	Very High	Medium	Relative Terrestrial Biodiversity Sensitivity was assessed to be *Medium-Sensitive* as the SSV found that the proposed development site has been transformed mainly due to the mining and small grazing activities which have disturbed the fauna and floral habitats. Based on previous biodiversity studies undertaken for the smelter (Jasper Müller Associates, 2006), the grasslands were found to possess medium to high vegetation species diversity as well as a low percentage of invader species. This provides a greater variety of habitat for flora and fauna species. Even though the impact on floral species is anticipated to relatively *medium-low*, the extent of the site and potential presence of important biodiversity cannot be excluded. Therefore, this area is classified as moderately disturbed, with a medium ecological quality.

Table 10: Summary of discussions regarding the undertaking of specialist Assessments

SPECIALIST ASSESSMENT	DICUSSION AND MOTIVATION
Agricultural Impact Assessment	There are some minimal subsistence agricultural activities and homestead within the northern portion of the proposed development site. Although, based on the minimal footprint of the agricultural activities compared to the overall footprint of the proposed development and a review of previous agricultural studies undertaken for the smelter, agricultural sensitivity theme was assessed to be Medium. An **Agricultural Compliance Statement for the project is recommended** by the EAP to assess impacts on agricultural activities and provide mitigation measures.
Landscape/Visual Impact Assessment	The need for visual input is often determined by issues relating to visual impact that may be raised by local residents or organisations, by the local authority, or on the recommendation of the EIA Practitioner of a project, or the visual specialist. Although solar panels can be highly visible and change the character of the existing landscape, the proposed PV facility only entails the development of low-rise panels next to existing mining facility with high rise stockpiles and tailings. In addition, the area is largely a flat terrain and with the plant only visible at the koppie within the nature reserve approximately 1km southeast of the site. Therefore, the proposed project within the proposed development area does not trigger a need for visual impact assessment based on the Guideline for involving visual & aesthetic specialists in EIA processes (Oberholzer, B. 2005). Therefore, a **Landscape/Visual Impact Compliance Statement is not recommended** by the EAP.

SPECIALIST ASSESSMENT	DICUSSION AND MOTIVATION
Archaeological and Cultural Heritage Impact Assessment	There are archaeological / physical cultural features within the proposed development footprint. There are potential stone walled sites some of which could be of high significance based on the Relative Archaeological and Cultural Heritage sensitivity of the area and previous heritage studies. Therefore, a **Heritage Impact Assessment (HIA) is recommended** by the EAP to identify the heritage features and provide mitigation measures (if any). It must be noted that the EAP only recommends Phase I HIA at this stage, no permits (Phase II) are applicable pending the findings of the Phase I HIA.
Palaeontology Impact Assessment	Based on the 1:250 000 SAHRIS PalaeoMap and the National Web-Based Screening Tool Report, the study area is located within a High Palaeo-Sensitivity area. The study area is located on an area which has been transformed and the proposed development entails excavations of the topsoil with no deep excavations anticipated. Although no deep drilling or excavations will be required for construction of the PV facility, due to the extent of the development footprint and the high palaeo-sensitivity rating, it is consequently the EAPs **recommendation that a Palaeontological Impact Assessment be undertaken** for the project.
Terrestrial Biodiversity Impact Assessment	Based on previous biodiversity studies undertaken for the smelter, the grasslands were found to possess medium to high vegetation species diversity as well as a low percentage of invader species. This provides a greater variety of habitat for flora and fauna species. Even though the impact on floral species is anticipated to relatively *medium-low*, the extent of the site and potential presence of important biodiversity cannot be excluded. Therefore, the EAP recommends that a **Terrestrial Biodiversity Impact Assessment** be undertaken to confirm if there are no Flora or Fauna SCC, or protected species within the development site and provide necessary mitigation measures.
Plant Species Assessment	Similarly, to the rationale above, the EAP recommends that a Terrestrial Biodiversity Impact Assessment be undertaken to confirm if there are no Flora or Fauna SCC, or protected species within the development site. The **Plant Species Assessment will be covered by the Terrestrial Biodiversity Impact Assessment**.
Animal Species Assessment	Similarly, to the rationale above, the EAP recommends that a Terrestrial Biodiversity Impact Compliance Assessment be undertaken to confirm if there are no Flora or Fauna SCC, or protected species within the development site. The **Animal Species Assessment will be covered by the Terrestrial Biodiversity Impact Assessment**.
Aquatic Biodiversity Impact Assessment	There are no pre-identified natural watercourses or wetlands within the study. Based on review of desktop information, it was also found that the study area is located at least 5km from the nearest strategic water source area. The Potloodspruit is however, located immediately adjacent boundary of the northern portion. In addition, the study area is located within an ESA: Important sub-catchments (DFFE Screening Report). Based on potential impacts on surface and groundwater through the establishment of the 375ha PV facility and associated infrastructure such as battery energy storage system, the EAP **recommends that an Aquatic Biodiversity Assessment be undertaken**.
Civil Aviation Assessment	The proposed project entails the development of large solar panels arrays to generate up to 300MW of electricity for the smelter. Solar panels do reflect light which may have an impact on civil aviation. Therefore, the construction of the PV facility within close proximity of the Lydenburg Airport was assessed to have a medium impact on Civil Aviation. **The EAP recommends a Civil Aviation Compliance Statement be undertaken for the project**. The SACAA and ATNS have been identified as a stakeholder on the project database and will be afforded with the opportunity to provide comments on the proposed development.
Defense Assessment	Relative Defence Theme Sensitivity was assessed to be *Low-Sensitive* as there are no military bases / facilities present within the vicinity of the project site. The nearest military base is the Army Support Base, located approximately 100 km southeast of the project site. Therefore, the EAP **does not recommend a Defense Assessment be undertaken for the project.**
RFI Assessment	The project site falls outside of the Karoo Central Astronomy Advantage Area (KCAAA). AAAs that have been declared to date are:

SPECIALIST ASSESSMENT	DICUSSION AND MOTIVATION
	• The Northern Cape Province, excluding Sol Plaatje Municipality; • The Karoo Core AAA (consisting of 13 406 hectares of land owned by the National Research Foundation, 90 km north of Carnarvon); and • The Karoo Central AAAs, as published in the Government Gazette on 12 March 2014. The EAP **does not recommend an RFI Assessment be undertaken for the project**. The South African Radio Astronomy Observatory (SARAO) have been identified as a stakeholder on the project database and will be afforded with the opportunity to provide comments on the proposed development.
Geotechnical Assessment	Based on the Geological Map Data obtained from the Council for Geosciences, the study area forms part of the Pretoria Group; Silverton Formation; comprised of the Machadodorp, Lydenburg and Boven Members. These members consist of basic lavas, mudstones, laminated shales, tuff, agglomerate and hornfels. These lithologies have been intruded by dolerite dykes and extruded over with diabase sills. As per the preliminary project information, the development of the PV facility will only require shallow excavations to accommodate the foundations for the plant. As such, **the previous geotechnical assessment undertaken is deemed relevant and the EAP does not recommend any further specialist input** for the project. However, should project information change, the geotechnical assessment may be required to identify risks and provide founding solutions. It must be noted that geotechnical assessments are usually associated with the engineering aspect of the development and not the environmental process.
Socio-Economic Assessment	The overarching aim of undertaking a Socio-Economic Assessment of a projects is to develop an understanding of the current social and economic environment and aims to assess or assesses the potential impact of the project on the socio-economic environment. Socio-Economic Assessment are usually undertaken for projects which have an impact and/or affect the social and/or economic structures such as low-cost housing projects, mixed-use developments, upgrading of informal settlements, linear projects transecting different communities, etc. Based on the project information and the purpose of the development, the EAP **does not recommend a Socio-Economic Assessment** for the project as it will not negatively impact on the socio-economic structures, but rather uplift the local community and economy at large through job creation and employment opportunities.

5.1.16 THE CONSERVATION OF AGRICULTURAL RESOURCES, 1983

The Conservation of Agricultural Resources (Act 43 of 1983) aims to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. In order to achieve the objectives of this Act, control measures related to the following may be prescribed to land users to whom they apply:

- The cultivation of virgin soil;
- The utilisation and protection of land which is cultivated;
- The irrigation of land;
- The prevention or control of waterlogging or salination of land;
- The utilisation and protection of vleis, marshes, water sponges, water courses and water sources;
- The regulating of the flow pattern of run-off water;
- The utilisation and protection of the vegetation;
- The grazing capacity of veld, expressed as an area of veld per large stock unit;
- The maximum number and the kind of animals which may be kept on veld;
- The prevention and control of veld fires;
- The utilisation and protection of veld which has burned;
- The control of weeds and invader plants;
- The restoration or reclamation of eroded land or land which is otherwise disturbed or denuded;
- The protection of water sources against pollution on account of farming practices;
- The construction, maintenance, alteration or removal of soil conservation works or other structures on land; and
- Any other matter which the Minister may deem necessary or expedient in order that the objects of this Act may be achieved.

Further, different control measures may be prescribed in respect of different classes of land users or different areas or in such other respects as the Minister may determine. Preliminary impacts on the agriculture and soil, biodiversity and water resources have been identified with regards to this project, and mitigation and management measures recommended. These will be updated during the EIA phase of this project with more site-specific information from the specialist studies.

5.1.17 THE ELECTRICITY REGULATION ACT, 2006

The Electricity Regulation Act (Act 4 of 2006) establishes a national regulatory framework for the electricity supply industries and introduces the National Energy Regulator as the custodian and enforcer of the National Electricity Regulation Framework. The Act also provides for licenses and registration in this regard.

5.1.18 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT, 2013

The Spatial Planning and Land Use Management Act, No.16 of 2013, has been in effect since July 2015. Essentially SPLUMA applies to the governance of how land is used, which is significant for developers who are applying for land developments. The objectives of the act are to:

- provide for a uniform, effective and comprehensive system of spatial planning and land use management for the Republic;
- ensure that the system of spatial planning and land use management promotes social and economic inclusion;
- provide for development principles and norms and standards;
- provide for the sustainable and efficient use of land;
- provide for cooperative government and intergovernmental relations amongst the national, provincial and local spheres of government; and
- redress the imbalances of the past and ensure that there is equity in the application of spatial development planning and land use management systems.

All affected properties are zoned for industrial use except for farm portion 143/30 which is zoned agricultural. However, a rezoning process is currently in progress to rezone this property to industrial as well.

5.1.19 OTHER POTENTIALLY APPLICABLE NATIONAL ACTS, PLANS AND GUIDELINES

The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, while taking environmental management requirements into account. The National Energy Act will not find significant application during the course of the EIA for the PV facility since all the electricity generated from the facility will be used at the mine the project will be excluded from energy planning in the country.

Similarly the Integrated Resource Plan for Electricity (IRP) 2010-2030 (2019) is not considered applicable to this project as the electricity generated will not go into the national grid but will be used at the mine.

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

5.2 RENEWABLE ENERGY DEVELOPMENT ZONES, 2018

Government Notice No. 114 in Government Gazette No. 41445 of 2018 identified 8 renewable energy development zones important for the development of large-scale wind and solar photovoltaic facilities. The Government Notice included procedure to be followed when applying for environmental authorisation for large scale wind and solar photovoltaic energy facilities when occurring in these REDZs. The sites proposed for the Lydenburg PV facility fall outside of the REDZ zones and therefore the REDZ will not be applicable for the PV facility project.

5.3 CLIMATE CHANGE BILL, 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 PV facility proposed consists of a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

5.4 BEST PRACTICE GUIDELINES BIRDS & SOLAR ENERGY, 2017

The Best Practice Guidelines Birds & Solar Energy (2017) proposed by the Birds and Renewable Energy Specialist Group contain guidelines for assessing and monitoring the impact of solar generation facilities on birds in Southern Africa. The guidelines recognise the impact that solar energy may have on birds, through for example the alteration of habitat, the displacement of populations from preferred habitat, and collision and burn

mortality associated with elements of solar hardware and ancillary infrastructure; and the fact that the nature and implications of these effects are poorly understood.

The guidelines are aimed at Environmental Assessment Practitioners (EAPs), avifaunal specialists, developers and regulators and propose a tiered assessment process, including:

- Preliminary avifaunal assessment – an initial assessment of the likely avifauna in the area and possible impacts, preferably informed by a brief site visit and by collation of available data; also including the design of a site-specific survey and monitoring project should this be deemed necessary.
- Data collection – further accumulation and consolidation of the relevant avian data, possibly including the execution of baseline data collection work (as specified by the preliminary assessment), intended to inform the avian impact study.
- Impact assessment – a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring if this was deemed a requisite at preliminary assessment.
- Monitoring – repetition of baseline data collection, plus the collection of mortality data. This helps to develop a complete before and after picture of impacts, and to determine if proposed mitigation measures are implemented and are effective or require further refinement. Monitoring may only be necessary for projects with the potential for significant negative impacts on birds (i.e. large area affected and / or vulnerable species present).

In terms of the guidelines the quantity and quality of baseline data required to inform the assessment process at each site should be set in terms of the size of the site and the predicted impacts of the solar technology in question, the anticipated sensitivity of the local avifauna (for example, the diversity and relative abundance of priority species present, proximity to important flyways, wetlands or other focal sites) and the amount of existing data available for the area.

5.5 LOCAL AND PROVINCIAL PLANNING TOOLS

According to the 2022 – 2027 IDP for the Thaba Chweu Local Municipality, Local Economic Development (LED) promotes and facilitates industrial development, enterprise development, skills development, economic transformation and poverty alleviation directed at five (5) focus areas:

- Enterprise Development;
- Rural Development;
- Economic Skills and Capacity Development;
- Industrial Development and Investment Facilitation; and
- Knowledge Management.

The municipality has identified renewable energy generation (particularly solar technologies) as potential opportunities in the utilities sector for the LED. Therefore, solar development is supported in terms of the municipality's current local planning tools.

In addition, the generation of renewable energy is supported at a provincial level. The Mpumalanga Economic Growth and Development Path (MEGDP) is predominantly based on the National Development Plan (NDP) and attempts to align with the vision, objectives and priorities of a united South Africa by 2030. Provincial Priority Area 2 (economic infrastructure) aims to expand renewable energy with special reference to solar power (solar power heaters and solar photovoltaic technologies) This is in line with the NDP which aims to increase employment and growth through the use of renewable electricity.

5.6 PERIOD FOR WHICH AUTHORIZATION IS REQUIRED

The authorisation will be required for the duration of the activities on-site. Construction is expected to commence within 5 years of the EA being granted.

6 PROJECT ALTERNATIVES

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended, feasible and reasonable alternatives must be identified and considered within the environmental assessment process. An alternative is defined as *"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:*

(a) property on which or location where it is proposed to undertake the activity;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity;

(e) operational aspects of the activity; and

(f) Includes the option of not implementing the activity."

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the EIA process. It is important to highlight that alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection. In order to ensure full disclosure of alternative activities, it is important that various role players contribute to their identification and evaluation. Stakeholders have an important contribution to make during the EIA Process and each role is detailed as follows:

The role of the environmental assessment practitioner is to:

- encourage the proponent to consider all feasible alternatives;
- Identify reasonable alternatives;
- provide opportunities for stakeholder input to the identification and evaluation of alternatives;
- document the process of identification and selection of alternatives;
- provide a comprehensive consideration of the impacts of each of the alternatives; and
- document the process of evaluation of alternatives.

The role of the proponent is to:

- assist in the identification of alternatives, particularly where these may be of a technical nature;
- disclose all information relevant to the identification and evaluation of alternatives;
- be open to the consideration of all reasonable alternatives; and
- be prepared for possible modifications to the project proposal before settling on a preferred option.

The role of the public is to:

- assist in the identification of alternatives, particularly where local knowledge is required;
- be open to the consideration of all reasonable alternatives; and
- recognise that there is rarely one favoured alternative that suits all stakeholders and that alternatives will be evaluated across a broad range of criteria, including environmental, social and economic aspects.

Table 11 outlines the various alternative types that must be considered for each development**.** The extent of the applicability of each of these is further presented. It must be highlighted that the alternatives presented in the

table are derived from both the the EIA Regulations (2014) as amended as well as the the Department of Environmental Affairs and Tourism's (now Department of Environmental, Fisheries and Forestry) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA. Where the alternative is applicable to the project, it will be further discussed in this Scoping Report. The alternatives discussed further in this SR are as follows:

- The No-Go Option;
- Process alternatives;
- Operational alternatives.

Table 11: Project alternatives as per NEMA EIA Regulations, 2014 as amended.

ALTERNATIVE	COMMENT
No-go Option	The 'no-go' alternative is sometimes referred to as the 'no-action' alternative (Glasson *et al.,* 1999) and at other times the 'zero-alternative'. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. This alternative must be discussed on all projects as it allows for an assessment of impacts should the activity not be undertaken. **This alternative is discussed in this report.**
Activity alternatives	These are sometimes referred to as project alternatives, although the term activity can be used in a broad sense to embrace policies, plans and programmes as well as projects. Consideration of such alternatives requires a change in the nature of the proposed activity. This would entail a process where a different project is proposed instead of the PV facility. **There is one proposed activity and no other activity alternative. Therefore, this alternative will not be discussed in this report.**
Location / property alternatives	Location alternatives could be considered for the entire proposal or for a component of a proposal, for example the location of a processing plant within the property boundary. The latter is sometimes considered under site layout alternatives. A distinction should also be drawn between alternative locations that are geographically quite separate, and alternative locations that are in proximity. In the case of the latter, alternative locations in the same geographic area are often referred to as alternative sites. Based on the proposed development, the PV facility if defined within the southern and northern section within the mining area with no alternative sites considered and therefore **the location/property alternatives are not applicable to this project.**
Process alternatives	Various terms are used for this category, including technological alternative and equipment alternative. The purpose of considering such alternatives is to include the option of achieving the same goal by using a different method or process. An industrial process could be changed, or an alternative technology could be used. These are also known as technological and equipment alternative and will be discussed as they are applicable to the PV facility. **These will be discussed in this report.**
Demand alternatives	Demand alternatives arise when a demand for a certain product or service can be met by some alternative means. This is applicable to the demand for a product or service. An example of this would be where there is a need to provide housing units. Examples of alternatives can be through managing demand through various methods or providing additional housing through either single dwelling residential units or

ALTERNATIVE	COMMENT
	mixed-use developments. Specific to the proposed project, **alternatives regarding the demand are not applicable and will not be discussed in this report.**
Scheduling alternatives	These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise several components, which can be scheduled in a different order or at different times and as such produce different impacts. **These are not applicable to the project and will not be discussed.**
Input alternatives	By their nature, input alternatives are most applicable to industrial applications that may use different raw materials or energy sources in their processes. Considering that the proposed development is a PV facility which does not involve the conversion of raw materials into finished products, **input alternatives are not applicable to the project and will not be discussed.**
Routing alternatives	Consideration of alternative routes generally applies to linear developments such as power lines, transport, and pipeline routes. Although the proposed development also entails the development of a powerline as PV facility, the powerline is short and limited to the site extent. **Therefore, routing alternatives will not be covered in this report.**
Site layout alternatives	Site layout alternatives permit consideration of different spatial configurations of an activity on a particular site. This may include particular components of a proposed development or may include the entire activity. Only one proposed layout was available at the time of compilation of this report, based on this, **site layout alternatives will not be covered in this report.**
Scale alternatives	In some cases, activities that can be broken down into smaller units can be undertaken on different scales. For example, a housing development within an overall mixed-used development could have the option of 1 000, 2 000 or 4 000 housing units. Each of these scale alternatives may have different impacts. However, the proposed PV facility cannot be broken down into smaller units. **For this reason, scale alternatives will not be discussed in this report.**
Design alternatives	This entails the consideration of different designs for aesthetic purposes or different construction materials to optimise local benefits and sustainability would constitute design alternatives. In such cases, all designs are assumed to have different impacts. Generally, the design alternatives could be incorporated into the project proposal and so be part of the project description and need not be evaluated as separate alternatives. **Based on project description and background information, design alternatives were identified and will be discussed in this SR**.
Operational alternatives	The Operational Alternative is where you can specify controls on the operational aspects of the project such as pressure pipes, pumps, as well as valves. In the case of the proposed PV facility, **no feasible operational alternatives were identified and are not discussed in this report.**

In this section the various alternatives considered are described and their advantages and disadvantages are presented where applicable. Furthermore, the feasibility of the considered alternatives, from both a technical as well as environmental perspective, is determined and the result thereof are the alternatives that will be investigated further in the EIA phase, towards the selection of preferred alternatives. Essentially, alternatives

represent different means of meeting the general purpose and need of the proposed project through the identification of the most appropriate and feasible method of development, all of which are discussed below.

