ENERTRAG SOUTH AFRICA (PTY) LTD

CAMDEN UP TO 400KV GRID CONNECTION AND COMMON COLLECTOR SUBSTATION

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DFFE Reference Number: 14/12/16/3/3/2/2134

05 SEPTEMBER 2022

PUBLIC

CAMDEN UP TO 400KV GRID CONNECTION AND COMMON COLLECTOR SUBSTATION

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ENERTRAG SOUTH AFRICA (PTY) LTD

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APPLICANT

Enertrag South Africa (Pty) Ltd

PROJECT NAME

Proposed Camden up to 400kV Grid Connection and Common Collector Substation

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PRODUCTION TEAM

APPLICANT

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Noise Specialist	Kirsten Collett
Traffic Specialist	Christo Bredenhann
Groundwater Specialist	Adam Sanderson

SPECIALISTS

Heritage & Palaeontology Specialist	Jaco van der Walt (Beyond Heritage)
Agriculture Specialist	Johan Lanz
Biodiversity and Ecology Specialist	David Hoare (David Hoare Consulting (Pty) Ltd
Aquatic Specialist	Brian Colloty (EnviroSci Pty Ltd)
Avifauna Specialist	Chris van Rooyen (Chris van Rooyen Consulting)
Bat Specialist	Werner Marais (Animalia Consultant (Pty) Ltd
Social Specialist	Tony Barbour (Tony Barbour Environmental Consulting)
Visual Specialist	Kerry Schwartz (SiVEST SA (Pty) Ltd / SLR Consulting (Pty) Ltd)

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1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This environmental impact report (EIR) documents the processes and findings of the impact assessment phase of the Scoping and Environmental Impact Reporting (S&EIR) process for the proposed Camden up to 400kV Grid Connection and Common Collector Substation (hereafter referred to as the "Project"), located approximately 10km south of Ermelo (near Camden) in the Mpumalanga Province of South Africa.

The EIR aims to provide stakeholders with information on the proposed development including location, layout and technological alternatives, the scope of the environmental assessment and key impacts to be addressed in the environmental assessment, and the consultation process undertaken through the environmental impact assessment (EIA) process.

1.2 BACKGROUND INFORMATION

ENERTRAG South Africa (Pty) Ltd (the Developer/Proponent) is proposing the development of a Camden Renewable Energy Complex within the vicinity of the Camden Power Station in Mpumalanga. The Complex consists of eight projects referred to as:

- Camden I Wind Energy Facility (up to 200MW) (subject to a S&EIR process);
- Camden I Wind Grid Connection (up to 132kV) (subject to a Basic Assessment (BA) Process);
- **Camden Grid Connection and Collector substation (up to 400kV) (subject to a S&EIR process) (this application);**
- Camden I Solar (up to 100MW) (subject to a S&EIR process);
- Camden I Solar Grid Connection (up to 132kV) (subject to a BA Process);
- Camden II Wind Energy Facility (up to 200MW) (subject to a S&EIR process);
- Camden II Wind Energy Facility up to 132kV Grid Connection (subject to a BA Process); and
- Camden Green Hydrogen and Ammonia Facility, including grid connection infrastructure (subject to a S&EIR process).

The Complex is being developed in the context of the Department of Mineral Resources and Energy's (DMRE Integrated Resource Plan, and the Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

The focus of this Environmental Impact Report is the proposed Camden 400kV Grid Connection and Common Collector Substation project.

The Project Applicant is ENERTRAG South Africa (Pty) Ltd. The proposed Camden Renewable Energy Complex will connect to a common Collector substation through various up to 132kV powerlines (subject to separate BA processes) between the grid connection substation portion (immediately adjacent the on-site Independent Power Producer (IPP) substation portions) and that of the Camden Collector substation (this application). The broader Camden developments (i.e. seven of the abovementioned projects) will connect to the Camden Power Station substation through an up to 400kV powerline (either single or double circuit) either directly or via a Loop-In-Loop-Out onto the existing Camden-Incandu 400kV power line.

In order for the proposed project to proceed, it will require an Environmental Authorisation (EA) from the Competent Authority (CA) (i.e. the National Department of Forestry, Fisheries and Environment, (DFFE)).

1.3 KEY ROLE PLAYERS

1.3.1 PROJECT PROPONENT

ENERTRAG South Africa (Pty) Ltd is the project proponent (Applicant) with regards to this application for the construction and operation of the WEF and associated infrastructure. **Table 1.1** provides the relevant details of the project proponent.

Table 1.1: Details of Project Proponent

PROPONENT:	**ENERTRAG SOUTH AFRICA (PTY) LTD**
Contact Person:	Mercia Grimbeek
Postal Address	Suite 104, Albion Springs, 183 Main Road, Rondebosch, Cape Town, South Africa 7700
Telephone:	071 752 8033
Email:	gideon.raath@enertrag.com

1.3.2 COMPETENT AUTHORITY

Section 24C(2)(a) of NEMA stipulates that the Minister of Forestry, Fisheries and the Environment ("the Minister") must be identified as the CA if the activity has implications for international environmental commitments or relations. GN 779 of 01 July 2016 identifies the Minister as the CA for the consideration and processing of environmental authorisations and amendments thereto for activities related the Integrated Resource Plan (IRP) 2010 – 2030.

As the Project constitutes associated infrastructure to projects related to the IRP, the DFFE is the CA. This was confirmed during the Pre-Application Meeting held on **19 October 2021**.

Table 1.2 provides the relevant details of the competent authority on the Project.

Table 1.2: Competent Authority

ASPECT	**COMPETENT / COMMENTING AUTHORITY**	**CONTACT DETAILS**
Competent Authority: Environmental Authorisation	Department of Forestry, Fisheries, and the Environment (DFFE)	Case Officer: Makhosi Yeni Integrated Environmental Authorisations MYeni@dffe.gov.za DFFE Reference: 14/12/16/3/3/2/2134mailto:BNcube@environment.gov.za

1.3.3 COMMENTING AUTHORITIES

The following commenting authorities have been identified for this application:

- Mpumalanga Department Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA);
- Department of Water and Sanitation (DWS);
- Vaal Water Management Area (WMA) Authority;
- South African Heritage Resource Agency (SAHRA);

- Mpumalanga Heritage Resources Authority (MHRA);
- Mpumalanga Tourism and Parks Agency (MTPA);
- DFFE: Biodiversity and Conservation;
- DFFE: Protected Areas;
- Civil Aviation Authority (CAA);
- Eskom;
- Air Traffic and Navigation Services (ATNS);
- Department of Defence (SA Army) (DD);
- Astronomy Management Authority (AMA);
- South African Weather Services (SAWS);
- South African National Roads Agency Limited (SANRAL);
- Gert Sibande District Municipality;
- Msukaligwa Local Municipality; and
- Dr Pixley Ka Seme Local Municipality.

1.3.4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP Group Africa (Pty) Ltd (WSP) has been appointed in the role of Independent Environmental Assessment Practitioner (EAP) to undertake the S&EIR processes for the development of the Project. The CV of the EAP is available in **Appendix A**. The EAP declaration of interest and undertaking is included in **Appendix B**. **Table 1.3** details the relevant contact details of the EAP. In order to adequately identify and assess potential environmental impacts, a number of specialists will support the EAP.

Table 1.3: Details of the Environmental Assessment Practitioner

ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)	**WSP GROUP AFRICA (PTY) LTD**
Contact Person:	Ashlea Strong
Postal Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, 2191, South Africa
Telephone:	011 361 1392
Fax:	011 361 1381
E-mail:	Ashlea.Strong@wsp.com
EAP Qualifications:	— Masters in Environmental Management, University of the Free State — B Tech, Nature Conservation, Technikon SA — National Diploma in Nature Conservation, Technikon SA
EAPASA Registration Number:	EAPASA (2019/1005)

STATEMENT OF INDEPENDENCE

Neither WSP nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment.