6.1 PROCESS ALTERNATIVES

Process alternatives are also known as technological and equipment alternatives that can be implemented to achieve the desired goal of a project. The process alternatives can be either mechanical (physical), chemical or biological and must be suitable to the specific type of development. There are three primary technologies by which solar energy is harnessed: photovoltaics (PV), which directly convert light to electricity; concentrating solar power (CSP), which uses heat from the sun (thermal energy) to drive utility-scale, electric turbines; and solar heating and cooling (SHC) systems, which collect thermal energy to provide hot water and air heating or conditioning. The latter is not discussed in this report as it is not applicable to the nature of the proposed development.

Photovoltaic (PV) devices generate electricity directly from sunlight via an electronic process that occurs naturally in certain types of material, called semiconductors. Electrons in these materials are freed by solar energy and can be induced to travel through an electrical circuit, powering electrical devices or sending electricity to the grid. Concentrating solar power (CSP) plants use mirrors to concentrate the sun's energy to drive traditional steam turbines or engines that create electricity. The thermal energy concentrated in a CSP plant can be stored and used to produce electricity when it is needed, day or night. These technologies displace the need to use electricity or natural gas. The advantages and disadvantages of each process is indicated in **Table 12** below.

Table 12: Advantages and disadvantages of solar process alternatives

Advantage	Disadvantage
Photovoltaic (PV)	
Electricity produced by solar cells is clean and silent.	PV systems are not capable of producing or storing thermal energy.
PV systems make use of batteries to temporary store energy to use in unfavourable conditions.	Battery energy storage systems are relatively expensive and have negative impacts on the environment.
Small photovoltaic systems are quiet and visually unobtrusive.	High demand met through PV facility requires extensive PV plants which in turn require a large area to be completely transformed / disturbed.
PV systems are a lot easier to build and are relatively cheaper to development and maintain.	Orientation matters. If the panels do not face the sun, minimum solar energy will be captured.
PV systems do not release any harmful air or water pollution into the environment, deplete natural resources, or endanger animal or human health.	
Concentrating solar power (CSP)	
CSP systems are able to produce excess energy and store it for future use.	It is difficult and dangerous to store and manage high volume electricity.
High energy efficiency. CSP plants can also compete favourably with coal or nuclear power plants, whose energy efficiency are around 35 percent.	Requires high levels of solar irradiance for extended periods of time. This means its rollout is limited exclusively to countries or regions that meet these requirements.

Advantage	Disadvantage
CSP can Produce Both Electricity and Heat as concentrating solar collectors deliver heat at a much higher temperature.	High cost of electricity produced at CSP plants. CSP systems are more difficult to build and are relatively more expensive to development and maintain.
	The reflective mirrors are usually visually obtrusive.

Based on the indicated advantages and disadvantages of the two applicable types of technological processes used in harnessing solar energy, the PV process is the most preferred method as it is relatively cheaper, less obtrusive and have reduced environmental impacts.

6.2 DESIGN ALTERNATIVES

Design alternatives are the consideration of different designs for technical efficiency, aesthetic purposes or different construction materials in an attempt to optimise local benefits and sustainability. The following design alternatives were considered for the project.

6.2.1 TYPES OF SOLAR POWER PLANT

The solar power plant is classified into two types according to the way load is connected, namely; Standalone system and Grid-connected system which are discussed below. The advantages and disadvantages of the different types of PV plants are indicated in **Table 13**.

6.2.1.1 STANDALONE SYSTEM

The stand system is an independent power plant. It is not connected with a grid. It is directly connected with the load. This type of plant is used in a place where a grid is not available like forest, hilly area etc. This type of plant can be used as a power backup plant when the power of the grid is not available, this plant is used to supply the load. A battery and charge controller is an optional part of this system. But in most cases, the battery and charge controller is used with this system to increase reliability. DC loads can directly connect with this plant. But in the case of AC load, the inverter is required to convert DC power into AC power. Generally, this type of system is not used to generate electrical power in bulk amounts. This type of plant use to operate small loads or in emergency conditions only.

6.2.1.2 GRID-CONNECTED SYSTEM

This type of system is used to generate bulk power and transmit it to the load by a grid. Hence, this plant is known as a grid-connected power plant. In this system, a greater number of solar panels are used to generate more power. And it requires a large area to build a power plant. The grid power is in the form of AC. And if we need to supply power to the grid, we need the output of solar plants similar to the power of the grid. In this system, the most important condition is that the output frequency and voltage must be matched with the grid's frequency and voltage. And also, the power quality maintains the grid standard.

Table 13: Advantages and disadvantages of different types of PV plants

Advantage	Disadvantage
Standalone System	
Independence. No longer subjected to the terms and policies of the utility company especially with the current electricity issues with Eskom.	Higher Initial Cost to develop
A large off-grid solar system saves money in the long run by taking away the monthly bills.	Solar batteries are expensive, and bigger ones are required to properly store energy for future use
No waste or byproducts are generated	Maintenance can be expensive

Advantage	Disadvantage
	Electricity access is wholly dependent on two sources: the sun and the energy stored in your battery bank
Grid-Connected System	
More cost-effective due to the lower upfront cost and the ability to receive credits for excess energy production	When there is no sunlight and the grid goes down resulting in a power outage, there is no access to any electricity. Making the need for batteries very important
When grid-tied systems produce more energy than required, the extra energy is sent back to the supply grid in exchange for electricity credits	Grid-tied system will still result in minimal charges that will still reflect on the electricity bill
A grid-tied solar system always provides access to electricity – whether or not there is sunlight	
The grid-connected PV system has a low gestation period	

Based on the indicated advantages and disadvantages of the different types of PV plants as well as the project description especially pertaining to generating up to 300MW of electricity only for the smelter, a hybrid connected system which will merge the standalone and grid-connected system approach would be favourable for the development.

6.2.2 TYPES OF SOLAR PANEL

Though there are many brands and styles of solar panels, there are generally four main types of cells of a solar panel, namely; bifacial solar panels, monocrystalline, polycrystalline, and thin-film. Bifacial solar panels, the reversible fashion accessory of the solar industry, are double-sided panels that absorb solar energy from both sides. Moncrystalline and polycrystalline panels are used for residential installations, while thin-film panels are more common for bigger solar projects. The types of solar panels are discussed below, and the advantages and disadvantages are indicated in **Table 14**.

6.2.2.1 BIFACIAL SOLAR PANELS

A bifacial solar cell is any photovoltaic solar cell that can produce electrical energy when illuminated on either of its surfaces, front or rear. Solar cells in bifacial solar panels are exactly the same as in monofacial solar panels. The only real difference is how the panel is made. Whereas traditional monofacial solar panels have an opaque backsheet, Bifacial solar panels have a reflective back or dual panes of glass holding the solar cells in place. Exposing the solar cells to sunlight at the back as-well as the front. Bifacial modules come in many designs, some are framed while others are frameless. Some are dual-glass, and others use clear backsheets. Most use monocrystalline cells, but there are polycrystalline designs. The one thing that is constant is that power is produced from both sides. There are frameless, dual-glass modules that expose the backside of cells but are not bifacial. True bifacial modules have contacts/busbars on both the front and back sides of their cells.

6.2.2.2 MONOCRYSTALLINE SOLAR PANELS

Monocrystalline solar panels—or mono panels—are made from a single silicon crystal. These are the most common type of solar panels for residential systems because they're more efficient and better suited for roofs with limited space. There are two kinds of monocrystalline panels: passivated emitter and rear contact (PERC) panels and bifacial panels. PERC panels have a conductive layer added to the backside of cells to increase energy absorptions, whereas bifacial panels can absorb light on both sides and at a higher rate than PERC panels. For this reason, PERC panels are most commonly used for rooftop installations while bifacial panels are typically reserved for ground-mounted systems that leave both sides of the panels exposed. Bifacial panels are also used

on awnings, canopies, and rack-mounted installations on white commercial roofs with high albedo, or the fraction of light that a surface reflects. Monocrystalline panels are mostly solid black but have some white space throughout. The black design makes them less noticeable on a rooftop.

6.2.2.3 POLYCRYSTALLINE SOLAR PANELS

Polycrystalline panels are made using earlier solar technology, so they are more affordable than the newer monocrystalline variety. However, because the technology is older, polycrystalline panels are not as efficient as their modern counterpart. Polycrystalline panels have a blue hue that's somewhat marbled in appearance, so there are some variations in color and consistency among panels. Polycrystalline panels are made of silicon solar cells, the same as monocrystalline panels. The difference is in the cooling process for polycrystalline panels, which creates multiple crystals rather than just one.

6.2.2.4 THIN-FILM SOLAR PANELS

Thin-film solar cells are less efficient than monocrystalline and polycrystalline varieties, so they're more often used in large industrial solar installations in which space is not a constraint. Thin-film panels can also be a good option for small or bigger solar projects. Thin-film panels have the best appearance among the three panel types. They are completely black, flat, and flexible in shape and size, so they blend easily on many landscapes. They also do not require the scaffolding that monocrystalline and polycrystalline panels often do. However, thin-film panels are not very efficient. They have higher overall costs and increased instances of panel issues, failures, and degradation over time, which is why they are not ideal for residential installations.

Table 14: Advantages and disadvantages of different solar panels

Advantage	Disadvantage
Bifacial Solar Panel	
Produces renewable energy from both surfaces	More expensive than regular one-sided panels
Produces more power than conventional solar panels because their entire surface works to produce electricity for the facility	Unsuitable for use in areas with lots of shade or obstructing buildings. Also not suitable to be installed above dark-coloured, non-reflective surfaces such as dirt or grass
More durable as they are less likely to get damaged by extreme weather	The installation of bifacial (double-sided) solar panels sometimes requires more time and effort than single-sided panel installation
Solar panels can work at different angles or orientations as long as they are facing towards the equator	Bifacial panels with double-sided glass surfaces are heavier than conventional solar panels. Their weight makes it difficult to manoeuvre or adjust them
Rodents cannot live or hide under double-sided solar panels because they don't have one side resting on surfaces like regular solar panels	
Monocrystalline Solar Panel	
Lasts more than 25 years	More expensive than the other two panel types
Made of the highest-grade silicon	Can be slightly less efficient during cold weather
Requires the least amount of roof space	Wastes material during production process
Polycrystalline Solar Panel	
Lasts more than 25 years	More easily affected by high temperatures

Advantage	Disadvantage
Is more affordable than monocrystalline panels	Less efficient than monocrystalline panels
Produces less waste during the manufacturing process	Requires more roof space
Thin-film Solar Panel	
Can withstand high temperatures	Is the least efficient
Is the least expensive panel option	Requires the most space
Weighs less than monocrystalline and polycrystalline panels	Is not sufficient for residential rooftop installations

Based on the indicated advantages and disadvantages of the different types of solar panels used in for PV as well as the project description especially pertaining to generating up to 300MW of electricity, bifacial solar panels, followed by polycrystalline solar panels are the most favourable followed by monocrystalline solar panels and lastly, polycrystalline solar panels. However, it must be noted that although bifacial and/or polycrystalline solar panels are preferred, the environmental impacts associated with all the different types of panels are largely similar so the choice of panel type would not have a major significance.

6.2.3 ENERGY STORAGE DEVICES

Energy storage is the capture of energy produced at one time for use at a later time to reduce imbalances between energy demand and energy production. A device that stores energy is generally called an accumulator or battery. Energy comes in multiple forms including radiation, chemical, gravitational potential, electrical potential, electricity, elevated temperature, latent heat and kinetic. Energy storage involves converting energy from forms that are difficult to store to more conveniently or economically storable forms. Storage options include batteries, thermal, or mechanical systems. All of these technologies can be paired with software that controls the charge and discharge of energy. There are many types of energy storage devices, however for purposes of this study, the discussion will be limited to the main storage devices namely, batteries, thermal, or mechanical systems.

6.2.3.1 BATTERY ENERGY STORAGE SYSTEMS

The batteries are used to store electrical energy generated by the solar power plants. The storage components are the most important component in a power plant to meet the demand and variation of the load. This component is used especially when the sunshine is not available for few days. According to Arabkoohsar (2020), There are various forms of batteries, including: lithium-ion, flow, lead acid, sodium, and others designed to meet specific power and duration requirements. The two main battery energy storage systems used in the solar power facilities are Lead-Acid battery or Nickel-Cadmium battery. A NiCad battery pack comprises two or more individual cells. This battery is a type of rechargeable battery using nickel oxide hydroxide and metallic cadmium as electrodes. A lead acid battery is a rechargeable battery that uses lead and sulphuric acid to function. The lead is submerged into the sulphuric acid to allow a controlled chemical reaction. There is also a different type of battery known as a Redox Flow Battery in which energy is stored and provided by two chemicals that are dissolved in liquids and stored in tanks. These are well suited for longer duration storage (Arabkoohsar, 2020).

6.2.3.2 THERMAL ENERGY STORAGE SYSTEMS

Thermal systems use heating and cooling methods to store and release energy. Thermal energy conversion involves the conversion of residual heat and heat from sustainable sources – such as solar energy, biomass or geothermal heat – to other energy carriers, such as electricity, heat at a different temperature level or cold (Arabkoohsar, 2020). Conversion systems also form the link between the various energy networks and may therefore act as energy hubs. An example of thermal energy device is molten salt storing solar-generated heat for use when there is no sunlight. Ice storage in buildings reduces the need to run compressors while still

providing air conditioning over a period of several hours. Other systems use chilled water and dispatchable hot water heaters. In all cases, excess energy charges the storage system (heat the molten salts, freeze the water, etc.) and is later released as needed.

The different kinds of thermal energy storage can be divided into three separate categories: sensible heat, latent heat, and thermo-chemical heat storage (Arabkoohsar, 2020). Each of these has different advantages and disadvantages that determine their applications. Sensible heat storage (SHS) is the most straightforward method. It simply means the temperature of some medium is either increased or decreased. This type of storage is the most commercially available out of the three; other techniques are less developed. The sensible heat of molten salt is also used for storing solar energy at a high temperature, termed molten-salt technology or molten salt energy storage (MSES). Secondly, Latent Heat Storage (LHS) is associated with a phase transition, the general term for the associated media is Phase-Change Material (PCM). During these transitions, heat can be added or extracted without affecting the material's temperature, giving it an advantage over SHS-technologies. Storage capacities are often higher as well. This allows for a more target-oriented system design. Lastly, Thermo-chemical heat storage (TCS) involves some kind of reversible exotherm/endotherm chemical reaction with thermo-chemical materials (TCM). Depending on the reactants, this method can allow for an even higher storage capacity than LHS (Arabkoohsar, 2020).

6.2.3.3 MECHANICAL ENERGY STORAGE SYSTEMS

According to Arabkoohsar (2020), Mechanical energy Storage Systems (MESS) works in complex systems that use heat, water or air with compressors, turbines, and other machinery, providing robust alternatives to electro-chemical battery storage. Mechanical energy storage systems use kinetic or gravitational forces to store energy. Since generators use the movement of a turbine to generate electricity, these systems harness the potential force to drive that turbine for a later date. Like thermal energy storage, it's based off a relatively simple theory, but produces some complex and imaginative results. In its simplest form it can take the shape of a weight and pulley, with the energy required to lift the weight stored as gravitational potential until it is released again. But more ambitious ideas are required in order to store grid-scale energy. The four most common MESS are Pumped Heat Energy Storage, Pumped Storage Hydropower, Compressed Air Energy Storage, and Flywheel Energy Storage.

Pumped heat energy storage converts electric energy from the grid into thermal energy that is stored as a thermal potential. At full capacity, the system can store energy in tanks for hours or up to several weeks before converting it back to electrical energy. The system can then provide greater than 10 hours of electricity at rated power. Pumped Storage Hydropower are electric power systems use pumped storage hydropower (PSH) for load balancing. The method uses the gravitational potential energy of water, pumped from a lower-elevation to a higher-elevation reservoir using low-cost, off-peak surplus electric power to run the pumps. During periods of high electrical demand, the stored water is returned to the lower reservoir, driving turbines to produce electric power. Compressed air energy storage (CAES) plants work similarly to pumped storage hydropower plants, but rather than pumping water between reservoirs, these types of plants compress and store ambient air in an underground cavern during periods of excess power. When power is needed, the air is heated and expanded in a turbine to drive power generation. Flywheel energy storage systems store energy as kinetic energy in a high-speed rotor connected to a motor or generator, typically in a vacuum environment. The flywheels decelerate in discharge mode and are ideal for short-duration fast-response backup power (Arabkoohsar, 2020).

Some of the advantages and disadvantages of the various energy storage devices are indicated in **Table 15**.

Table 15: Advantages and disadvantages of energy storage devices

Advantage	Disadvantage
Battery Energy Storage Devices	
Stores energy for future consumption when demand arises	Batteries which last longer can be expensive
Reduces the carbon footprint	Batteries do not last forever, and proper care is required to avoid negative environmental impacts through incorrect disposal
Can be charged faster and have a longer life cycle of up to 15-20 years	More likely to leak acid, which can damage the device
Some batteries such as Lead-Acid battery are easier to dispose of and recycle	Harmful to the environment as they contain toxic metals
Less likely to suffer from self-discharge, meaning they can hold their charge for extended periods	More likely to leak acid, which can damage the device
Provide a large amount of power when needed	Require regular maintenance, such as topping up the water level and cleaning the terminals
Easier to dispose of and recycle	Produce hydrogen gas when charging, which can be explosive if it builds up in a confined space
Thermal Energy Storage Systems	
Longer life (batteries typically 10 to 15 years, thermal storage up to 30 years)	Less efficiency (< 70%)
Generally better than batteries for storing heat or cooling	Very expensive system / infrastructure cost
Thermal energy storage can save energy consumed and cost	Device must always be sealed (to prevent loss of water when subjected to long-term thermal cycling)
Can increase the uptake of renewable energy	Problems of corrosion with container
Thermal storage systems are generally 100% recyclable	Integration/transport challenges
Provides backup when heating or cooling generating equipment fails	Long term stability is a requirement for any thermal storage system
Mechanical energy Storage Systems	
Affordable and low environmental impact	Very high-cost energy storage systems to establish
Most parts of the systems are dependable and commercially available since years, which results in an enhanced lifetime	Continuous maintenance which can be expensive
Depends on itself to generate the power, so it is autonomous	Energy use is most efficient locally, inefficient to try to send over long distances
Very versatile, so it has multiple applications and uses	Low energy densities and very high losses due to friction
More comfortable and safe, the technological advances have decreased the occupational hazards and the accidents have been reduced	Long construction lead time and technology type can be dependent on regional topography

It can be seen from **Table 15** above that each energy storage device has its pros and cons. The type of energy device used is largely dependent on the type of nature of the project, scale and budget. From an environmental

perspective, Thermal Energy Storage Systems and Mechanical energy Storage Systems are more preferrable over Battery Energy Storage Devices. There may also be other alternatives which may also be considered by the applicant.

6.3 NO-GO ALTERNATIVE

The **no-go alternative** option means 'do nothing' or the option of not undertaking the proposed PV facility project or any of its activities, consequently leading to the continuation of the current land-use, which is leaving the location as an open unutilized space. As such, the 'do nothing' alternative or keeping the current status quo of the site with no construction or operation activities occurring on-site and also provides the baseline against which the impacts of other alternatives should be compared. Leaving the area undeveloped would not have any significant environmental or social benefits and would also not create any additional negative environmental impacts.

7 STAKEHOLDER ENGAGEMENT

The Public Participation Process (PPP) is a requirement of several pieces of South African legislation and aims to ensure that all relevant Interested and Affected Parties (I&APs) are consulted, involved and their opinions are taken into account, and a record included in the reports submitted to relevant authorities. The process aims to ensure that all stakeholders are provided an opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the proposed project needs to be managed sensitively and according to best practises in order to ensure and promote:

- Compliance with international best practise options;
- Compliance with national legislation;
- Establish and manage relationships with key stakeholder groups; and
- Encourage involvement and participation in the environmental study and authorisation / approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Provide an opportunity for I&APs to obtain clear, accurate and comprehensible information about the proposed activity, its alternatives or the decision and the environmental impacts thereof;
- Provide I&APs with an opportunity to indicate their viewpoints, issues and concerns regarding the activity, alternatives and / or the decision;
- Provide I&APs with the opportunity to suggest ways of avoiding, reducing or mitigating negative impacts of an activity and enhancing positive impacts;
- Enable the applicant to incorporate the needs, preferences and values of I&APs into the activity;
- Provide opportunities to avoid and resolve disputes and reconcile conflicting interests;
- Enhance transparency and accountability in decision-making;
- Identify all significant issues for the project; and
- Identify possible mitigation measures or environmental management plans to minimise and / or prevent environmental impacts associated with the project.

The PPP for this project has been undertaken in accordance with the requirements of the NEMA, as well as in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other I&APs are afforded an opportunity to comment on the project.

7.1 LEGAL COMPLIANCE

The PPP must comply with several important sets of legislation that require public participation as part of an application for authorisation or approval, namely:

- The National Environmental Management Act (Act No. 107 of 1998 – NEMA);
- The National Water Act (Act No. 36 of 1998).