1.3.5 SPECIALISTS

Specialist input is required in support of this application for EA. The details of the specialists are provided in **Table 1.4** below. The specialist declarations are included in **Appendix C.**

Table 1.4: Details of Specialists

ASSESSMENT	NAME OF SPECIALIST	COMPANY	SECTIONS IN REPORT
Agriculture	Johann Lanz	Independent consultant	**Section 7.1.4** **Section 8.1** **Appendix G-1**
Avifauna	Chris van Rooyen	Chris van Rooyen Consulting	**Section 7.2.5** **Section 8.6** **Appendix G-2**
Plant Species Animal Species Terrestrial biodiversity	David Hoare	David Hoare Consulting (Pty) Ltd	**Section 7.2.3 & Appendix G-3** **Section 7.2.4 & Appendix G-4** **Section 7.2.2 & Appendix G-5**
Aquatic Ecology	Brian Colloty	EnviroSci Pty Ltd	**Section 7.1.5** **Section 8.2** **Appendix G-6**
Heritage and Palaeontology	Jaco van der Walt	Beyond Heritage	**Section 7.3.2 & 7.3.3** **Appendix G-7** **Appendix G-8**
Socio-economic	Tony Barbour	Tony Barbour Environmental Consulting	**Section 7.3.5** **Section 8.10** **Appendix G-9**
Visual	Kerry Schwartz	SLR Consulting (Pty) Ltd	**Section 7.3.4** **Section 8.7** **Appendix G-10**

1.4 IMPACT ASSESSMENT TERMS OF REFERENCE

The 2014 Environmental Impact Assessment (EIA) Regulations (GNR 982), as amended, identifies the proposed Camden 400kV Grid Connection and Common Collector Substation project as an activity being subject to an S&EIR process due to the applicability of the EIA Listing Notices 1 and 2 (GNR 983 and 984, as amended). In order for the project to proceed it will require an Environmental Authorisation (EA) from DFFE.

WSP has been appointed as the independent EAP to carry out the S&EIR process in accordance with the EIA Regulations, 2014, as amended in 2017.

The Scoping Process has been completed and involved consultation with interested and affected parties and the drafting of the Plan of Study (PoS) for EIA, which culminated in the submission of a Final Scoping Report (FSR) to the DFFE. The DFFE acceptance of the FSR and authorisation to proceed with the EIR was received on **25 May 2022** (**Appendix J**). A request for extension to the submission deadline of the FEIR was submitted to the DFFE in terms of EIA Regulation 3(7). A 60-day extension was approved on 24 June 2022. The final EIR is due to the DFFE on 02 November 2022.

This draft EIAR will be made available for public comment from 07 September 2022 to 10 October 2022.

As defined in Appendix 3 of GNR 982, as amended, the objective of the impact assessment process is to, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

- Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the—
  - Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - Degree to which these impacts-
    - Can be reversed;
    - May cause irreplaceable loss of resources, and
    - Can be avoided, managed or mitigated;
- Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored.

Public participation is a requirement of the S&EIR process; it consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the S&EIR decision-making process. Effective public participation requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the Proposed Project. The objectives of the public participation process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the Proposed Project;
- Clearly outline the scope of the Proposed Project, including the scale and nature of the existing and proposed activities;
- Identify viable Proposed Project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the subsequent specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the Proposed Project, issues and solutions.

1.5 IMPACT ASSESSMENT REPORT STRUCTURE

Table 1.5

Table 1.5: Legislated Report Requirements as detailed in GNR 982 cross-references the sections within the EIR with the legislated requirements as per Appendix 2 of GNR 982.

Table 1.5: Legislated Report Requirements as detailed in GNR 982

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
(a)	Details of	
	the EAP who compiled the report; and	**Section 1.3.4 & Appendix A**
	the expertise of the EAP, including a Curriculum Vitae	**Appendix A**

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
(b)	The location of the activity, including-	
	The 21-digit Surveyor code for each cadastral land parcel;	**Section 6.1**
	Where available, the physical address and farm name	**Section 6.1**
	Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property.	**N/a**
(c)	A plan which locates the proposed activities applied for at an appropriate scale, or, if it is-	
	A linear activity, a description of the corridor in which the proposed activity or activities is to be undertaken; or	**Section 2**
	On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	**N/a**
(d)	A description of the proposed activity, including-	
	All listed and specified activities triggered;	**Section 2**
	A description of the activities to be undertaken, including associated structures and infrastructure;	**Section 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 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 5**
(h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	
	Details of all the alternatives considered;	**Section6.5**
	Details of the public participation undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	**Section 4.3**
	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;	**Appendix F**
	the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	**Section 7**
	the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	**Section 8**
	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;	**Section 4**
	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;	**Section 8**