Adherence to the requirements of the above-mentioned Acts will allow for an Integrated PPP to be conducted, and in so doing, satisfy the requirement for public participation referenced in the Acts. The details of the Integrated PPP followed are provided below.

7.2 GENERAL APPROACH TO PUBLIC PARTICIPATION

The PPP has been undertaken in accordance with the requirements of the NEMA (and the NWA where applicable) as well as in line with the principles of Integrated Environmental Management (IEM). IEM implies an

open and transparent participatory process, whereby stakeholders and other I&APs are afforded an opportunity to comment on the project.

7.3 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

The I&AP databases compiled for various past environmental authorisation processes in the vicinity of the proposed facility have been utilised towards compiling a pre-notification register of key I&APs to be notified of the Environmental Authorisation Application. The I&AP database includes amongst others: landowners, communities, regulatory authorities and other specialist interest groups. Additional I&APs have been registered during the initial notification and call to register period. The I&APs database will continue to be updated throughout the duration of the EIA process. A full list of I&APs is attached in **Appendix C.**

7.3.1 LIST OF AUTHORITIES IDENTIFIED AND NOTIFIED

The following Government Authorities were notified of the proposed project:

- Thaba Chweu Local Municipality;
- Ehlanzeni District Municipality;
- Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs;
- Mpumalanga Department of Water and Sanitation;
- Mpumalanga Department of Mineral Resources and Energy;
- Mpumalanga Green Cluster Agency
- Mpumalanga Tourism & Parks Agency;
- Mpumalanga Department of Public Works, Roads and Transport;
- Mpumalanga Department of Social Development;
- National Department of Agriculture, Land Reform and Rural Development;
- National Department of Forestry, Fisheries and the Environment;
- National Department of Human Settlements, Water and Sanitation;
- National Department of Mineral Resources and Energy;
- Air Traffic and Navigation Services SOC Limited
- South African Civil Aviation Authority
- South African Heritage Resource Agency (SAHRA); and
- Mpumalanga Provincial Heritage Resources Authority;
- South African National Roads Agency Limited (SANRAL).

7.3.2 OTHER KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

The following key stakeholders have been identified and notified of the proposed project:

- Birdlife South Africa;
- Endangered Wildlife Trust;
- Eskom SOC Ltd.;
- South African National Biodiversity Institute.
- Council of Geoscience;
- South African Civil Authority;
- Conservation South Africa; and
- Transnet SOC Limited.

7.4 INITIAL NOTIFICATION OF INTERESTED AND AFFECTED PARTIES

The PPP commenced on the 23rd of November 2023 with an initial notification and call to register. Initial call to register notifications were conducted as presented below.

7.4.1 REGISTERED LETTERS, FAXES AND EMAILS

Registered letters, emails and facsimiles (faxes) were prepared and distributed to the identified relevant authorities, affected and adjacent landowners and legal occupiers, ward councillors and other pre-identified key stakeholders. The notification documents included the following information:

- The purpose of the proposed project;
- Details of the NEMA and NWA Regulations that are anticipated to be applicable and must be adhered to;
- List of anticipated activities to be authorised;
- Location and extent of activities to be authorised;
- Details of the affected properties (including a locality map or an indication of where the locality map may be viewed or obtained);
- Brief but sufficient detail of the intended operation to enable I&APs to assess/ surmise what impact the project will have on them or on the use of their land (if any);
- Initial call to register duration; and
- Contact details of the EAP.

In addition, a registration form was included in the registered letters, emails and facsimiles distributed to I&APs and it included a request for the following information from I&APs:

- Provide information on how they consider that the proposed facility will impact on them or their socio-economic conditions;
- Make proposals as to how the potential impacts on identified environmental features, their infrastructure, and socio-economic concerns may be managed, avoided or mitigated;
- Details of the landowner and information on lawful occupiers;
- Details of any communities existing within the area;
- Details of any Tribal Authorities within the area;
- Details of any other I&APs that need to be notified;
- Details on any land developments proposed; and

- Any specific comments or concerns regarding the proposed application for environmental authorisation.

Proof of the registered letters, emails and facsimiles that were distributed during the initial notification and call to register period are attached in **Appendix C**.

7.4.2 SITE NOTICES AND POSTERS

Six (6) size A2 site notices (English Setswana and Afrikaans) were placed along, within and surrounding the perimeter of the proposed project area and its surroundings on the 23rd of November 2023. The on-site notices and posters included the following information:

- Project name;
- Applicant name;
- Project location;
- Description of the environmental authorisation application process;
- Legislative requirements; and
- Relevant EAP contact person details for the project.

Please refer **Appendix C** for proof of site notice and poster placement.

7.4.3 NEWSPAPER ADVERTISEMENTS

One advertisement (English, Setswana and Afrikaans) was placed on the 23rd of November 2023 in the Steelburger/Lydenburg Newspaper with circulation in the vicinity of the project area. The details of the advertisements are presented below.

The newspaper advertisement included the following information:

- Project name;
- Applicant name;
- Project location;
- Description of the environmental authorisation application process;
- Legislative requirements; and
- Relevant EAP contact person details for the project.

7.5 NOTIFICATION OF AVAILABILITY OF SCOPING REPORT

Notification regarding the availability of this Scoping Report for public review has been given in the following manner:

- Registered letters with details on where the Scoping Report is available from, as well as the duration of the public review comment period, were distributed to all registered I&APs (which includes key stakeholders, affected and surrounding landowners, and registered occupiers);
- Facsimile notifications with information similar to that in the registered letter described above, were distributed to all registered I&APs; and
- Email notifications with a letter attachment containing the information described above were also distributed to all registered I&APs.

The Scoping Report will be available for public review from the 23rd of February 2024 until the 26th of March 2024, for a period of 30 days at the following venues:

- Lydenburg Public Library; and

- Various Tribal Authority Offices in the area;
- Electronic copies will be available on the EIMS website (www.eims.co.za/public-participation/).

7.6 ISSUES AND REPONSES

Issues raised to date have been addressed in a transparent manner and the full details (such as the comment received, the name of the I&AP who commented, the issue raised and the main aspect of the raised issue, as well as the response provided to the I&AP) included in the Public Participation Report (**Appendix C**). As the project is still at the Scoping stage most of the comments received so have been requests to be included on the database and requests for additional information, refer to **Table 16** for a summary.

Table 16: Summary of issues or comments raised by I&APs

Issue/ Comment Raised	Aspect Affected	Summary of EAP Response
Request for Hardcopy of the Report for Mpumalanga Parks and Tourism Agency	Public Participation	Hardcopy will be provided to the MPTA during the public review period.
Requests to be Registered as I&APs	Public Participation	I&APs have been added to the project I&AP database.
Ensuring DARLEA and MPTA are consulted during the process.	Public Participation	All I&APs and Key stakeholders will be adequately consulted during the PP process.

7.7 REVIEW OF THE SCOPING REPORT BY COMPETENT AUTHORITIES

MDARDLEA as the competent Authority for the listed activity must, within 43 days of receipt of the Final Scoping Report that has been subjected to 30 days of public review as a Draft Report, accept the Final Scoping Report and Plan of Study for EIA in writing should no amendments be required, or shortcomings be identified therein. Upon acceptance of the Scoping Report, the Environmental Assessment Practitioner (EAP) may then proceed with the tasks contemplated in the Plan of Study for EIA.

The authority can also reject the Scoping Report for not following legislative procedure if any of the required steps were not undertaken. In terms of Regulation 22 (b) of Government Notice R. 982, the Scoping Report may be amended and resubmitted by the EAP should it be rejected. On receipt of the amended Scoping Report and Plan of Study for EIA, the competent authority will then reconsider the application. Should the Scoping Report be approved, the amended Scoping Report will then be made available for public review and comment prior to submission to the Competent Authority. The authority may also advise the EAP of matters that may hinder the success of the EIA application or matters that may prejudice the success of the application.

7.8 PUBLIC PARTICIPATION PROCESS FOR EIA PHASE

The Public Participation Process (PPP) will be documented and included in the Environmental Impact Report (EIR). The PPP will be undertaken in accordance with the Plan of Study for EIA. The project I&APs will be updated on all project developments throughout the EIA Phase. A summary of comments received from the registered I&APs, the date of their receipt and responses of the EAP to those comments will be provided in the Comments and Response Report that will be updated during all project phases. All copies of any representations, objections and comments received will also be submitted to the competent authority together with the EIR.

7.9 APPEAL PERIOD

After a decision has been reached by MDARDLEA, Chapter 2 of the National Appeal Regulations 2014 makes provision for any affected person to appeal against the decision. Within 20 days of being notified of the decision by the competent authority, the appellant must submit the appeal to the appeal administrator. An appeal panel may be appointed at the discretion of the delegated or organ of state to handle the case and it would then

submit its recommendations to that organ of state for a final decision on the appeal to be reached. EIMS will communicate the decision of the Provincial Authority and the way appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the final decision has been received.

8 ENVIRONMENTAL ATTRIBUTES AND BASELINE

This section of the Scoping Report provides a description of the environment that may be affected by the proposed PV facility. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed project have been described. Climatic conditions such as clouds, hot temperatures, rain and snow can minimize the amount of solar energy that reaches solar panels, significantly decrease a solar panel's power production. However, there is a solution achieved through the BESS which allows for solar usage even on days with inclement weather. Baseline information sourced from various spatial datasets utilised to prepare the environmental attributes baseline below.

8.1 CLIMATE AND TEMPERATURE

The climatic conditions prevailing in Lydenburg are characterized by a warm and moderate temperature. In winter, there is much less rainfall in Lydenburg than in summer. According to Köppen and Geiger, this climate is classified as Cwb. The optimal temperature for solar panels is around 25°C. Solar panels perform best under moderate temperatures, as higher or lower temperatures can reduce efficiency. For every degree above 25°C, a solar panel's output can decrease by around 0.3% to 0.5%, affecting overall energy production. The mean yearly temperature observed in Lydenburg is recorded to be 15.2°C. This is approximately 10°C less than the optimal temperature for solar panels which makes the installation of the BESS very crucial to the PV facility's optimal performance throughout the year. **Figure 7** shows the monthly average temperatures for Lydenburg (Weatherspark, 2023).

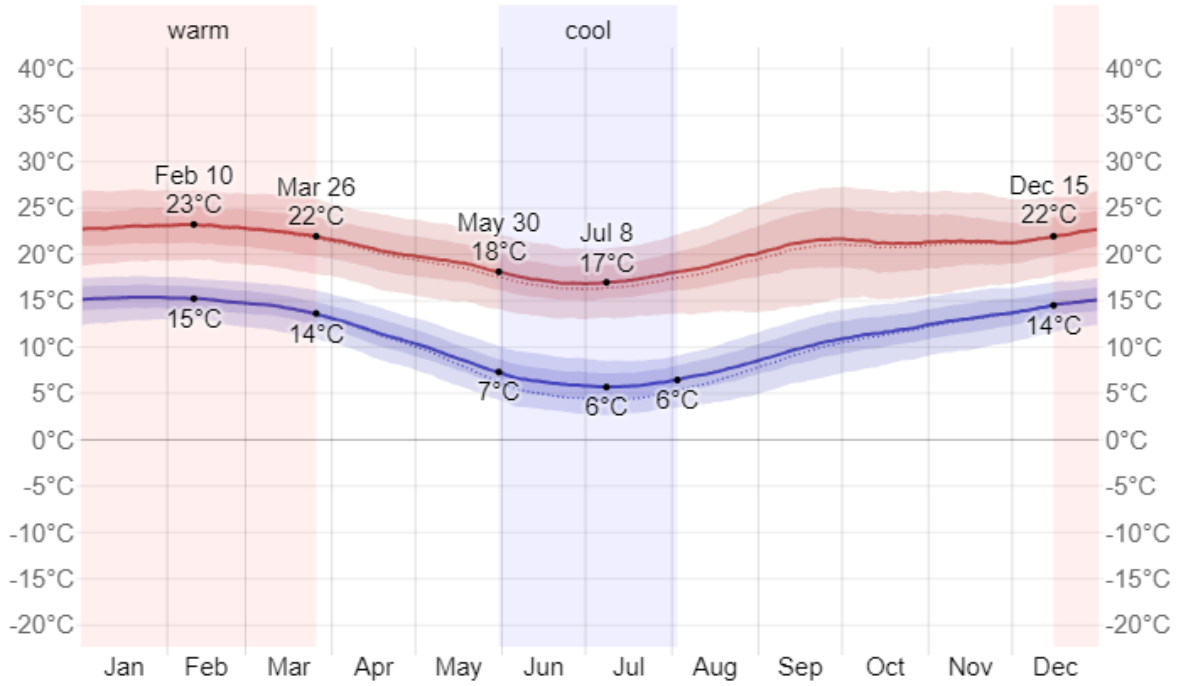

Figure 7: Average annual temperatures for Lydenburg (Weatherspark, 2023)

The length of the day in Lydenburg varies over the course of the year. In 2023, the shortest day is June 21, with 10 hours, 35 minutes of daylight; the longest day is December 22, with 13 hours, 42 minutes of daylight. The earliest sunrise is at 4:59 AM on November 30, and the latest sunrise is 1 hour, 44 minutes later at 6:44 AM on July 4. The earliest sunset is at 5:15 PM on June 8, and the latest sunset is 1 hour, 38 minutes later at 6:53 PM on January 13. Daylight saving time (DST) is not observed in Lydenburg during 2023. **Figure 8** below presents a compact representation of the sun's elevation (the angle of the sun above the horizon) and azimuth (its compass bearing) for every hour of every day in the reporting period. The horizontal axis is the day of the year, and the vertical axis is the hour of the day. For a given day and hour of that day, the background colour indicates the azimuth of the sun at that moment. The black isolines are contours of constant solar elevation.

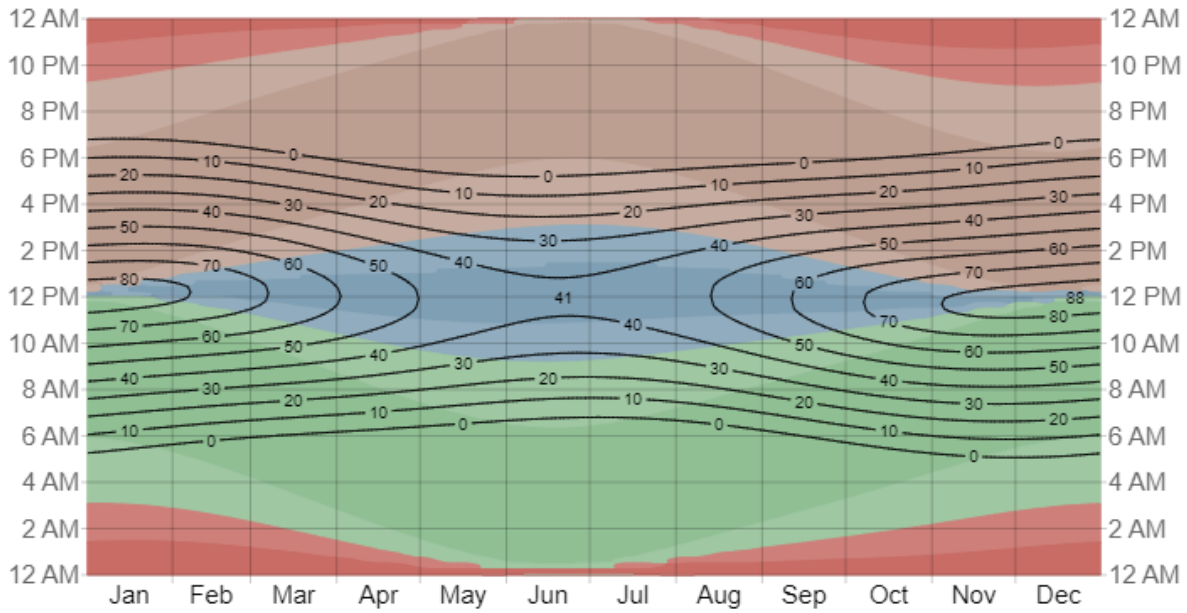

Figure 8: Solar elevation and azimuth over the course of the year 2023 for Lydenburg (Weatherspark, 2023)

8.2 RAINFALL AND CLOUD COVER

A wet day is one with at least 1mm of liquid or liquid-equivalent precipitation. The chance of wet days in Lydenburg varies very significantly throughout the year. Approximately 854mm of rainfall occurs on a yearly basis. The rainy season lasts for 5.5 months, from October 14 to March 29, with a greater than 28% chance of a given day being a wet day (see **Figure 9**). The month with the most wet days in Lydenburg is December, with an average of 16.5 days with at least 1mm of precipitation. The drier season lasts for *6.5* months, from March 29 to October 14. The month with the fewest wet days in Lydenburg is July, with an average of 0.7 days with at least 1mm of precipitation. The most common form of precipitation throughout the year is rain alone, with a peak probability of 55% in December (see **Figure 9**).

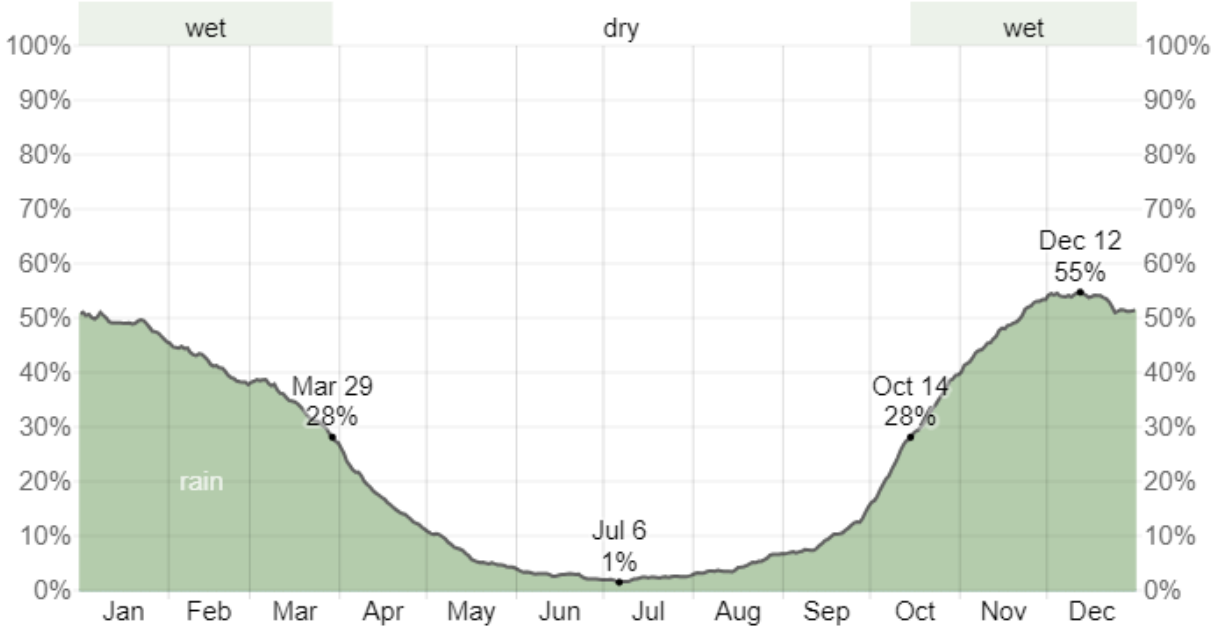

Figure 9: Average chance of precipitation for Lydenburg (Weatherspark, 2023)

The rainy period of the year lasts for 8.5 months, from September 1 to May 17, with a sliding 31-day rainfall of at least 13mm. The month with the most rain in Lydenburg is January, with an average rainfall of 119mm.

The rainless period of the year lasts for 3.5 months, from May 17 to September 1. The month with the least rain in Lydenburg is July, with an average rainfall of 5mm (see **Figure 10** obtained from Weatherspark, 2023). Solar panels can still operate in the rain, but their power output depends on cloud coverage. Heavy rain clouds will most likely hinder energy production, but rainfall provides a safe and easy way to clean solar panels. Rain actually helps to keep your panels operating efficiently by washing away any dust or dirt.

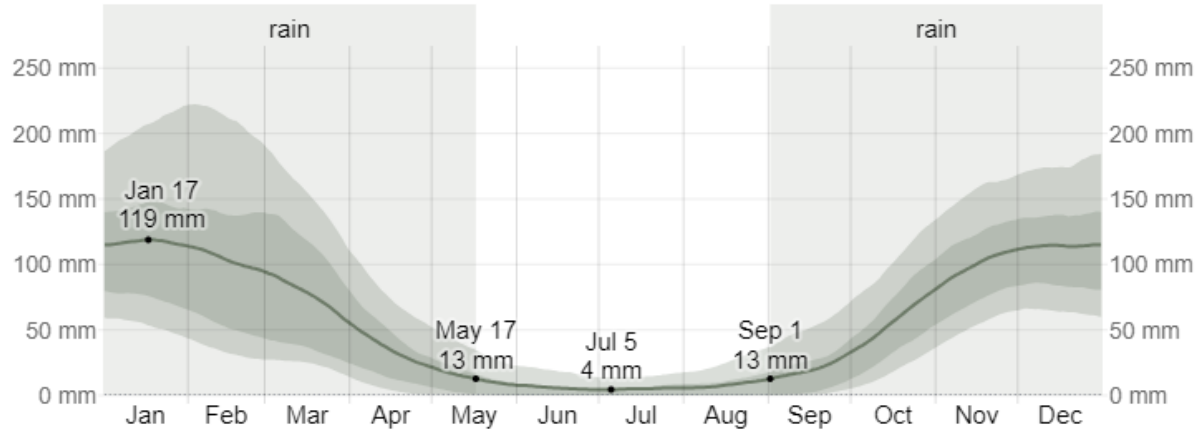

Figure 10: Average rainfall for Lydenburg (Weatherspark, 2023)

In Lydenburg, the average percentage of the sky covered by clouds experiences significant seasonal variation over the course of the year. The clearer part of the year in Lydenburg begins around March 11 and lasts for 7.1 months, ending around October 14. The clearest month of the year in Lydenburg is June, during which on average the sky is clear, mostly clear, or partly cloudy 92% of the time. The cloudier part of the year begins around October 14 and lasts for 4.9 months, ending around March 11. The cloudiest month of the year in Lydenburg is December, during which on average the sky is overcast or mostly cloudy 44% of the time.

8.3 SOLAR ENERGY

This section discusses the total daily incident shortwave solar energy reaching the surface of the ground over a wide area, taking full account of seasonal variations in the length of the day, the elevation of the Sun above the horizon, and absorption by clouds and other atmospheric constituents. Shortwave radiation includes visible light and ultraviolet radiation. This section is important for the proposed development as it shows the potential solar energy which can be absorbed by the solar panels.

The average daily incident shortwave solar energy experiences significant seasonal variation over the course of the year. The brighter period of the year lasts for 4.6 months, from October 15 to March 3, with an average daily incident shortwave energy per square meter above 6.8 kWh. The brightest month of the year in Lydenburg is January, with an average of 7.3 kWh. The darker period of the year lasts for 2.7 months, from May 10 to July 31, with an average daily incident shortwave energy per square meter below 4.9 kWh. The darkest month of the year in Lydenburg is June, with an average of 4.3 kWh (see **Figure 11**).

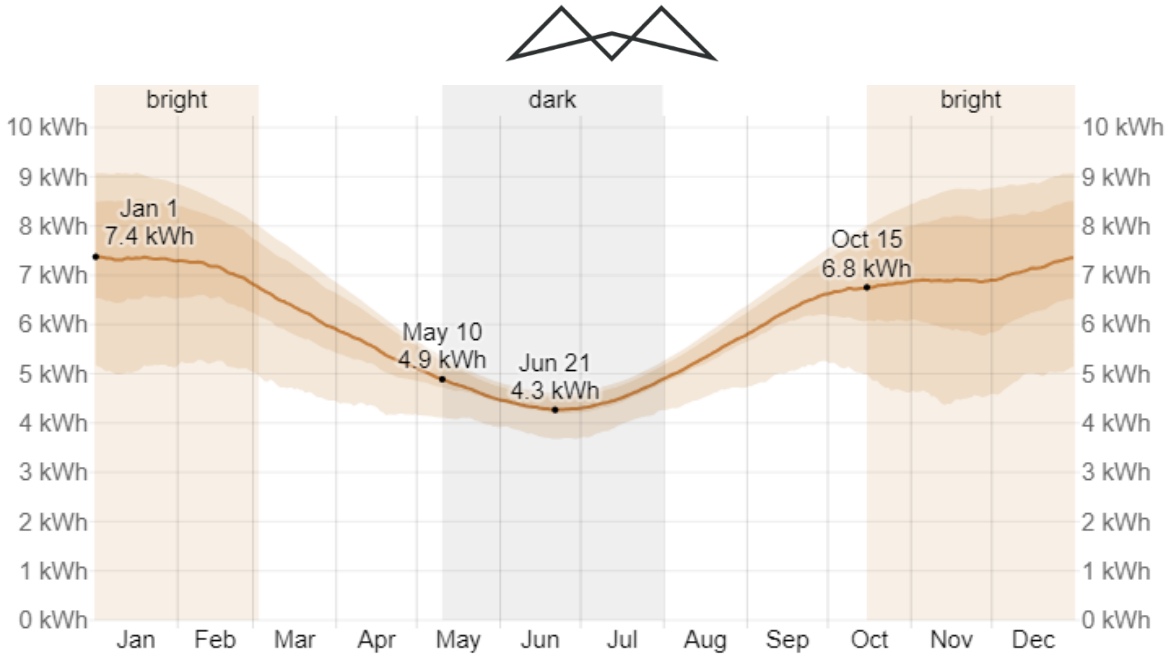

Figure 11: Average daily shortwave solar energy reaching the ground per square meter (Weatherspark, 2023)

8.4 TOPOGRAPHY

Lydenburg is located at the base of the Long Tom Pass on the banks of the Sterkspruit River. The average elevation of Lydenburg is 1,410 meters above sea level (m.a.s.l). The topography within 3km of Lydenburg contains only modest variations in elevation, with a maximum elevation change of 142 meters. Within 16km, contains only modest variations in elevation (1,148m). Within 80km also contains extreme variations in elevation (1,919m).

8.5 GEOLOGY

Based on the Geological Map Data obtained from the Council for Geosciences, the study area forms part of the Pretoria Group; Silverton Formation; comprised of the Machadodorp, Lydenburg and Boven Members. These members consist of basic lavas, mudstones, laminated shales, tuff, agglomerate and hornfels (see **Figure 18**). These lithologies have been intruded by dolerite dykes and extruded over with diabase sills.

Based on the Jasper Müller Associates CC (2006) Geology Report, the area is located on the sediments and volcanics of the Transvaal Sequence that form the Highveld Areas and the Escarp. The Transvaal Sequence overlies the basement rocks of the Lowveld Region to the far west. Intrusive into the Transvaal rocks and exposed to the east, are the basic layered rocks of the Rustenburg Layered Suite of the Bushveld Complex. The strata of the Transvaal Sequence have a regional dip ranging between 10 and 25 degrees to the west. Numerous basic dykes and sills of various ages are present throughout the study area and (contact) metamorphism of shale to hornfels, is locally largely attributable to these sills.

The members of the Pretoria Group that are relevant to the study area are Lydenburg Works are indicated below:

- Pretoria Group - Silverton Formation - Boven Member - Greenish, fine-grained, shale and mudstone with tuff and subordinate carbonate layers, hornfels in places.
- Pretoria Group - Silverton Formation - Machadodorp Member - Very finegrained tuff, coarser grained agglomerate and basic lava.
- Pretoria Group - Silverton Formation - Lydenburg Member - Greenish, finegrained, laminated shale and subordinate mudstone, inter-layered carbonate layers rare, hornfels in places

Informally and collectively referred to as Transvaal Diabase, the Marico Diabase Suite rocks are intrusive into all horizons of the Transvaal Sequence, mainly on the southern side of the Bushveld Complex and more particularly on the south-eastern side. The Maruleng Diabase sills are largely confined to the margin of the Bushveld

Complex, while the Lydenburg Diabase occurs farther out. The diabase sills vary in thickness from 1 m to over 300 m. They are particularly prolific in the strata of the Pretoria Group where intrusion of the thicker sills occurred, characteristically at the contact between shales and quartzites and often over long distances of strike (Jasper Müller Associates CC, 2006).

8.6 SOIL AND LAND CAPABILITY

Based on the ARC-Institute for Soil, Climate and Water (ARC-ISCW) 2006 Report for the Smelter, the dominant soils within the area are Mispah, Hutton and Tukulu soils. The soils range from socky soils, shallow, structureless soils, moderately deep, structureless soils and clay soils of wetter areas to miscellaneous. The soils description and their agricultural potential is indicated in **Table 17**.

Table 17: Soils and Agricultural Potential (ARC-ISCW, 2006)

Dominant Soil Form(s)	Sub-dominant Soil Form(s)	General description of soils occurring	Agricultural Potential
Rocky soils			
Mispah	Hutton, Glenrosa	Brown to reddish-brown, structureless sandy clay loam to clay loam topsoils on hard (occasionally weathering) rock. Much rock outcropping is present.	Very low
Shallow, structureless soils			
Mispah	Hutton, Glenrosa	Brown to reddish-brown, structureless sandy clay loam to clay loam topsoils on hard (occasionally weathering) rock. Occasional rock outcropping is present.	Low
Hutton	Mispah, Glenrosa	Brown to reddish-brown, structureless sandy clay loam to sandy clay topsoils on red to reddish-brown, structureless sandy clay loam to loam subsoils on hard (occasionally weathering) rock. Occasional rock outcropping is present.	Low
Moderately deep, structureless soils			
Hutton	Bainsvlei	Brown to reddish-brown, structureless sandy clay loam to sandy clay topsoils on red, structureless sandy clay loam to clay subsoils on hard rock, occasionally with a mottled, gravelly layer above the rock.	Moderate
Clay soils of wetter areas			
Tukulu	Sepane, Katspruit	Brown to dark brown, weakly structured sandy clay loam to clay loam topsoils on brown to dark brown, weakly (occasionally moderately) structured clay loam to clay subsoils on greybrown, mottled clay subsoils. Lowest lying areas are very wet, with surface water.	Low
Miscellaneous			
Mispah	Various	Areas that have been disturbed, mixed and/or excavated by human activities, with varying structure and texture. Includes depressions, soil heaps and other disturbance. Impossible to classify soils.	Very low

Based on the preliminary soil information, quaternary deposits in the region include residual soils, alluvial and scree deposits. The soils in the area are usually in the region of 2m thick. The soils were found to be shallow to moderately deep, red to brown, medium textured soils with rock outcrops in places. The soils along the stream are darker brown, with a heavier texture and signs of wetness lower in the profile. In addition, the soils are known to be possibly restricted depth in places, otherwise have favourable texture (ARC-ISCW, 2006). The Bainsvlei (Hutton) soils are the only soils with a moderate agricultural potential. As there are some minimal

subsistence agricultural activities and homestead within the northern portion of the proposed development site, moderate impact on soils and agricultural impact is anticipated from the proposed development.

8.7 CULTURAL AND HERITAGE RESOURCES

The objective of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is to introduce an integrated system for the management of national heritage resources. The Act defines a 'heritage resource' as any place or object of cultural significance (aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance). The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa is required by this Act. This section of the report presents the heritage status of the proposed PV facility in Lydenburg.

According to the national web-based environmental screening tool (DFFE Screening Tool Report), the proposed development is located within an area of *very high* relative archaeological and cultural heritage theme sensitivity (see **Figure 12**). An assessment of the NHRA and preliminary project information revealed that the proposed development triggers Section 38(1) of the NHRA. Therefore, a Heritage Impact Assessment is required and will be undertaken in the EIA Phase. The South African Heritage Resources Agency (SAHRA), the Mpumalanga Provincial Heritage Resources Authority (MHRA) and Association of Southern African Professional Archaeologists (ASAPA) are I&APs in the project and will be provided with a copy of the report for review and comment.

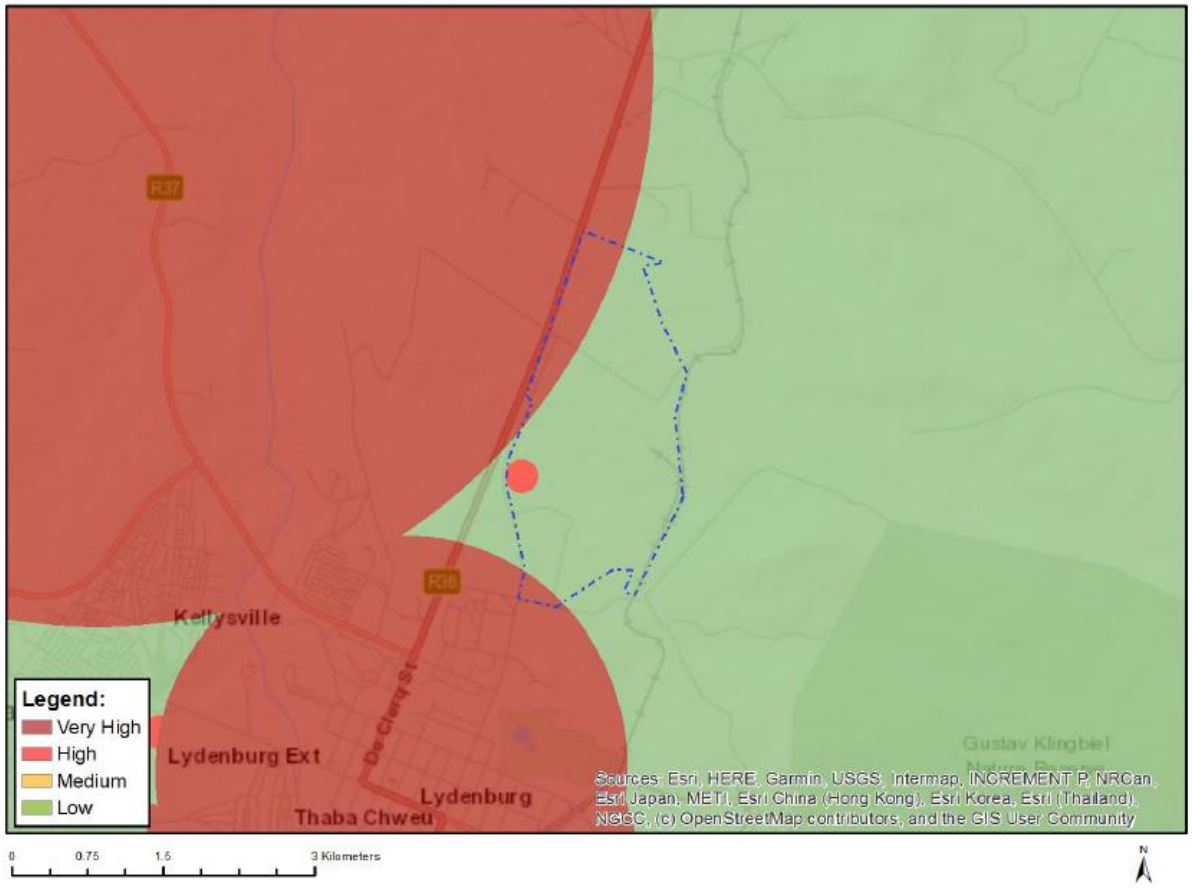

Figure 12: Map of relative archaeological and cultural heritage theme sensitivity (DFFE, 2023)

8.8 PALAEONTOLOGY

Cultural Heritage in South Africa, including all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include "all objects recovered from the soil or waters of South Africa, including archaeological and **palaeontological objects** and material, meteorites and rare geological specimens". Palaeontological heritage is exceptional and non-

renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

Based on the 1:250 000 SAHRIS PalaeoMap and the National Web-Based Screening Tool Report, the study area is located within a High Palaeo-Sensitivity area (see **Figure 13**). The study area is located on an area which has been transformed and the proposed development entails excavations of the topsoil with no deep excavations anticipated. Although no deep drilling or excavations will be required for construction of the PV facility, due to the extent of the development footprint and the high palaeo-sensitivity rating, it is consequently the a requirement that a Palaeontological Impact Assessment (PIA) be undertaken for the project. The findings and mitigation measures of the PIA will be discussed in the EIA phase.

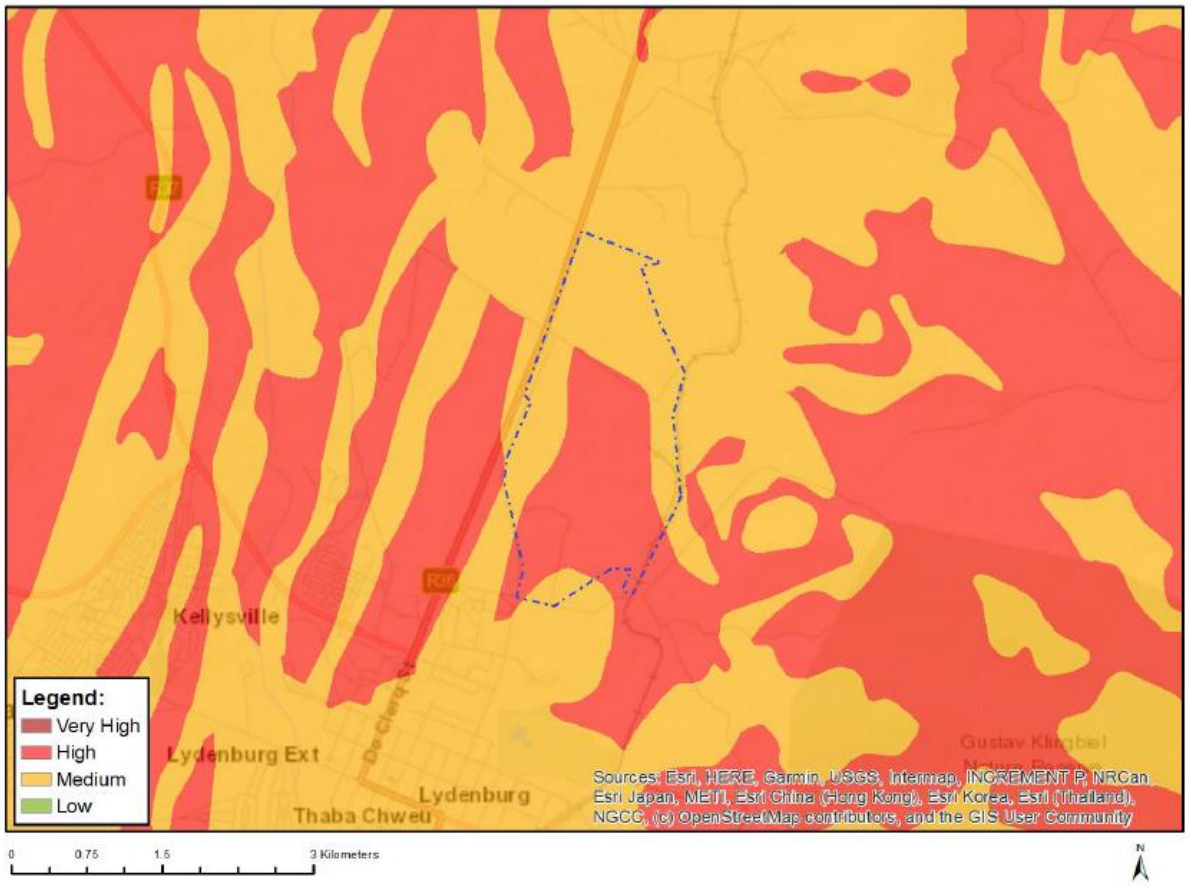

Figure 13: Map of relative paleontology theme sensitivity (DFFE, 2023)

8.9 SURFACE WATER

South Africa is divided into nineteen (19) Water Management Areas (WMAs). The delegation of water resource management from central government to catchment level is achieved by establishing Catchment Management Agencies (CMAs) at WMA level. Each CMA progressively develops a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a WMA is the CMS which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resources. According to the DWS water management areas delineations, the proposed PV facility is situated in the Olifants Water Management Area (Tertiary Drainage Region B42).

Based on review of desktop information, it was found that the study area is located at least 5km from the nearest strategic water source area. The Potloodspruit is however, located immediately adjacent boundary of the northern portion. In addition, the study area is located within an ESA: Important sub-catchments (see **Figure 14**). Based on potential impacts on surface and groundwater through the establishment of the 375ha PV facility and associated infrastructure such as battery energy storage system, an Aquatic Biodiversity Assessment is required for the proposed development.