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
	the possible mitigation measures that could be applied and level of residual risk;	**Section 8**
	the outcome of the site selection matrix;	**Section 10.5**
	if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	**N/A**
	a concluding statement indicating the preferred alternatives, including preferred location of the activity;	**Section 11**
(i)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including-	
	a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	**Section 6.5**
	a description of the aspects to be assessed as part of the environmental impact assessment process;	**Section 7**
	aspects to be assessed by specialists;	**Section 4**
	a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;	**Section 4**
	a description of the proposed method of assessing duration and significance;	**Section 4**
	an indication of the stages at which the competent authority will be consulted;	**Section 3.2**
	particulars of the public participation process that be conducted during the environmental impact assessment process; and	**Section 4.3**
	a description of the tasks that will be undertaken as part of the environmental impact assessment process;	**Section 4**
	identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	**Section 8**
(j)	An undertaking under oath or affirmation by the EAP in relation to-	
	the correctness of the information provided in the report;	**Appendix B**
	the inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(k)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	**Appendix B**
(l)	Where applicable, any specific information required by the competent authority; and	**N/A**
(m)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	**N/A**

1.6 ADDITIONAL PERMITS AND AUTHORISATIONS

Table 1.6 outlines the additional permits and authorisations required for the proposed development, as well as the relevant Competent Authorities responsible.

Table 1.6: Additional Permits and Authorisations required for the proposed development

PERMITS/AUTHORISATION	LEGISLATION	RELEVANT AUTHORITY	STATUS
Water Use Licence / General Authorisation	National Water Act (Act No. 36 of 1998)	Department of Water and Sanitation	Application process will run concurrently with the EIA Phase.
Section 50 Approval	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	DFFE: Protected Areas Directorate	In Process It is important to note that further investigation and engagement with the MTPA has been conducted. The MTPA have furthermore confirmed their intent to de-proclaim the nature reserve and the process is currently in the early stages.
Section 38 Notification	National Heritage Resource Act (Act No. 25 of 1999)	Mpumalanga Heritage Resources Authority	In Process
Section 53 Approval	Minerals and petroleum Resources Development Act (No. 28 of 2002)	Department of Mineral Resources and Energy	Application process will run concurrently with the EIA Phase.
Section 53 Approval	Minerals and petroleum Resources Development Act (No. 28 of 2002)	Department of Mineral Resources and Energy	Application submitted 13 May 2022. DMR Ref: MP30/5/4/2/11097SU
Section 57 permits	National Environmental Management: Biodiversity Act 10 of 2004	DFFE: Protected Areas Directorate	In process

Subdivision of Agricultural Land Act (SALA) Consent / Change of Land Use (re-zoning)	Subdivision of Agricultural Land Act (Act No. 70 of 1970) / Spatial Planning and Land Use Management Act (Act No. 16 of 2013) (SPLUMA)	Department of Agriculture, Land Reform and Rural Development (DALRRD) / Msukaligwa Municipality	Given that the project is proposed on land zoned for Agriculture, SALA requires that any long-term lease associated with the renewable energy facility be approved by the DALRRD. Subdivision and consolidation of land are also regulated as part of municipal planning, and will therefore be subject to municipal by-laws and provincial legislation. The SALA consent and Land use zoning are separate processes from the Application for EA, and needs to be applied for and obtained separately from the EA and S&EIR process. It is however noted that a rezoning application is already underway for the proposed project, however, can only be complete once the EA is issued. The proponent will ensure all municipal approvals and zoning requirements are met prior to commencement of construction.