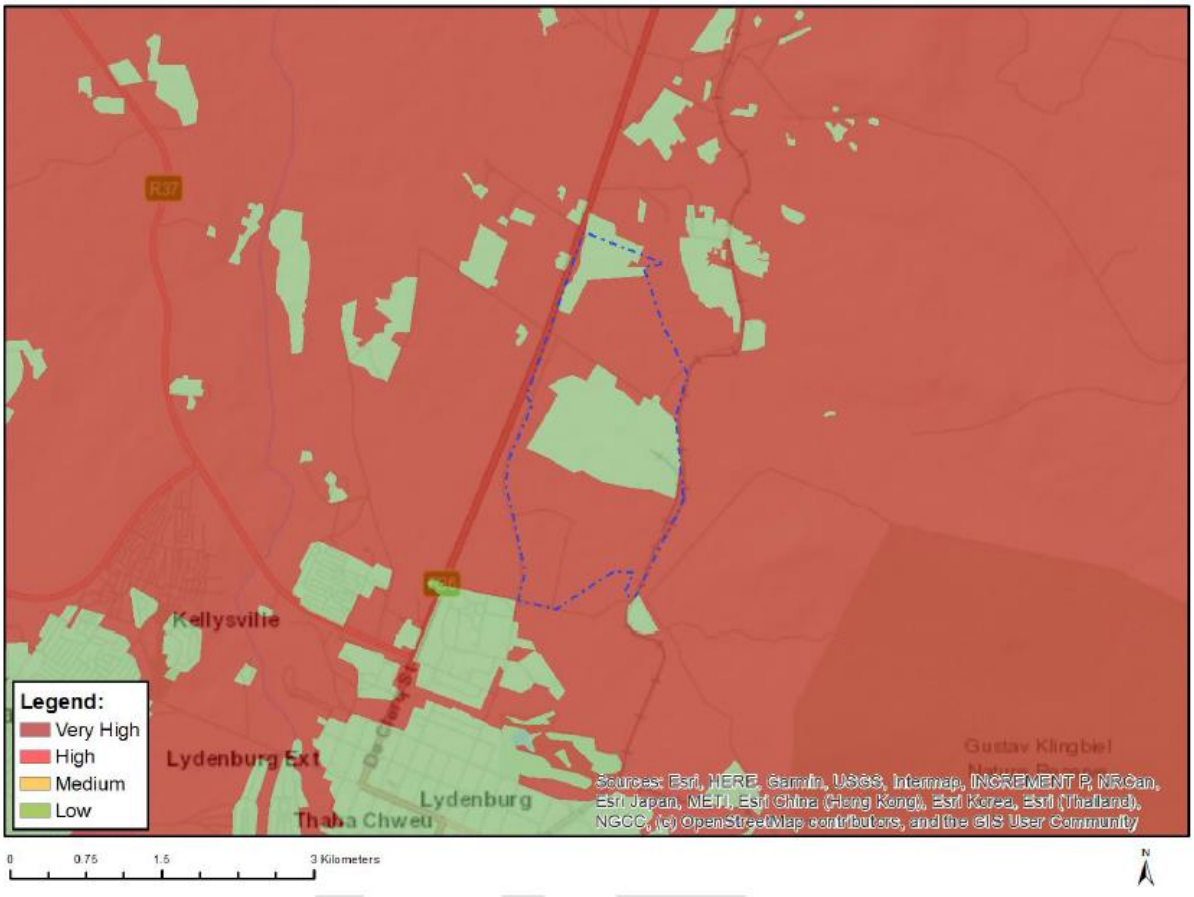

Figure 14: Map of relative aquatic biodiversity theme sensitivity (DFFE, 2023)

8.10 TERRESTRIAL BIODIVERSITY AND VEGETATION

Terrestrial biodiversity is the variety of life forms on the land surface of the Earth. High biodiversity is an indicator of a healthy ecosystem, which is directly linked to human health. Animals and plants are responsible for many vital services our lives depend on, including:

- oxygen production;
- water regulation;
- soil retaining; and
- providing flood protection.

Biodiversity is both a part of nature and affected by it. Some biodiversity loss is because of events such as seasonal changes or ecological disturbances (wildfires, floods, etc.), but these effects are usually temporary, and ecosystems have managed to adapt to these threats. Human-driven biodiversity loss, in contrast, tends to be more severe and long-lasting. The human-made climate crisis is leading to environmental destruction, habitat loss, and species extinction. Terrestrial biodiversity is decreasing rapidly through habitat loss: a process where a natural habitat becomes incapable of supporting its native species, which are consequently displaced or killed. In the recent past, there have Increased efforts implemented to prevent further loss of terrestrial biodiversity

and the ecosystem services they provide. The characteristics and implications of the terrestrial biodiversity within the Lydenburg site are discussed below.

8.10.1 ECOLOGICALLY IMPORTANT LANDSCAPE FEATURES

The following features describe the general area and habitat, this assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and SANBI.

Table 18: Desktop and background spatial features examined

Desktop Information Considered	Relevant/Irrelevant
Critical Biodiversity Area	Irrelevant. The study area does not transect CBAs.
Ecosystem Threat Status	Irrelevant. The study area is located within the Lydenburg Thornveld vegetation which is a least concerned status.
Ecosystem Protection Level	Irrelevant. The Lydenburg Thornveld vegetation is not a protected ecosystem.
Protected Areas	Relevant. The study area is within an ESA: Protected Area buffer and also adjacent to the Lydenburg Nature Reserve area.
National Protected Area Expansion Strategy	Relevant. The study area transects a National Protected Area Expansion Strategy area.
Important Bird and Biodiversity Areas	Irrelevant. The study area does not transect Important Bird and Biodiversity Areas. However, the study area is approximately 4km southwest of the Kruger to Canyon Biosphere Reserve.
South African Inventory of Inland Aquatic Ecosystems	Irrelevant. The study area does not transect any nor is within close proximity of South African Inventory of Inland Aquatic Ecosystems.
National Freshwater Ecosystem Priority Areas	Irrelevant. The study area does not transect any nor is within close proximity of National Freshwater Ecosystem Priority Areas.
Strategic Water Source Areas	Irrelevant. The study area does not transect Strategic Water Source Areas (SWSA). The closest SWSA is approximately 5km northeast of the proposed development site.

8.10.2 MPUMALANGA BIODIVERSITY SECTOR PLAN

Mpumalanga is a province well known for its globally important biodiversity, its wealth of natural resources and spectacular natural vistas. Its terrestrial ecosystems are characterised by high levels of both plant and animal diversity and a significant number of unique species that are not known to occur anywhere else outside the province. Mpumalanga's freshwater ecosystems are also home to important biodiversity and represent high value ecological infrastructure for delivering water for human use. Mpumalanga's biodiversity and ecological infrastructure is a valuable, though vulnerable, asset that could be a rich source of natural solutions to the challenges posed by poverty, unemployment, and climate change. But, for this potential to be realised, there is a need for accurate and up-to-date scientific information that is effectively interpreted and made available to end-users. Well-informed policies and legislation that safeguards important biodiversity and ecological infrastructure, together with well-capacitated institutions that are responsible for effective management and governance of biodiversity assets are also needed.

The Mpumalanga Biodiversity Sector Plan (MBSP) is such a spatial tool which serves to provide such information to end-users and guide decision making to ensure that the biodiversity objectives are achieved. The MBSP covers the whole province, which is divided into three District Municipalities: Ehlanzeni, Gert Sibande, and Nkangala, and forms part of a broader set of national biodiversity planning tools and initiatives that are provided for in national legislation and policy. The MBSP is based on an objective planning approach which considers national and provincial biodiversity targets while trying to avoid conflict with competing land uses. Planning for climate change is a common thread throughout the MBSP where it has been explicitly considered and incorporated into

the spatial priorities. It supports the principles of integrated development planning and integration with Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs). It comprises a set of maps of biodiversity priority areas accompanied by contextual information and land-use guidelines that make the most recent and best quality biodiversity information available for use in land-use and development planning, environmental assessment and regulation, and natural resource management.

Both terrestrial and freshwater biodiversity priority areas are identified in the MBSP, either as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). These CBA and ESA areas must be considered and taken into account in processes that will result in a change in land use and will also form part of the geographic areas in which certain activities will require environmental authorisation in terms of Listing Notice 3 of the NEMA EIA Regulation, 2014 as amended. According to the MBSP, the project area mostly overlaps with 'ESA Protected Areas Buffer' (see **Figure 19**).

The site has been transformed mainly due to the mining and small grazing activities which have disturbed the fauna and floral habitats. Based on previous biodiversity studies undertaken for the smelter (Jasper Müller Associates, 2006), the grasslands were found to possess medium to high vegetation species diversity as well as a low percentage of invader species. This provides a greater variety of habitat for flora and fauna species. Even though the impact on floral species is anticipated to relatively *medium-low*, the extent of the site and potential presence of important biodiversity cannot be excluded. Therefore, this area is classified as moderately disturbed, with a medium ecological quality and a Terrestrial Biodiversity Impact Assessment will be undertaken duringthe EIA phase.

8.10.3 THE NATIONAL BIODIVERSITY ASSESSMENT

The National Biodiversity Assessment (NBA) was completed as a collaboration between the SANBI, the DEA and other stakeholders, including scientists and biodiversity management experts throughout the country over a three-year period. The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors.

The two headline indicators assessed in the NBA are ecosystem threat status and ecosystem protection level which are discussed in more detail in the sub-sections below.

8.10.3.1 ECOSYSTEM THREAT STATUS

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition. According to the National Vegetation Data (2018) obtained from SANBI, the proposed development site is located within the Lydenburg Grassland (**Figure 20**).

The Lydenburg Grassland was previously known as the North-eastern Mountain Sourveld (Acocks 1953) and North-Eastern Mountain Grassland (Low & Rebelo 1996). According to Mucina & Rutherford (2006), this vegetation unit is situated in a broad band between the high-lying mountains from just north of Ohrigstad, tapering southwards through Lydenburg to as far south as the area in the vicinity of the Kwena Dam. This vegetation unit occurs at lower levels at the foot of the mountains and on undulating plains. This is open, frost-hardy woodland. Structurally this unit comprises closed grassland which is almost always wooded, sometimes densely so in rocky areas and less so in frost-ridden valleys where *Vachellia karroo* is still able to persist. Many woody plants have evolved a *suffrutex* habit (*Argyrolobium wilmsii*), where aerial parts die back to an underground rootstock during cold winters. It is a transition zone between the high lying grasslands and the warmer and drier bushveld areas.

According to Mucina & Rutherford (2006), Lydenburg Thornveld is listed as vulnerable ecosystem. The conservation target is 27% and 2% is protected (Gustav Klingbiel and Ohrigstad Dam Nature Reserves). A total of 22% of this unit has been transformed mainly by dryland and irrigated cultivation. Rainfall is generally too low for aforestation or plantations. Erosion from very low (45%), low (26%) and moderate (18%). It must be noted

that according to the NBA 2018 dataset from SANBI, Lydenburg Thornveld is currently classified as a least concerned ecosystem threat status.

8.10.3.2 ECOSYSTEM PROTECTION LEVEL

Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected (NP), poorly protected (PP), moderately protected (MP) or well protected (WP), based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act. The project area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development (**Figure 20**). The proposed development overlaps with poorly protected ecosystem.

8.10.3.3 FLORA, FAUNA AND AVIFAUNA

According to the study that was undertaken for the Lydenburg smelter by Jasper Müller Associates (2006), no endangered, vulnerable or rare species were observed in the area. Potential vulnerable species might, however, occur in the region. According to the study, Lydenburg is a site of low importance for threatened mammal, bird, amphibian and reptile species. It also has a medium-low intrinsic biodiversity value in terms of specific species and a medium intrinsic biodiversity value in terms of important communities.

The natural grassland within the proposed site is mainly used for mining and grazing purposes. The grasslands, possess medium to high vegetation species diversity as well as a low percentage of invader species. This provides a greater variety of habitat for animal species. Even though the impacts on animal life is anticipated to be relatively medium-low, the extent of the site and potential presence of important biodiversity cannot be excluded. Therefore, this area is classified as moderately disturbed, with a medium ecological quality. A Terrestrial Biodiversity Impact Assessment with components of flora, fauna and avifauna will be undertaken during the EIA phase.

8.11 SURROUNDING LAND USES AND DEMOGRAPHICS

8.11.1 LAND USES

Thaba Chweu Local Municipality area comprises of urban, rural and tribal areas (villages), which each have its own characteristics. Accordingly, land use in the rural areas are mainly characterised by forestry and other agricultural and farming uses, mining as well as tourism attractions that form an integral part of the spatial structure of these areas. In this regard the area is well known for the many areas of geological and historical interest, scenic beauty and natural vegetation, such as waterfalls; passes; gorges; rivers; dams, etc. The municipality as a result boasts several nature reserves as proclaimed. According to the integrated development plan and deeds offices, the properties owned by the applicant are demarcated for industrial use except for farm portion 143/30 which is zoned agricultural. However, a rezoning process is currently in progress to rezone this property to industrial as well.

The study area is separated into two portions by the CMI Smelter, namely, the southern section and the northern section with the CMI Smelter in the centre (see **Figure 1**). The area surrounding the study area is largely open veld to the east and west, industries and residential areas to the south, homesteads, and small lodging establishment to the north. See **Figure 2** for a map of the landcover in and around the proposed development sites. The extended surrounding areas including residentials areas, protected areas, mining, grasslands and agricultural fields. Based on the Global Land Cover SHARE (GLC-SHARE) 2014 database by Latham et al., (2014), the area within 3 kilometers of Lydenburg is covered by grassland (73%) and artificial surfaces (25%), within 16 kilometers by grassland (60%) and cropland (21%), and within 80 kilometers by grassland (34%) and cropland (33%).

8.11.2 DEMOGRAPHICS AND EMPLOYMENT STATISTICS

8.11.2.1 EHLANZENI DISTRICT MUNICIPALITY

The information presented in this section was summarized from the Department of Cooperative Governance and Traditional Affairs (CoGTA) (2020), StatsSA, 2016 by Wazimap and the TCLM IDP 2022-2027. The Ehlanzeni

District Municipality is one of the three district municipalities that form part of the Mpumalanga province. Municipality is bordered by Mozambique and Swaziland in the east, Gert Sibande District in the south, Mopani and Sekhukhune Districts of Limpopo in the north and Nkangala District Municipality in the west. The district comprises four local municipalities of Bushbuckridge, City of Mbombela, Nkomazi and Thaba Chweu. The municipality also comprises a District Management Area (DMA) in the southern part of Kruger National Park. With the incorporation of Bushbuckridge into Ehlanzeni the total area coverage of the district is approximately 27,895.47 Km^2.

The district is based in Nelspruit the provincial capital of Mpumalanga. Its main route the N4 Maputo corridor transverse the district from the east of Maputo harbour – that is in Mozambique – through Gauteng province to the North-West Province in the west; and the R40 Maputo sub-corridor transverse the district from Barberton in the south linking Swaziland to Phalaborwa that is Limpopo Province in the north.

According to the CoGTA (2020), with the population of 1 856 753 people in 2019, the Ehlanzeni District Municipality houses about 40% of Mpumalanga province's population and 3.2% of South Africa's total population. The number of people without any schooling in the District stands at 47.8%. In 2018, there were 1.24 million people living in poverty, using the upper poverty line definition, across the Ehlanzeni District. The percentage of people living in poverty has however decreased from 74.85% in 2008 to 67.27% in 2018. In the Ehlanzeni District Municipality, the economic sectors that recorded the largest number of employment in 2019 were the trade sector with a total of 111 000 employed people or 24.1% of total employment in the district municipality. The community services sector with a total of 102 000 (22.2%) employs the second highest number of people relative to the rest of the sectors. The electricity sector with 3 100 (0.7%) is the sector that employs the least number of people in Ehlanzeni District Municipality, followed by the mining sector with 7 760 (1.7%) people employed (see **Figure 15** obtained from CoGTA, 2020).

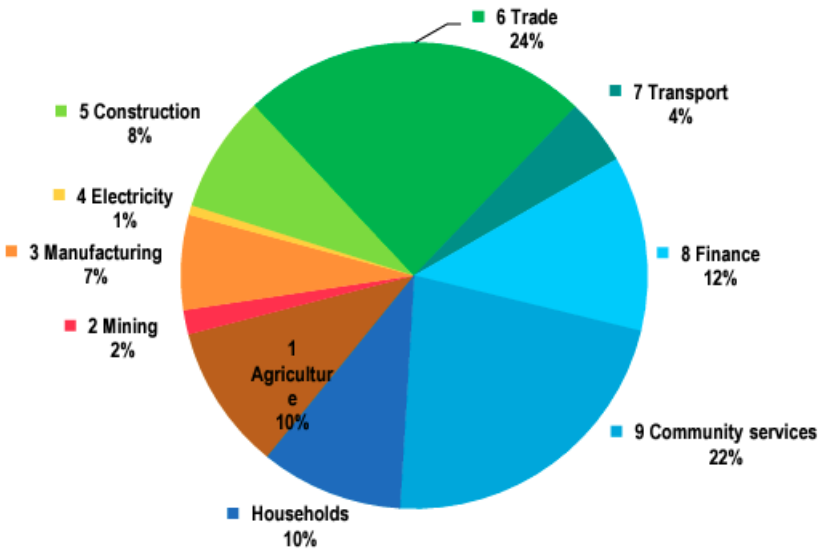

Figure 15: Total Employment Composition of Ehlanzeni District Municipality (CoGTA, 2020)

In 2019, there were a total number of 262 000 people unemployed in Ehlanzeni, which is an increase of 118 000 from 144 000 in 2009. The total number of unemployed people within Ehlanzeni constitutes 43.41% of the total number of unemployed people in Mpumalanga Province. The Ehlanzeni District Municipality experienced an average annual increase of 6.15% in the number of unemployed people, which is worse than that of the Mpumalanga Province which had an average annual increase in unemployment of 5.39% (CoGTA, 2020).

8.11.2.2 THABA CHWEU LOCAL MUNICIPALITY

Thaba Chweu Local Municipality (TCLM) is located on the western part of the district and it derives its name from Sesotho meaning "white mountain" as the municipal area is surrounded by mountains and it is also misty. Its extent is 5 719km^2 and the escarpment that runs through Thaba Chweu divides the locality into eastern and western halves. The western half (Lydenburg area) is dominated by agricultural and farming activities, while

forestry is the main economic activity of the eastern half (Sabie/Graskop area). Thaba Chweu is one of the major tourist attraction areas in South Africa. Mashishing (previously Lydenburg) is the oldest town in the province, and a hub of heritage where the famous Lydenburg Heads, which are said to date back to 400AD, were found in the 1950s. Also found here are old stone houses. Most of all, this is the home of trout fishing. Graskop is home to the Three Rondavels, The Blyde Canyon, Potholes, God's Window, The Pinnacle, Berlin, Lisbon, and Graskop Falls, all of which are World Heritage Sites, and form the Panorama Route. In the Sabie area, when travelling east of Mashishing through the Long Tom Pass, there are hectares of pine plantations. These mountains are part of the Drakensberg Mountain Range. The main economic sectors are mining, forestry, agriculture, business services, and tourism (CoGTA, 2020).

According to the Census results of Stats SA the TCLM population size in 2011 was 98387, 2016 it stood at 101 895, and in 2019 projections for 2022 were standing at 121 966 (TCLM, 2021). According to these statistics there is an increase in population size from 2011 to 2022 and we will experience a further increase in the population. This is due to migration and the high unemployment rate across all the neighbouring provinces/towns leading people to flock into Thaba Chweu as there are a few economic pull factors into the area (TCLM, 2021). Similarly to the district and provincial dynamics, TCLM the dominant race within TCLM is Black African with 84,962, over 80% of the population and followed by White group with just under 15% of the population (see **Figure 16**).

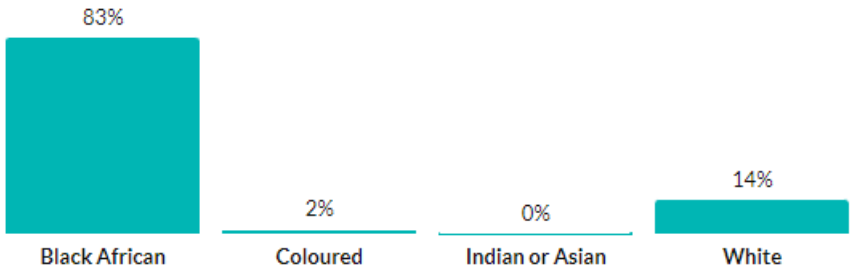

Figure 16: Population by race (Wazimap-StatsSA, 2016)

The graph above (**Figure 16)** presents the status quo in terms of the percentage of ethnic/race groups within TCLM. It shows that blacks/black people are the most dominant in the year 1996, 2001 and 2011 followed by whites/white people. This means that the municipal planning in terms of socioeconomic related up-liftment programmes and projects must target groups or speak or respond to the race with the highest percentage. The municipal plans have taken note of this information and are responding (through prioritisation of programmes and projects) to these figures through its relevant sector plans. Although there is still a huge backlog for most black households for basic infrastructure provision. The IDP development approach has identified all areas with black/black people dominance for basic service delivery back-log intervention and to address some of the- socio-economic challenges facing this race although the impact will be realised over a medium to long term period. Sepedi is the language most spoken at home, a little higher than the figure in Ehlanzeni (39.31%) and more than 1.5 times the figure in Mpumalanga (23.81%). The other more common languages in the area are Siswati and Afrikaans (see **Figure 17**). Language plays a key role in the PPP and has been factored into the communication methods implemented for this project.

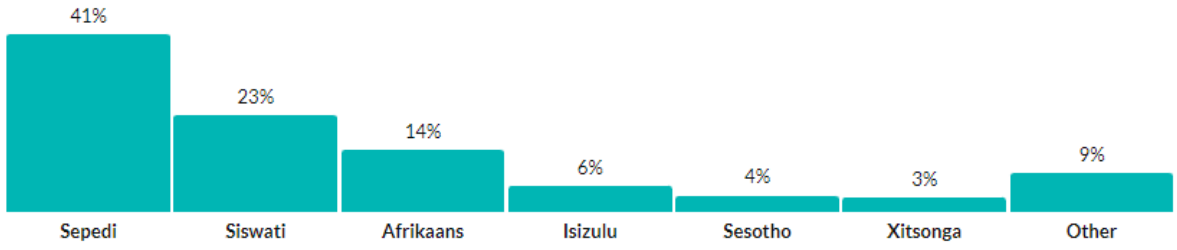

Figure 17: Population by language most spoken (Wazimap-StatsSA, 2016)

According to the socio-economic profile conducted by the department of economic development and tourism the provincial poverty rate stood at 50,2% in 2020 and this was seen last in 2009 on the poverty rate. The recorded percentage is due to the unemployment rate of the economically active group. The unemployment rate of Thaba Chweu in 2020 was 30,9% which increased from 24,2 in 2016. The table below outlines the poverty rate of Thaba Chweu as in 2015 and it outlined that it was at 21,0 which was an increase from 18,9% in 2011. This indicates that the poverty rate is continuously increasing as people migrate into Thaba Chweu at the quest of socio-economic benefits (TCLM, 2016).

8.12 SITE SPECIFIC PHOTOGRAPHS

Photographs were taken in all eight major directions from approximately the center of both the northern and southern sections of the proposed project area to give a visual indication of the site-specific attributes. The table of figures below, **Table 19**, includes all the photos in the eight major directions.

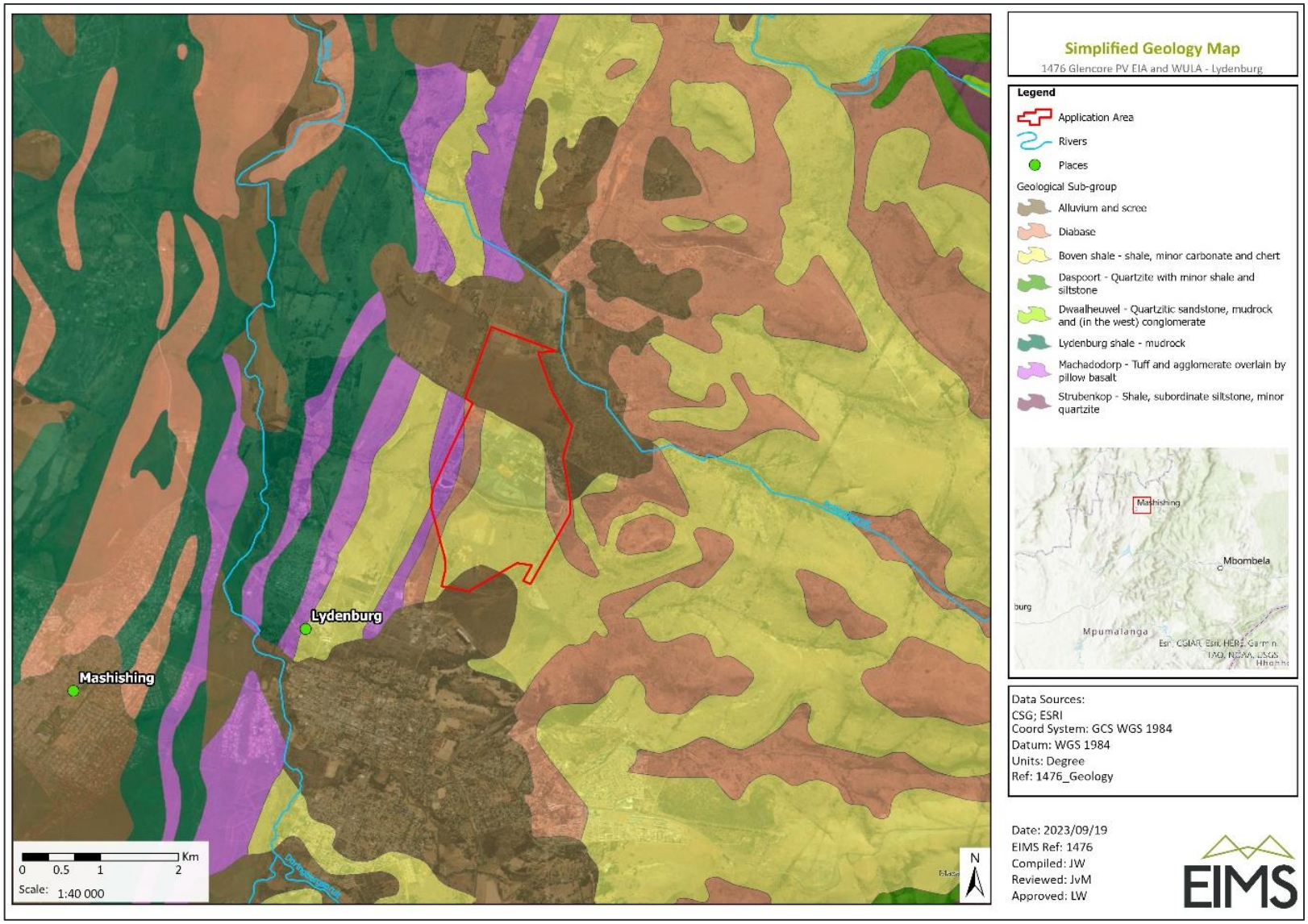

Figure 18: Lydenburg Geological Map

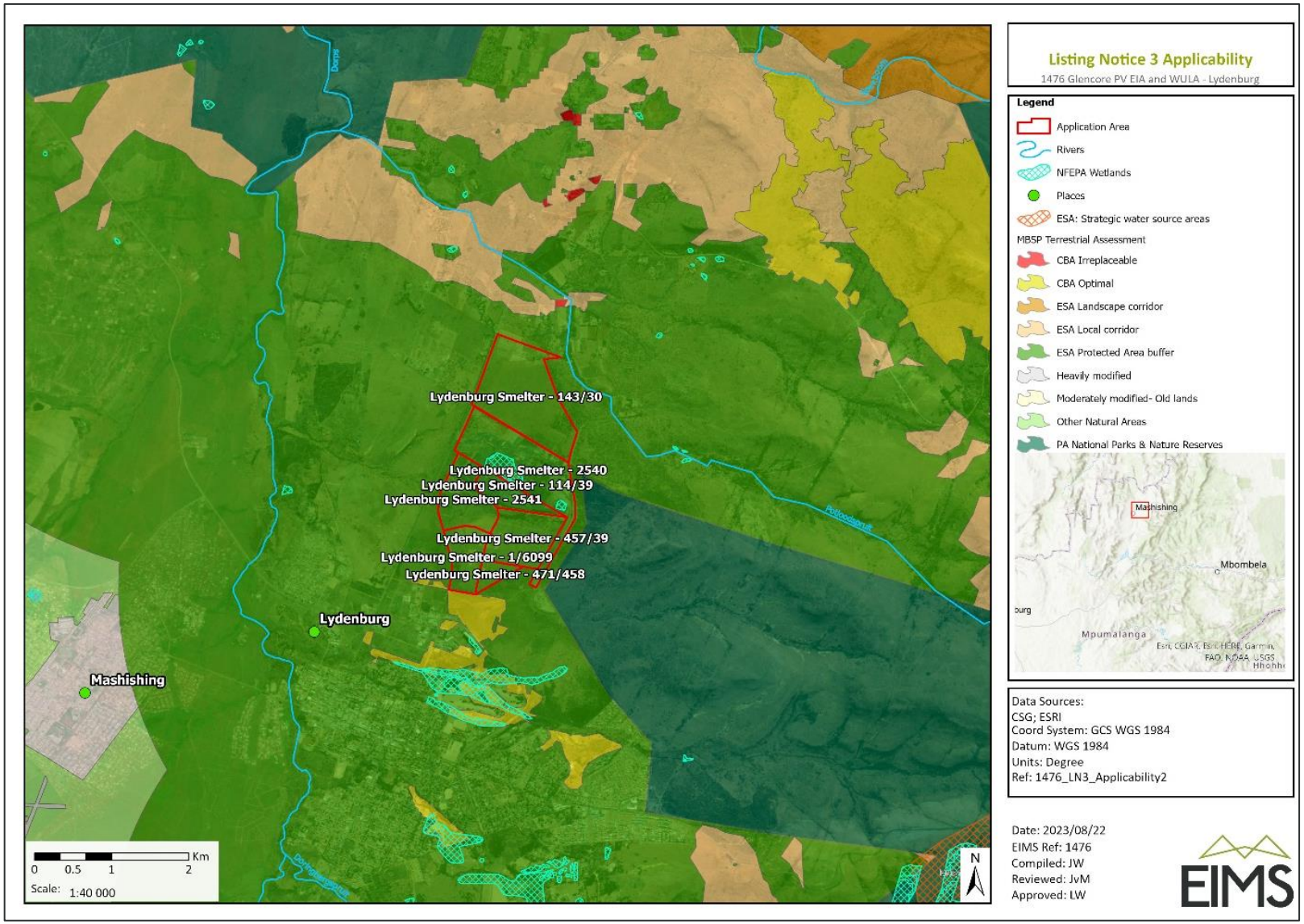

Figure 19: Site Conservation Plan Map

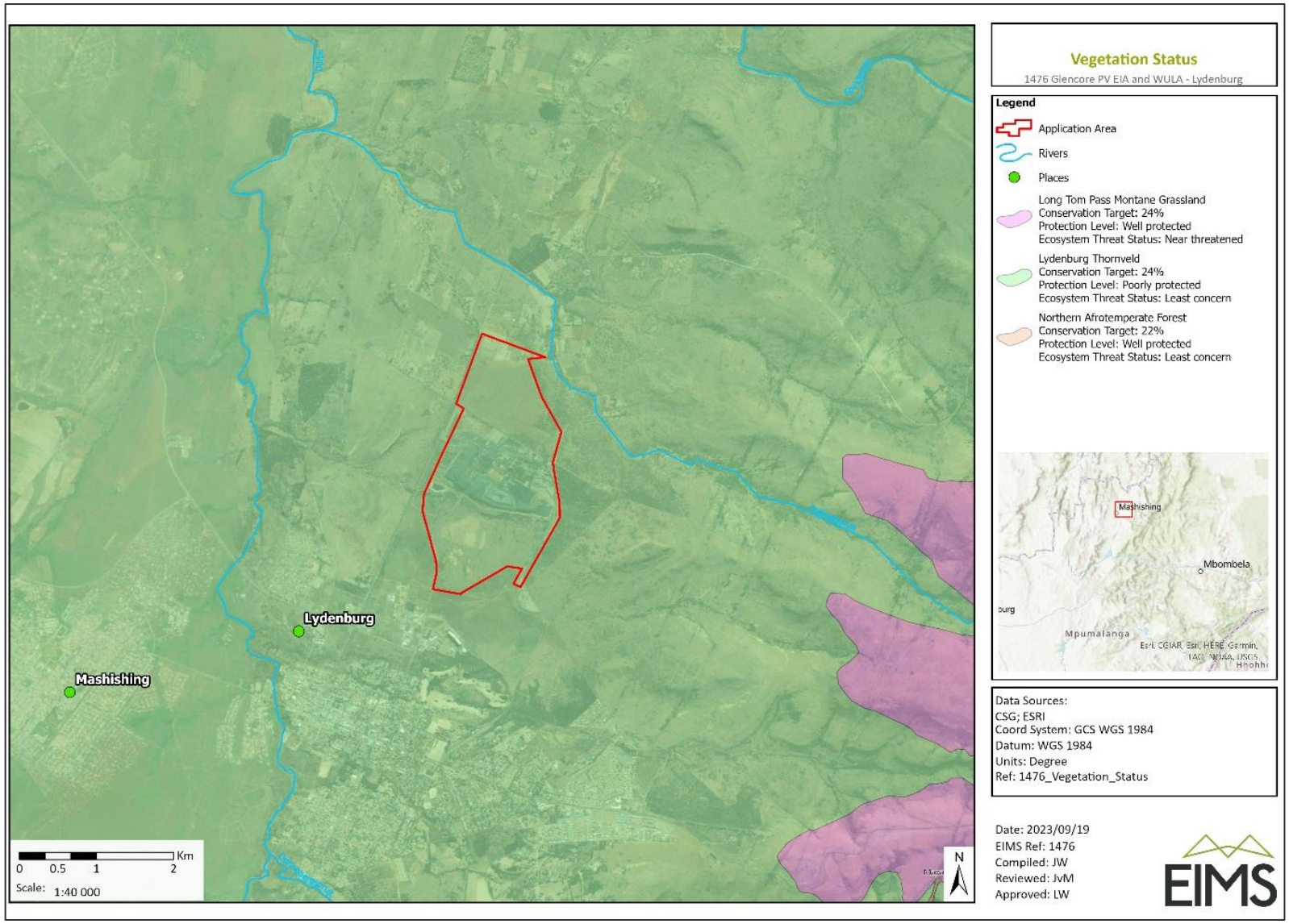

Figure 20: Site Vegetation Status Map

Table 19: Table of figures showing photos of the status quo of the proposed project area

Northern Section (Northern Property)

Existing building structures.

Generally low laying grass.

Thick vegetation along the eastern boundary.

Subsistence farming and agricultural activities.

Smelter Plant Area (Central Properties)

Main access road and existing services including Eskom Substation.

Smelter Plant, currently non-operational.

Internal gravel roads and areas of thick intact vegetation.

Disturbed, low laying grass, pockets of shrubs and tailings facility.

Southern Section (Southern Property)

Existing building structures.

Large scar of cleared vegetation and exposed soil (bare land).

Low laying grassland with alien vegetation towards the centre and areas of thick intact vegetation towards the edges.

Thick intact vegetation which links to the vegetation of the nature reserve adjacent to the study area.

9 ENVIRONMENTAL IMPACT ASSESSMENT

This section aims to identify and do a preliminary assessment on the potential environmental impacts associated with the proposed PV facility. This impact assessment will be used to guide the identification and selection of preferred alternatives, and management and mitigation measures, applicable to the proposed activities. The preliminary assessment will also serve to focus the subsequent EIA phase on the key issues and impacts.

9.1 PROCEDURE

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. The ER is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives.

9.1.1 DETERMINATION OF ENVIRONMENTAL RISK

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact. For the purpose of this methodology the consequence of the impact is represented by:

$$\boldsymbol{C} = \frac{(\boldsymbol{E} + \boldsymbol{D} + \boldsymbol{M} + \boldsymbol{R}) * \boldsymbol{N}}{\boldsymbol{4}}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in **Table 20** below.

Table 20: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary)
	3	Local (i.e. the area within 5 km of the site)
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years)

	3	Medium term (6-15 years)
	4	Long term (15-65 years), the impact will cease after the operational life span of the project)
	5	Permanent (>65 years), no mitigation measure of natural process will reduce the impact after construction)
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way, moderate improvement for +ve impacts)
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease, high improvement for +ve impacts)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts)
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact.

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per **Table 21**.

Table 21: Probability Scoring.

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$\boldsymbol{ER = C \; x \; P}$$

Table 22: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Probability				

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in **Table 23**.

Table 23: Environmental Risk Scores

ER Score	Description
<9	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
≥9 ≤17	Medium (i.e. where the impact could have a significant environmental risk/ reward),
>17	High (i.e. where the impact will have a significant environmental risk/ reward).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

9.1.2 IMPACT PRIORITISATION

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 24: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.

	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$\boldsymbol{Priority = CI + LR}$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to **Table 25**).

Table 25: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 26: Final Environmental Significance Rating

Significance Rating	Description
<-17	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
≥-17, ≤-9	Medium negative (i.e. where the impact could influence the decision to develop in the area).
>-9, < 0	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).

0	No impact
>0, <9	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥9, ≤17	Medium positive (i.e. where the impact could influence the decision to develop in the area).
>17	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

9.2 IDENTIFICATION AND PRELIMINARY ASSESSMENT OF IMPACTS

Potential environmental impacts were identified during the Scoping phase. These impacts were identified by the EAP, the appointed specialist, as well as information received from the public. Section 9 provides the list of preliminary impacts identified during scoping, some of which will be further assessed in the EIA phase. Moreover Table 27 presents the combined details of the preliminary impact assessment calculations undertaken towards determining the pre- and post-mitigation impact significance, as well as the final significance scores.

Without proper mitigation measures and continual environmental management, most of the identified impacts may potentially become cumulative, affecting areas outside of their originally identified zone of impact. The potential cumulative impacts have been identified, evaluated, and mitigation measures suggested which will be updated during the detailed EIA phase level of investigation. When considering cumulative impacts, it is vitally important to bear in mind the scale at which different impacts occur. There is potential for a cumulative effect at a broad scale, as well as finer scale effects occurring in the area surrounding the activity. The main impacts which have a cumulative effect on a regional scale are related to the transportation vectors that they act upon. At a finer scale, there are also impacts that have the potential to result in a cumulative effect, although due to the smaller scale at which these operate, the significance of the cumulative impact is lower in the broader context.

9.2.1 PLANNING PHASE IMPACTS

9.2.1.1 IMPACTS ON EXISTING INFRASTRUCTURE AND SERVICES

During the planning phase, existing infrastructure and services in and around the proposed location for the PV facility could be impacted on by the proposed activities. Construction could lead to the destruction of existing infrastructure. Overuse or pollution of water sources within the study area could negatively effect on surrounding land users. The significance of the impact, however, is rated as medium negative before and low negative after mitigation as the proposed activities are located within the mining area and is largely surrounded by mine infrastructure. The only other infrastructure potentially affected would be the infrastructure related to the homestead and/or subsistence farming in the northern section.

(i) Mitigation measures

- Identify all infrastructure and services within proximity of the proposed facility during the planning phase and attempt to plan around the identified infrastructure and services as far as reasonably possible.
- Communicate with surrounding land users to help identify existing infrastructure and services within the area.

(ii) Cumulative Impacts

- Destruction of existing infrastructure or obstruction of existing services during construction could impact on surrounding land users within the vicinity of the proposed PV facility.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss on existing infrastructure or services are foreseen as a result of the proposed activity. If existing infrastructure is damaged or services hindered, it will incur a cost to the applicant.

9.2.1.2 IMPACTS DUE TO COMMUNICATION INEFFICIENCY

Communication is important as to notify I&APs about the proposed project and activities. It will give them clarity on how their livelihoods or businesses could possibly be impacted on by the proposed activities. Open and clear communication will allow I&APs to comment on any queries or concerns that they might have as well as to inform the EIA. Communication will also allow the local community of possible vacancies. If communication is not transparent it could lead to uninformed decisions by the applicant, uprisings by an unhappy community and an incomplete EIA which could lead to an ungranted Environmental Authorisation. The impact significance is rated as being medium negative before mitigation, but low negative if the mitigation measures are applied.

(i) Mitigation measures

- Clear and transparent communication with the authorities and all affected and surrounding I&APs about the proposed project and activities as well as possible vacancies.
- Keep a register with any complaints from stakeholders/ I&APs and address them appropriately.

(ii) Cumulative Impacts

- Non-transparent communication could lead to bad decision making which might affect livelihoods in the surrounding community.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of communication inefficiency during the planning phase.

9.2.2 CONSTRUCTION PHASE IMPACTS

9.2.2.1 IMPACT ON TERRESTRIAL BIODIVERSITY AND AVIFAUNA

The project area has been transformed/disturbed from its original state by the current mining operations and grazing activities. The project area appears to have an overall moderate sensitivity however this will be confirmed in the EIA phase. Sensitive species of plants and animals could occur within in the project area. Avifaunal habitats could also be affected by the proposed construction of the facility. Vegetation in the area is still mostly in a natural state. Unmitigated, the development of this site could have a negative impact to the surrounding habitats. The sites may support a number of general avifauna species, and the development will still lead to habitat loss and fragmentation. More detail will be provided in the EIA phase once detailed specialist investigations have been conducted. It is thus important that the management outcomes be adhered to in order to mitigate an indirect impact that might stem from the development. This should reduce potential impacts from a medium to a low significance.

(i) Mitigation measures

- Where possible, existing access routes and walking paths must be made use of.
- Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.
- The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments and signs must be put up to enforce this.
- Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals.

- All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any species of conservation concern not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.
- The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.
- An alien management plan must be implemented quarterly for 2 years after phase.

(ii) Cumulative Impacts

- No cumulative impacts are expected on flora and fauna during the construction phase.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected during the construction phase.

9.2.2.2 NOISE GENERATION

Noise will be generated during the construction phase as a result of construction vehicles and heavy machinery working on-site. Noise relating to the construction phase of this project can be described as a nuisance rather than having environmental or health implications. The impact significance is rated as low negative before and after mitigation, as the proposed activities will take place within the mine vicinity where which is already subject to existing noises from the mining processes.