1.7 ASSUMPTION AND LIMITATIONS

General assumptions and limitations:

- The EAP hereby confirms that they have undertaken to obtain project information from the client that is deemed to be accurate and representative of the project;
- Site visits have been undertaken to better understand the project and ensure that the information provided by the client is correct, based on site conditions observed;
- The EAP hereby confirms their independence and understands the responsibility they hold in ensuring all comments received are accurately replicated and responded to within the EIA documentation;
- The comments received in response to the public participation process, will be representative of comments from the broader community; and
- Based on the Pre-Application meeting and subsequent minutes, the CA would not require additional specialist input, in order to make a decision regarding the application.

Agriculture:

There are no limitations and assumptions associated with this study

Aquatic Ecology:

- To obtain a comprehensive understanding of the dynamics of both the flora and fauna of communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling.
- Due to the scope of the work presented in this report, a long-term investigation of the proposed site was not possible and as such not perceived as part of the Terms of Reference – Scoping Phase. However, a concerted

effort was made to sample and assess as much of the potential site, as well as make use of any supporting literature, species distribution data and aerial photography. This limitation is common to many impact assessment type studies, but the findings are deemed adequate for the purposes of decision-making support regarding project acceptability in this Phase, unless otherwise stated.

- It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

Avifauna:

This study made the basic assumption that the sources of information used are reliable and accurate. The following must be noted:

- The focus of the study was primarily on the potential impacts of the proposed on-site substation and up to up to 400kV overhead power line on priority species. Priority species were defined as species which could potentially be impacted by power line collisions or electrocutions, based on specific morphological and/or behavioural characteristics.
- The assessment of impacts is based on the baseline environment as it currently exists in the study area.
- Conclusions in the study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will be valid under all circumstances.
- The study area was defined as a 2km zone around the proposed on-site substation and an up to 400kV overhead power line.
- The SABAP2 dataset is a comprehensive dataset which provides a reasonably accurate snapshot of the avifauna which could occur at the proposed site. For purposes of completeness, the list of species that could be encountered was supplemented with personal observations, general knowledge of the area, and the results of the pre-construction monitoring which was conducted over 12 months.

Terrestrial Biodiversity:

- The assessment is based on a field survey conducted 3-7 February 2020. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas. The seasons in which the fieldwork (peak summer flowering period) was conducted was ideal for assessing the composition and condition of the vegetation.
- The vegetation was in good condition for sampling at the time of the field assessment, and the species lists obtained are considered reliable and relatively comprehensive.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling.
- Due to time constraints inherent in the EIA process, this was not possible for this study. However the comprehensive field survey is sufficient for the purposes of this report and towards sufficiently informing the decision making process by the Competent Authority.

Plant Species:

- The purpose of the fieldwork undertaken for this Project to characterize the habitat of the study area, compile species checklists from as diverse a variety of habitats as possible, and to map habitats within the entire collection of farms within which the Project is situated.
- The proposed project layout was provided during the EIA process, therefore no development footprint areas were assessed for the Project, only the general area in which the project is located.
- A final walk-through to survey conducted in Spring or Summer, where possible, is therefore recommended to check for potential species of conservation concern within footprints of the development.

Animal Species:

- Inventory surveys of animal species occurring on a site are difficult to achieve within the time-frames associated with an EIA. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons and be undertaken a much longer timeframe and include extensive sampling. It is more important to know of fauna of value, as well as ecological processes. Therefore, the assessment attempts to identify threatened and other significant species, important habitats, and ecological processes.
- Compiling the list of species that could potentially occur on site is limited by the density of collection records for the area. The list of animal species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site.
- The assessment is based on a field survey conducted 3-7 February 2020. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas. The seasons in which the fieldwork (peak summer flowering period) was conducted was ideal for assessing the composition and condition of the vegetation, which is also suitable for assessing habitat condition and suitability for animals.

Social:

Technical suitability

- It is assumed that the development site represents a technically suitable site for the establishment of the proposed development.

Strategic importance of the project

- The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.

Fit with planning and policy requirements

- Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard, a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.

Demographic data

- Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.