(i) Mitigation measures

- Ensure that all construction vehicles and equipment are in a good working condition as to not generate unnecessary noise.
- The provisions of the South African National Standards (SANS) 10103 (The measurement and rating of environmental noise with respect to annoyance and to speech communication), must be complied with.
- The Environment Conservation Act (Act 73 of 1989) (ECA), Section 25 of the Act and the Noise Regulations (GNR 154 of 1992) promulgated under this section, are still in effect. These regulations serve to control noise and general prohibitions relating to noise impact and nuisance. These regulations need to be complied with.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of noise during the construction phase.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of noise during the construction phase.

9.2.2.3 IMPACT ON SOIL

The impact on soil during construction is considered to be medium negative before and low negative after mitigation. The location of the site is within the existing mine area, but extensive medium potential soils will affected the establishment of the PV facility. In addition, there is grazing activities in the northern section which will also be affected. A soil compliance statement will be undertaken for the PV facility and the findings and recommendations will be discussed in the EIR.

(i) Mitigation measures

- Bunded (surface sealed with plastic or other impermeable material) areas should be established for:
    - The storage of fuels, oils and hydraulics;
    - The storage of raw materials, such as sand, stone and cement; and

- Vehicle maintenance.

- All servicing/ maintenance of construction vehicles that could cause harm to the environment must be done off-site. No servicing of construction vehicles is allowed on site, except for minor repairs to prevent further environmental pollution or damage.
- All working fronts must be provided with a spill containment kit to contain and collect spills.
- Any evidence of erosion, scouring, sedimentation, and/or undercutting must be rectified and rehabilitated immediately.
- Should erosion become a problem during construction, then diversion berms and drains should be constructed to divert run-off away from exposed areas.
- A detailed Stormwater Management Plan (SWMP) needs to be prepared.
- Adequate stormwater drainage and management is required to prevent soil erosion.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of impact on soil during the construction phase.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of impact on soil during the construction phase.

9.2.2.4 IMPACT ON HERITAGE AND PALAEONTOLOGICAL RESOURCES

Impact significance on heritage and palaeontological resources during construction were identified as being high negative before and medium negative after mitigation. The area is known to have importance cultural heritage features, some of which were previously identified in the area during the 2006 smelter specialist studies. It must be noted though that although the underlying geology is rated as having a high palaeontological sensitivity no deep drilling or excavations will be required for construction of the PV facility. An archaeological assessment (HIA and PIA) will be undertaken for the PV facility and the findings and recommendations will be discussed in the EIR.

(i) Mitigation measures

- Known heritage features must be marked as no-go areas as far as possible. Known features to be impacted upon must first be authorized through a permit.
- If unearthed, under no circumstances shall any heritage, archaeological or paleontological artefact/ feature be removed, destroyed or interfered with by anyone on the site, unless such removal has been authorised by the heritage authorities.
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts as set out in the NHRA (Act No 25 of 1999) Section 51 (1).

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of impacts on heritage and palaeontological resources during construction.

(iii) Irreplaceable loss of Resources

- If any known cultural features are destroyed and/or if any palaeontological resources are unearthed and destroyed, it will be irreplaceable.

9.2.2.5 EMPLOYMENT CREATION

Employment creation was identified as having a medium positive impact significance before and after mitigation during the construction phase. Construction vehicles, industrial instrumentation and operators of these vehicles

and equipment will be required during construction phase. Approximately 30 temporary job opportunities are to be created during the construction phase of the project.

(i) Mitigation measures

- Employ people from the surrounding local communities as far as reasonably possible.
- Utilise existing community structures if available, to act as a communication link between the local community and the applicant for informing the local community of job opportunities and informing the Applicant of possible contractors in the local community.

(ii) Cumulative Impacts

- An overall positive addition to the job creation and employment opportunities in the area.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of employment creation.

9.2.2.6 WASTE MANAGEMENT IMPACTS

Waste management impacts were rated as having a low negative significance before and after mitigation. Domestic waste, construction waste and sewage are all waste types that need to be considered during construction. One ton per month of solid waste (rubble) is expected to be generated during construction.

(i) Mitigation measures

- The Contractor should inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.
- No waste releases into the environment should be permitted.
- The toilets shall be of a neat construction and shall be provided with doors and locks and shall be secured to prevent them from falling over.
- The contractor shall always supply toilet paper at all toilets. Toilet paper dispensers shall be provided in all toilets.
- A dedicated waste collection and storage facility must be prepared, and this should be emptied and collected wastes disposed of on a regular basis. Wastes must be disposed of at suitably licensed waste disposal facilities.
- Contaminated water, and effluents must be prevented from entering the local environment (soil and water), adequately stored in protected and where necessary bunded areas, and disposed of at a suitably licensed disposal facility.
- Vermin / weatherproof bins must be provided in enough numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Each active construction site must be checked daily to ensure that the site is free from litter and unnecessary wastes.
- Hazardous substances, if applicable, must be stored in a secure location, isolated from direct contact with the soils and covered where necessary.
- No waste is to be left on site whether it is biodegradable or not. Unutilised, construction materials are to be removed once construction has ended.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of waste management impacts during construction.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of waste management impacts during construction.

9.2.2.7 DUST GENERATION

Dust will be generated as a result of movement of heavy machinery and vehicles on-site during construction. The impact significance was rated as being low negative before and after mitigation.

(i) Mitigation measures

- Haul vehicles carrying potentially dusty material should be covered with a tarp to prevent dust.
- Dust suppression techniques must be implemented on all exposed surfaces during periods of high wind.

(ii) Cumulative Impacts

- The additional dust expected to be generated during the construction phase will have a cumulative effect on the overall dust in the area from the mining activities.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of dust generation during construction.

9.2.3 OPERATIONAL PHASE IMPACTS

9.2.3.1 IMPACT ON TERRESTRIAL BIODIVERSITY

Operation of the PV facility could have impacts on terrestrial biodiversity. Erosion, dust, fire, alien vegetation introduction and proliferation as well as poor waste management resulting in increase in pest numbers could impact on flora and fauna. The significance of these impacts is considered to be of low significance because the area will have been further fragmented from its original state, however the project can still affect species in the surrounding area during operational phase.

(i) Mitigation measures

- A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.
- It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.
- A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.
- Any individual of the protected plants that was observed needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Preferably, the plants can be relocated within the property without a permit or otherwise left unharmed.

(ii) Cumulative Impacts

- No cumulative impacts are expected on flora and fauna during the operations phase.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of biodiversity resources is expected during operations.

9.2.3.2 IMPACT ON AVIFAUNA

Collisions with PV panels are said to be caused by the mirage effect, this has however not been conclusively proven. It has been proven the small passerines have a high risk of collision with PVs and associated infrastructure including power lines. This is as a result of the reflective surfaces that disorientate them when

feeding in large swarms. Large passerines are susceptible to electrocution by electrical infrastructure at the facility.

(i) Mitigation measures

- As far as possible power cables within the project area should be thoroughly insulated and preferably buried.
- Any exposed parts must be covered (insulated) to reduce electrocution risk.
- All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution.
- Consider the use of bird deterrent devices to limit collision risk.

(ii) Cumulative Impacts

- Loss of habitat for species including migratory species will be cumulative.

(iii) Irreplaceable loss of Resources

- Loss of habitat of indigenous species.

9.2.3.3 VISUAL IMPACT

The facility may be visible from several existing roads in the area including the R36 and R37. The closest residential areas are a couple of kilometres away and the facility is not expected to be visible from these areas due to the topology and the mining facilities. The landscape is characterised by undulating rises and valleys which create significant visual screening for infrastructure with a low vertical extent. Any structures above 10m high will be highly visible and have a visual impact. However, the facility is located within the mine area and is surrounded by existing mining infrastructure. The overall visual impact of the proposed PV facility holds a medium negative impact before and low overall visual impact after mitigation.

(i) Mitigation measures

- Develop Low / short infrastructures.
- Have a wall or trees around the facility to block potential visual intrusion.

(ii) Cumulative Impacts

- None expected as no other PV facilities are proposed for the area.

(iii) Irreplaceable loss of Resources

- None.

9.2.3.4 EMPLOYMENT CREATION

Employment creation will be a high positive impact on the local community before and after mitigation (enhancement). Approximately 15 employment opportunities will be made available during the operational phase.

(i) Mitigation measures

- Employ people from the surrounding local communities as reasonably possible.
- Utilise existing community structures if available, to act as a communication link between the local community and the applicant for informing the local community of job opportunities.

(ii) Cumulative Impacts

- The creation of employment opportunities will assist in reaching the ELM goal of reducing unemployment as well as positively contribute to certain livelihoods in the community through income generation.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is anticipated as a result of employment creation.

9.2.3.5 IMPACT ON HEALTH AND SAFETY

The impact on health and safety during the operation phase was identified as being low negative before and after mitigation. All employees need to be subject to a safe and healthy working environment and the mine already has existing health and safety protocols in place.

(i) Mitigation measures

- The speed limit on private/ unregulated roads (access roads) of haul trucks should be limited to 30km/h and all traffic rules on regulated roads should be adhered to.
- Employees must be made aware of their specific responsibilities in terms of the environmental impacts i.e. controlling noise levels, reducing dust, etc.
- Employees must be made aware that no alcohol/drugs are allowed on site and no workers under the influence are permitted on site.
- Employees must be made aware that no fires will be permitted on site.
- The required PPE shall always be worn on site.
- Access to the site should be controlled.
- No person shall be allowed to stay on the site after working hours, except for any security that might be patrolling at night.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of health and safety impacts during production.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of health and safety impacts during production.

9.2.3.6 WASTE MANAGEMENT IMPACTS

Waste management impacts were rated as having a low negative significance before and after mitigation. Domestic waste and sewage are waste types that need to be considered during operation.

(i) Mitigation measures

- No waste releases into the environment should be permitted.
- A dedicated waste collection and storage facility must be prepared, and this should be emptied and collected wastes disposed of on a regular basis. Wastes must be disposed of at suitably licensed waste disposal facilities.
- Contaminated water, and effluents must be prevented from entering the local environment (soil and water), adequately stored in protected and where necessary bunded areas, and disposed of at a suitably licensed disposal facility.
- Vermin / weatherproof bins must be provided in enough numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Each active area must be checked daily to ensure that the site is free from litter and unnecessary wastes.
- Hazardous substances, if applicable, must be stored in a secure location, isolated from direct contact with the soils and covered where necessary.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of waste management impacts during production.

(iii) Irreplaceable loss of Resources.

- No irreplaceable loss of resources is expected as a result of waste management impacts during production.

9.2.3.7 STORMWATER IMPACTS

Stormwater runoff after a rainfall event needs to be managed on site. This impacted was rated as medium negative before mitigation and low negative after mitigation.

(i) Mitigation measures

- A detailed SWMP needs to be prepared.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of stormwater during operations.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of stormwater during production.

9.2.3.8 IMPACT ON SOIL

The impact on soil during operation is considered to be medium negative before and low negative after mitigation. The area is surrounded by mining infrastructure and is largely designated for mining use with the northern edge still considered for agricultural activities, thus, potential agricultural land will be impacted on.

(i) Mitigation measures

- Disturbed areas must be immediately rehabilitated.
- Raw material stockpile should be placed on a cemented or bunded surface.
- All working fronts must be provided with a spill containment kit to contain and collect spills.
- Any evidence of erosion, scouring, sedimentation, and/or undercutting must be rectified and rehabilitated immediately.
- Should erosion become a problem during operation, then diversion berms and drains should be constructed to divert run-off away from exposed areas.
- Adequate stormwater drainage and management is required to prevent soil erosion.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of impact on soil during the construction phase.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of impact on soil during the construction phase.

9.2.4 DECOMMISSIONING PHASE IMPACTS

Please note that the holder of the Environmental Authorisation (EA), if granted, will have to apply for a separate EA for the decommissioning phase as required under Listing Notice 1, Activity 31 of the NEMA as amended. This will necessitate the need to reassess and consider the below mentioned, and any additionally identified impacts at such time when decommissioning is considered.

9.2.4.1 IMPACT ON TERRESTRIAL BIODIVERSITY AND AVIFAUNA

Decommissioning phase impacts on terrestrial biodiversity and avifauna will be identical to the construction phase impacts listed in section 9.2.2.1 above.

(i) Mitigation measures

- As per section 9.2.2.1 above (construction phase terrestrial biodiversity and avifauna impacts).

(ii) Cumulative Impacts

- No cumulative impacts are expected on flora and fauna during the construction phase.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected during the construction phase.

9.2.4.2 DUST GENERATION

Some dust will be generated as a result of movement of heavy machinery and vehicles on-site during decommissioning. The impact significance was rated as being low negative before and after mitigation.

(i) Mitigation measures

- As per Section 9.2.2.7 above (construction phase dust generation)

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of dust generation during construction.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of dust generation during construction.

9.2.4.3 NOISE GENERATION

Noise will be generated during the decommissioning phase as a result of vehicles working on-site. Noise relating to the decommissioning phase of this project can be described as a nuisance rather than having environmental or health implications. The impact significance is rated as low negative before and after mitigation, as the proposed activities will take place within the mine area, which is subject to existing noises from mining activities.

(i) Mitigation measures

- As per section 9.2.2.2 above (construction phase noise generation).

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of noise during the decommissioning phase.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of noise during the decommissioning phase.

9.2.4.4 WASTE MANAGEMENT IMPACTS

Waste management impacts were rated as having a low negative significance before and after mitigation. Domestic waste, construction waste and sewage are all waste types that need to be considered during decommissioning.

(i) Mitigation measures

- As per Section 9.2.4.4 above (construction phase waste management impacts).

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of waste management impacts during decommissioning.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of waste management impacts during decommissioning.

9.2.4.5 JOB LOSSES

As a result of the facilities closing down and being decommissioned, employees that worked during the production phase of this project no longer be able to hold their working position at the facility. This impact was rated with a moderate negative significance before and after the mitigation.

(i) Mitigation measures

- Ensure contributions are made for employees to the Unemployment Insurance Fund (UIF).

(ii) Cumulative Impacts

- Employees that had a position at the facility will have to go without a working income until they can find another position.
- Contribution to unemployment within the local municipality due to decommissioning.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of job losses during decommissioning.

9.2.5 REHABILITATION AND CLOSURE PHASE IMPACTS

9.2.5.1 REHABILITATION IMPACTS

The nature of the site does not require any major rehabilitation of the environment. However, the property will need to be rehabilitated to the extent of which it was before construction, including revegetation. This impact was rated as medium positive before and after mitigation.

(i) Mitigation measures

- Ensure the ground is levelled out on the site.
- No waste should be left on the site.
- The site should resemble a pre-construction state.

(ii) Cumulative Impacts

- No cumulative impacts are expected as a result of rehabilitation.

(iii) Irreplaceable loss of Resources

- No irreplaceable loss of resources is expected as a result of rehabilitation.

9.2.5.2 IMPACT ON TERRESTRIAL BIODIVERSITY AND AVIFAUNA

This impact was rated as being low positive. No terrestrial biodiversity impacts will occur however the project area is located within the mine area and is in a modified state due to the presence of mining activities and alien Invasive plant species, resulting in a moderate - low habitat sensitivity, however this will be confirmed in the EIA phase once detailed specialist investigations have been completed.

9.2.5.3 IMPACT ON SOIL

This impact was rated as being high positive. Although the soil will not be disturbed as a result of the construction, production or decommissioning phases if the no-go alternative is considered, the impact on soil is still considered high positive, as the area within the mine will stay vacant and the land in the north will continue with agricultural activities.

9.2.5.4 IMPACT ON HERITAGE AND PALAEONTOLOGICAL RESOURCES

The impact on heritage and palaeontological resources if the no-go option is considered was rated as medium positive. There are known heritage features on site and the area has a high heritage sensitivity. However, the construction of the PV facility will not require deep excavations, which minimises the chance of uncovering any palaeontological resources.

9.2.5.5 EMPLOYMENT CREATION

Employment creation was rated as being medium negative before any mitigation measures if the no-go option is considered. If the area remains undeveloped it will serve no purpose and will hinder the possibilities of employment for the local community. The proposed project will create approximately 15 employment opportunities during the first year of operations. If the PV facility goes ahead the impact on employment creation will be considered high positive. The no-go alternative would mean the potential job creation associated with construction and operation would not be realized.

9.2.5.6 NOISE GENERATION

Noise generation was rated as low positive. If the no-go option is considered, there will be no noise generation other than the existing noises within the surrounding mining area.

9.2.6 OVERALL PREFERRED ALTERNATIVE

Process and design alternatives are the only reasonable alternatives considered for the proposed project. The level of detail regarding alternatives will be made available in the EIA phase as more and detailed project information becomes available. At this stage and based on preliminary assessments, the PV process is the most preferred method as it is relatively cheaper, less obtrusive and have reduced environmental impacts compared to the Concentrating Solar Power (CSP) process. A hybrid connected design system which will merge the standalone and grid-connected system approach would be favourable for the development. Polycrystalline solar panels are the most favourable followed by monocrystalline solar panels and lastly, polycrystalline solar panels. Lastly, Nickel-cadmium Batteries are more environmentally friendly and the better alternative which should be considered for the energy storage device over Lead-Acid battery.

9.3 SUMMARY OF PRELIMINARY IMPACTS

A summary of all the identified preliminary impacts, their associated phase, as well as their impact calculations and significance are presented in **Table 27** below.

Table 27: Significance rating of identified impacts

IMPACT DESCRIPTION				Pre-Mitigation							Post Mitigation								Priority Factor Criteria			
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Cumulative	Irreplaceable	Priority Factor	Final score
9.2.1.1	Impacts on Existing Infrastructure and Services	Alternative 1	Planning	-1	1	2	2	3	2	-4	-1	1	2	1	2	2	-3	Medium	2	1	1,13	-3,375
9.2.1.2	Impacts Due to Communication Inefficiency	Alternative 1	Planning	-1	3	4	4	3	3	-10,5	-1	3	2	2	2	2	-4,5	Medium	2	1	1,13	-5,0625
9.2.2.1	Impact on Terrestrial Biodiversity and Avifauna	Alternative 1	Construction	-1	3	2	4	3	3	-9	-1	3	2	2	3	3	-7,5	Medium	2	1	1,13	-8,4375
9.2.2.2	Noise Generation	Alternative 1	Construction	-1	2	2	2	2	4	-8	-1	2	2	1	1	3	-4,5	Medium	1	1	1,00	-4,5
9.2.2.3	Impact on Soil	Alternative 1	Construction	-1	2	2	2	2	4	-8	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.2.4	Impact on Heritage and Palaeontological Resources	Alternative 1	Construction	-1	1	2	2	2	2	-3,5	-1	1	2	1	1	1	-1,25	Medium	1	3	1,25	-1,5625
9.2.2.5	Employment Creation	Alternative 1	Construction	1	3	2	2	1	5	10	1	3	2	3	1	5	11,25	Medium	1	1	1,00	11,25
9.2.2.6	Dust Generation	Alternative 1	Construction	-1	2	2	2	2	3	-6	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.2.7	Waste Management Impacts	Alternative 1	Construction	-1	2	2	3	2	3	-6,75	-1	2	2	2	1	2	-3,5	Medium	1	1	1,00	-3,5
9.2.3.1	Impact on Terrestrial Biodiversity	Alternative 1	Operation	-1	3	4	3	2	3	-9	-1	3	4	2	2	3	-8,25	Medium	2	2	1,25	-10,3125
9.2.3.2	Impact on Avifauna	Alternative 1	Operation	-1	3	4	3	2	3	-9	-1	3	4	1	2	3	-7,5	Medium	2	2	1,25	-9,375
9.2.3.3	Visual Impact	Alternative 1	Operation	-1	3	4	1	2	4	-10	-1	2	4	1	1	4	-8	Medium	1	1	1,00	-8
9.2.3.4	Noise Generation	Alternative 1	Operation	-1	2	4	2	2	3	-7,5	-1	2	4	1	1	2	-4	Medium	1	1	1,00	-4
9.2.3.5	Employment Creation	Alternative 1	Operation	1	3	4	2	5	5	17,5	1	3	4	2	5	5	17,5	Medium	2	1	1,13	19,6875
9.2.3.6	Impact on Health and Safety	Alternative 1	Operation	-1	2	4	3	2	3	-8,25	-1	2	4	2	1	2	-4,5	Medium	1	1	1,00	-4,5
9.2.3.7	Waste Management Impacts	Alternative 1	Operation	-1	2	4	3	2	3	-8,25	-1	2	4	2	1	2	-4,5	Medium	1	1	1,00	-4,5
9.2.3.8	Stormwater Impacts	Alternative 1	Operation	-1	3	4	3	2	3	-9	-1	3	4	2	1	2	-5	Medium	1	1	1,00	-5
9.2.3.9	Stormwater Impacts	Alternative 1	Operation	-1	3	4	4	3	3	-10,5	-1	3	4	3	2	2	-6	Medium	1	1	1,00	-6
9.2.3.10	Impact on Soil	Alternative 1	Operation	-1	2	2	2	2	4	-8	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.3.11	Impacts from Storage of Hazardous Materials	Alternative 1	Operation	-1	2	3	4	4	3	-9,75	-1	2	2	2	2	2	-4	Medium	1	1	1,00	-4
9.2.4.1	Impact on Terrestrial Biodiversity and Avifauna	Alternative 1	Decommissioning	-1	3	2	3	3	3	-8,25	-1	3	2	2	3	3	-7,5	Medium	2	1	1,13	-8,4375
9.2.4.2	Dust Generation	Alternative 1	Decommissioning	-1	2	2	2	2	3	-6	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.4.3	Noise Generation	Alternative 1	Decommissioning	-1	2	2	2	2	4	-8	-1	2	2	1	1	3	-4,5	Medium	1	1	1,00	-4,5
9.2.4.4	Employment Creation	Alternative 1	Decommissioning	1	3	1	2	1	5	8,75	1	3	1	3	1	5	10	Medium	1	1	1,00	10
9.2.4.5	Waste Management Impacts	Alternative 1	Decommissioning	-1	2	2	3	2	3	-6,75	-1	2	2	2	1	2	-3,5	Medium	1	1	1,00	-3,5
9.2.4.6	Job Losses	Alternative 1	Decommissioning	-1	2	5	1	5	5	-16,25	-1	2	5	1	4	5	-15	Medium	2	1	1,13	-16,875
9.2.5.1	Rehabilitation Impacts	Alternative 1	Rehab and closure	1	2	4	2	1	5	11,25	1	2	4	3	1	5	12,5	Medium	1	1	1,00	12,5
9.2.1.1	Impacts on Existing Infrastructure and Services	Alternative 2	Planning	-1	1	2	3	3	2	-4,5	-1	1	2	1	2	2	-3	Medium	2	1	1,13	-3,375
9.2.1.2	Impacts Due to Communication Inefficiency	Alternative 2	Planning	-1	3	4	4	3	3	-10,5	-1	3	2	2	2	2	-4,5	Medium	2	1	1,13	-5,0625
9.2.2.1	Impact on Terrestrial Biodiversity and Avifauna	Alternative 2	Construction	-1	3	2	1	3	3	-6,75	-1	3	2	2	3	3	-7,5	Medium	2	1	1,13	-8,4375
9.2.2.2	Noise Generation	Alternative 2	Construction	-1	2	2	2	2	4	-8	-1	2	2	1	1	3	-4,5	Medium	1	1	1,00	-4,5
9.2.2.3	Impact on Soil	Alternative 2	Construction	-1	2	2	1	2	4	-7	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.2.4	Impact on Heritage and Palaeontological Resources	Alternative 2	Construction	-1	1	2	1	2	2	-3	-1	1	2	1	1	1	-1,25	Medium	1	3	1,25	-1,5625
9.2.2.5	Employment Creation	Alternative 2	Construction	1	3	2	2	1	5	10	1	3	2	3	1	5	11,25	Medium	1	1	1,00	11,25
9.2.2.6	Dust Generation	Alternative 2	Construction	-1	3	4	4	2	5	-16,25	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.2.7	Waste Management Impacts	Alternative 2	Construction	-1	2	2	3	2	3	-6,75	-1	2	2	2	1	2	-3,5	Medium	1	1	1,00	-3,5
9.2.3.1	Impact on Terrestrial Biodiversity	Alternative 2	Operation	-1	3	4	1	2	3	-7,5	-1	3	4	2	2	3	-8,25	Medium	2	2	1,25	-10,3125
9.2.3.2	Impact on Avifauna	Alternative 2	Operation	-1	3	4	1	2	3	-7,5	-1	3	4	1	2	3	-7,5	Medium	2	2	1,25	-9,375
9.2.3.3	Visual Impact	Alternative 2	Operation	-1	3	4	4	2	4	-13	-1	2	4	1	1	4	-8	Medium	1	1	1,00	-8
9.2.3.4	Noise Generation	Alternative 2	Operation	-1	2	4	2	2	3	-7,5	-1	2	4	1	1	2	-4	Medium	1	1	1,00	-4
9.2.3.5	Employment Creation	Alternative 2	Operation	1	3	4	2	5	5	17,5	1	3	4	2	5	5	17,5	Medium	2	1	1,13	19,6875
9.2.3.6	Impact on Health and Safety	Alternative 2	Operation	-1	2	4	3	2	3	-8,25	-1	2	4	2	1	2	-4,5	Medium	1	1	1,00	-4,5
9.2.3.7	Waste Management Impacts	Alternative 2	Operation	-1	2	4	3	2	3	-8,25	-1	2	4	2	1	2	-4,5	Medium	1	1	1,00	-4,5
9.2.3.8	Stormwater Impacts	Alternative 2	Operation	-1	3	4	3	2	3	-9	-1	3	4	2	1	2	-5	Medium	1	1	1,00	-5
9.2.3.9	Stormwater Impacts	Alternative 2	Operation	-1	3	4	4	3	3	-10,5	-1	3	4	3	2	2	-6	Medium	1	1	1,00	-6
9.2.3.10	Impact on Soil	Alternative 2	Operation	-1	2	2	1	2	4	-7	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.3.11	Impacts from Storage of Hazardous Materials	Alternative 2	Operation	-1	2	3	4	4	3	-9,75	-1	2	2	2	2	2	-4	Medium	1	1	1,00	-4
9.2.4.1	Impact on Terrestrial Biodiversity and Avifauna	Alternative 2	Decommissioning	-1	3	2	1	3	3	-6,75	-1	3	2	2	3	3	-7,5	Medium	2	1	1,13	-8,4375
9.2.4.2	Dust Generation	Alternative 2	Decommissioning	-1	2	2	4	2	3	-7,5	-1	2	2	1	1	2	-3	Medium	1	1	1,00	-3
9.2.4.3	Noise Generation	Alternative 2	Decommissioning	-1	2	2	2	2	4	-8	-1	2	2	1	1	3	-4,5	Medium	1	1	1,00	-4,5
9.2.4.5	Waste Management Impacts	Alternative 2	Decommissioning	-1	2	2	3	2	3	-6,75	-1	2	2	2	1	2	-3,5	Medium	1	1	1,00	-3,5
9.2.4.6	Job Losses	Alternative 2	Decommissioning	-1	2	5	1	5	5	-16,25	-1	2	5	1	4	5	-15	Medium	2	1	1,13	-16,875
9.2.5.1	Rehabilitation Impacts	Alternative 2	Rehab and closure	1	2	4	2	1	5	11,25	1	2	4	3	1	5	12,5	Medium	1	1	1,00	12,5
9.2.6.1	Impact on Terrestrial Biodiversity and Avifauna	No-Go		1	4	4	2	2	1	3	1	4	4	2	2	1	3	Medium	3	3	1,50	4,5
9.2.6.2	Impact on Soil	No-Go		1	2	4	1	1	1	2	1	2	4	1	1	1	2	Medium	1	1	1,00	2
9.2.6.3	Impact on Heritage and Palaeontological Resources	No-Go		1	1	4	1	1	1	1,75	1	1	4	1	1	1	1,75	Medium	1	1	1,00	1,75
9.2.6.4	Employment Creation	No-Go		-1	3	4	2	1	5	-12,5	-1	3	4	2	1	5	-12,5	Medium	1	1	1,00	-12,5
9.2.6.5	Noise Generation	No-Go		1	2	4	1	1	1	2	1	2	4	1	1	1	2	Medium	1	1	1,00	2

10 SENSITIVITY MAPPING

Environmental sensitivity mapping provides a strategic overview of the environmental, cultural and social assets in a region. The sensitivity mapping technique integrates numerous datasets (base maps and shapefiles) into a single consolidated layer making use of Geographic Information System (GIS) software and analysis tools. Environmental sensitivity mapping is a rapid and objective method applied to identify areas which may be particularly sensitive to development based on environmental, cultural and social sensitivity weightings – which is determined by specialists' input within each respective field based on aerial or ground-surveys. Therefore, the sensitivity mapping exercise assists in the identification of sensitive areas within and surrounding the proposed PV facility area. At this stage the sensitivity/ composite map will only consist of desktop information as detailed specialist investigations will only be undertaken during the EIA phase.

This sensitivity mapping approach allows for the proposed PV facility activities to be undertaken whilst protecting identified sensitive environmental areas/ features. Furthermore, environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of Environmental Assessment processes. Refer to **Figure 21** for the preliminary scoping combined sensitivity/ composite map.

The study area does not transect CBAs and is located within the Lydenburg Thornveld vegetation which is a least concerned status as well as not a protected ecosystem. However, the study area is within an ESA: Protected Area buffer and also adjacent to the Lydenburg Nature Reserve area. The study area transects a National Protected Area Expansion Strategy area. The identified preliminary sensitivities be further assessed during the EIA phase, and a final combined sensitivity map produced which will inform the selection of the preferred location and layout alternatives for the proposed PV Facility.

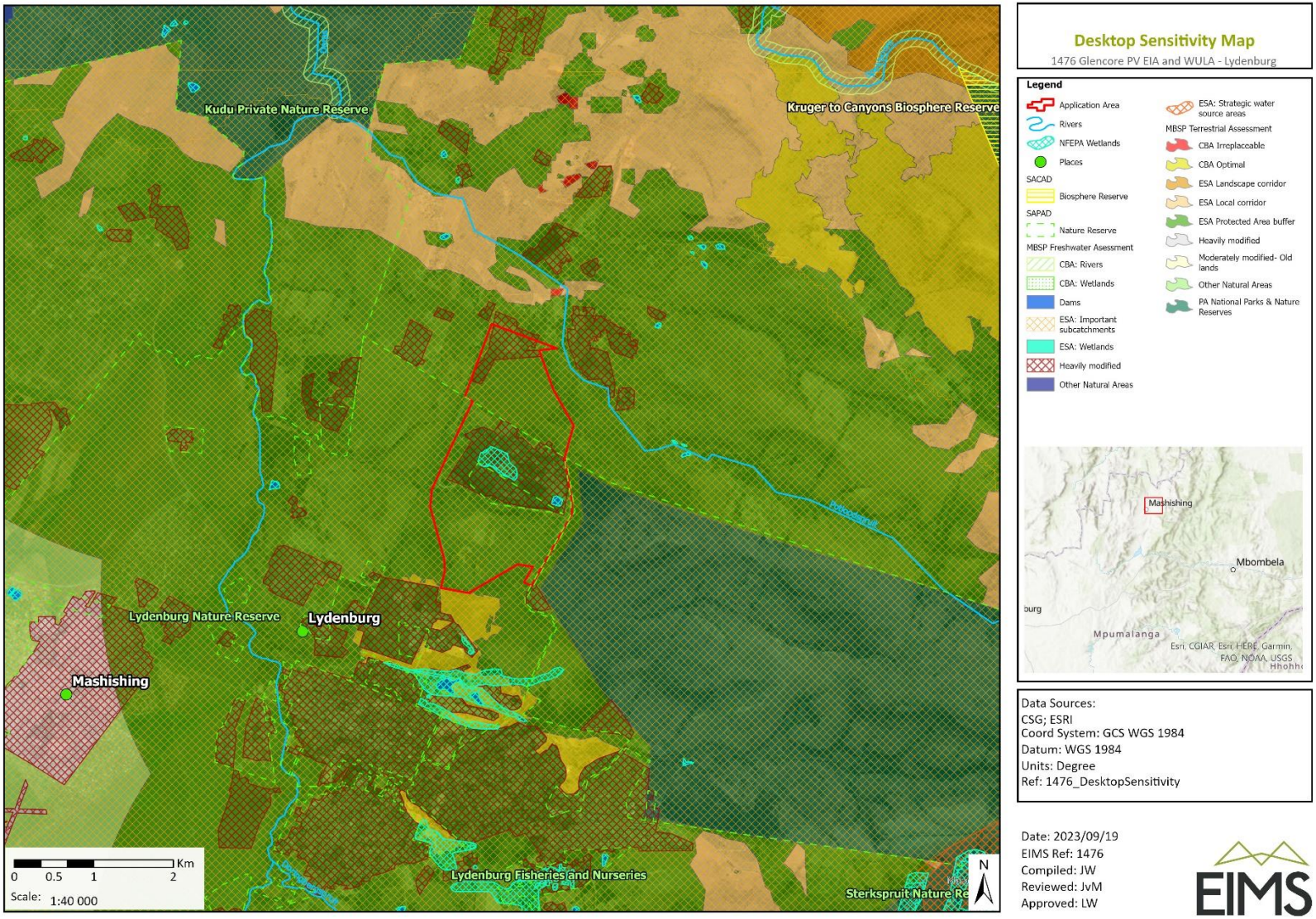

Figure 21: Preliminary sensitivity/ composite map

11 PLAN OF STUDY FOR THE IMPACT ASSESSMENT

The section below outlines the proposed plan of study which will be conducted for the various environmental aspects during the EIA phase. It is also important to note that the plan of study will also be guided by comment obtained from I&APs and other stakeholders during the Scoping Report public review period.

11.1 DESCRIPTION OF ALTERNATIVES TO BE CONSIDERED

The alternatives considered and discussed in **Section 6** of this Scoping Report, which include process and design alternatives, have culminated into the identification of feasible development alternatives to be addressed further in the EIA phase of this EIA process. The feasible development alternatives to be further assessed in the EIA phase are presented below.

11.2 DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PHASE

No specialist studies were undertaken during scoping. Specialist studies will be undertaken for the EIA phase. The following aspects will be assessed further during the EIA phase specialist investigations to be undertaken:

- Agricultural Impact Assessment;
- Aquatic Biodiversity and Wetlands Impact Assessment;
- Civil Aviation Compliance Statement;
- Heritage Impact Assessment;
- Palaeontological Impact Assessment;
- Landscape/Visual Compliance Statement; and
- Terrestrial Biodiversity (flora, fauna and avifauna);

11.3 PROPOSED METHOD OF ASSESSING ENVIRONMENTAL ASPECTS

The same method of assessing impact significance as was used during the Scoping phase will be applied during the EIA phase. This methodology is described in detail in **Section 9** of this Scoping Report.

11.4 PROPOSED METHOD FOR ASSESSING SIGNIFICANCE

The significance of environmental impacts will be rated before and after the implementation of mitigation measures. These mitigation measures may be existing measures or additional measures that may arise from the impact assessment and specialist input. The impact rating system considers the confidence level that can be placed on the successful implementation of the mitigation. The proposed method for the assessment of environmental issues is set out in the **Section 9**. This assessment methodology enables the assessment of environmental issues including: the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

The specialist studies will recommend practicable mitigation measures or management actions that effectively minimise or eliminate negative impacts, enhance beneficial impacts, and assist project design. If appropriate, the studies will differentiate between essential mitigation measures, which must be implemented and optional mitigation measures, which are recommended (“nice-to-haves”).

11.5 COMPETENT AUTHORITY CONSULTATION

The project site is located within a mining area and all the power generated will be used at the mine. In terms of the EIA Regulations, 2014 (as amended) published on 11 June 2021 under Government Notice No. 517 in Government Gazette No. 44701, the competent authority in respect of the activities listed in this part of the Schedule is the competent authority in the province in which the activity is to be undertaken, unless:

a) It is an application for an activity contemplated in section 24C(2) of the Act, in which case the competent authority is the Minister or an organ of state with delegated powers in terms of section 42(1) of the Act; or

b) The application is a mining application, in which case the competent authority is the Minister responsible for mineral resources.

The EIA Regulations defines a 'mining application' as an application for environmental authorisation for a permission, right, permit, or consent required in terms of the Mineral and Petroleum Resources Development Act and includes hydraulic fracturing and reclamation. Therefore, the competent authority will be the provincial department responsible for environmental affairs. This is because the solar PV facility does not from part of a mining application, as defined in the EIA Regulations, 2014 (as amended) and the application is submitted separately, and in this instance, subsequent to the mining application. Mpumalanga Province Department of Agriculture Rural Development and Environmental Affairs (MP DARDLEA) will therefore, in terms of S24(c) of NEMA, be the competent authority for the project. The Scoping report will be sent to the competent authorities for comment, as will the EIA report. If and/ or when an authority requires a meeting, one will be arranged. Should a meeting be required, the date, time, and venue of the meeting will be scheduled post dissemination of the project notification documents. The purpose of an authority meeting would be to explain the project in detail to authorities and clarify the process going forward if uncertainties exist.

11.6 PROPOSED METHOD OF PUBLIC PARTICIPATION

An overview of the proposed public participation process to be followed for the EIA phase is provided below. The commenting periods that will be provided to the I&APs (and the competent authorities) will be thirty (30) days long. Two commenting periods are provided for during this EIA process, these will be during the review period of the:

- Scoping Report; and
- EIA Report and associated EMPr.

All comments received during the initial notification and call to register have been included in this Scoping Report, and comments received during the Scoping Report comment period will be included in the finalised Scoping Report for submission to the competent authority. The details pertaining to the review of the EIA Report and EMPr, the venue where the report will be placed for review, as well as the duration of the comment period, will be determined at a later date and communicated to all registered I&AP.

11.6.1 STEPS TO BE TAKEN TO NOTIFY INTERESTED AND AFFECTED PARTIES

I&APs were notified of the proposed application via registered letters, emails and facsimiles. The Public Participation Process has been and will continue to be undertaken in accordance with the NEMA EIA Regulations (2014, as amended). A minimum of 30 days was provided to the public to register as I&APs and provide initial comments on the project, a further 30 days will be provided for to comment on the Scoping Report. The information submitted by I&APs will be utilised during the Impact Assessment and compilation of the EIA Report and associated EMPr. Upon acceptance of the Scoping Report by the competent authority, the EIA phase will commence. An EIA Report will be compiled presenting the findings of the EIA phase, this report will be made available for public review and comment for a further 30 days.

Feedback from I&APs has been and will be solicited through the following means:

- Registered letters;
- Facsimile and e-mails; and
- Any other communication with EIMS, which includes SMS's.

11.6.2 DETAILS OF ENGAGEMENT PROCESS TO BE FOLLOWED

I&APs will be afforded the following opportunities to participate in the project:

- I&APs have been requested via written notifications distributed to provide their views, queries and / or comments on the project;
- The EIA Report and EMPr will be available for comment for a period of 30 days at the same public places in the project area that the Scoping Report was made available. Furthermore, copies of the said report sent to stakeholders who request a copy and placed on the EIMS website: www.eims.co.za/public-participation/

All comments and issues raised during the Scoping Report 30-day public comment period will be incorporated into the final Scoping Report, and the comments from the EIA Report and EMPr review period will be included in the finalised EIA Report and EMPr to be submitted to the competent authority for decision-making.

11.6.3 DESCRIPTION OF INFORMATION TO BE PROVIDED

The following information will be provided during the EIA phase PPP:

- Sufficient detail of the intended operation to enable communities to assess what impact the activities will have on them;
- Details of the NEMA Regulations that must be adhered to;
- Date by which comment, concerns and objections must be forwarded through to both EIMS and/ or the competent authority respectively; and
- Contact details of the EAP.

11.7 DESCRIPTION OF TASKS THAT WILL BE UNDERTAKEN DURING THE EIA PROCESS

The plan of study in terms of certain aspects or specialist fields is detailed in the above sections and is summarised below. The following tasks will be undertaken as part of the EIA phase of the project:

- Detailed specialist studies;
- Public consultation:
    - Notification of the availability of the EIA Report for review and comment to all registered I&APs;
    - Informing registered I&APs of the project progress;
- Authority consultation:
    - Consultation with the competent authorities; and
    - Other relevant/ commenting authorities' consultation to provide authorities with project related information and obtain their feedback.
- Document compilation:
    - The EIA Report and associated EMPr will be compiled in line with the requirements of Appendix 3 and 4 of the NEMA EIA Regulations (2014, as amended);
    - The EIA Report and EMPr will be made available for public comment for a period of 30 days; and
    - The EIA Report and EMPr will be finalised and submitted to the competent authority.

11.8 MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IMPACTS

All comments received by I&APs will be taken into consideration and will inform the high-level mitigation measures. Detailed mitigation measures will be further developed as part of the EIA phase. The potential impacts

identified during the Scoping phase will further be assessed in terms of the mitigation potential, taking into consideration the following:

- Reversibility of impact:
    - Reversible;
    - Partially reversible.; and
    - Irreversible.
- Irreplaceable loss of resources:
    - Replaceable;'
    - Partially replaceable; and
    - Irreplaceable.
- Potential of impacts to be mitigated:
    - High;
    - Medium; and
    - Low.

More detailed assessment findings for each identified impact taking the above into consideration will be provided in the EIA Report and associated EMPr.

12 UNDERTAKINGS

12.1 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I **Vukosi Mabunda** herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected Parties has been correctly recorded in the report.

Signature of the EAP

…….

Date: 19 February 2024

12.2 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I **Vukosi Mabunda** herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of the EAP

…….

Date: 19 February 2024

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