Visual:

The Visual Impact Assessment is based on a combination of desktop-level assessment supported by field-based observation. The following assumptions and limitations are applicable:

- Power lines and associated substations are relatively large structures that could impact on visual receptors located relatively far away, particularly in areas where the terrain is very flat. Given the nature of the receiving environment and the height of the proposed power line towers, the study area or visual assessment zone is assumed to encompass an area of 5km from the outer boundary of the combined power line assessment corridors and substation sites. This 5 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the proposed development may still be visible beyond 5 km, the degree of visual impact would diminish considerably and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.
- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken in mid-September 2019. Due to the extent of the study area however and the number of receptors that could potentially be sensitive to the proposed development, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, a number of broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development.
- It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants

on the scenic quality of views from the facility and on people's perceptions of the value of improved electricity supply. Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.

- The potential visual impact at each sensitive visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides an indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.
- The exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means. Where details of the levels of leisure / tourism activities on different sectors of the relevant farms are not known, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on each property.
- Where receptors have been identified within the Camden Renewable Energy Complex project area, it has been confirmed that the land owners or residents at these locations support the proposed renewable energy development and would not view the project in a negative light.
- Based on the project description provided by Enertrag, all analysis for this VIA is based on a worst-case scenario where power line tower heights are assumed to be 40 m.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the National Geo-Spatial Information (NGI)'s 25m Digital Elevation Model (DEM), is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the DEM used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.
- In addition, the viewshed / visibility analysis does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.
- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the DEIR for the up to 400kV grid connection infrastructure will however be incorporated into further drafts of this report, if relevant.
- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting required for the proposed development and therefore the potential impact of lighting at night has not been assessed at a detailed level. It is however assumed that operational and security lighting will be required for the proposed substations and general measures to mitigate the impact of additional light sources on the ambient nightscape have been provided accordingly.
- This study includes an assessment of the potential cumulative impacts of other renewable energy and infrastructural / mining developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.
- It should be noted that the fieldwork for this study was undertaken in mid-September 2019, during late winter which is characterised by low levels of rainfall and reduced vegetation cover. In these conditions, increased levels of visual impact will be experienced from receptor locations in the surrounding area.
- The overall weather conditions in the study area have certain visual implications and are expected to affect the visual impact of the proposed development to some degree. In clear weather conditions, the power lines and associated infrastructure would present a greater contrast with the surrounding environment than they would on an overcast day. Although the field investigation was conducted during clear weather conditions however, localised pollution in the study area often results in relatively hazy skies which would reduce the visibility of the power lines.

Heritage:

- The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material

cannot be excluded. This limitation is successfully mitigated with the implementation of a Chance Find Procedure, pre-construction walkthrough and monitoring of the study area by the Environmental Control Officer (ECO).

- The report only deals with the footprint area (including the assessment corridor for linear features) of the proposed development and consisted of non-intrusive surface surveys.
- The study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components will be highlighted through the public consultation process if relevant.
- It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

Palaeontological:

- Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and do contain fossil plant, insect, invertebrate and vertebrate material.
- The site visit and walk through confirmed that there are no fossils present on the land surface. It is not known if there are any fossils below the land surface. The sands of the Quaternary period and the Jurassic dolerite would not preserve fossils.

Notwithstanding these assumptions and limitations, it is the view of WSP that this EIR provides a good description of the issues associated with the project.

2 GOVERNANCE FRAMEWORK

2.1 NATIONAL ENVIRONMENTAL LEGAL FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 2.1.**

Table 2.1: Applicable National Legislation[1]

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
The Constitution of South Africa (No. 108 of 1996)	The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.
National Environmental Management Act (No. 107 of 1998)	In terms of Section 24(2) of the NEMA, the Minister may identify activities, which may not commence without prior authorisation. The Minister thus published GNR 983 (as amended) (Listing Notice 1), GNR 984 (as amended) (Listing Notice 2) and GNR 985 (as amended) (Listing Notice 3) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in the EIA Regulations of 2014 (GNR 982) (as amended). Listing Notice 1 identifies activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&EIR process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. WSP undertook a legal review of the listed activities according to the proposed project description to conclude that the activities listed in in this section are considered applicable to the development: A S&EIR process must be followed. An EA is required and will be applied for with the DFFE.
Listing Notice 1: GNR 983	*Activity 11 - The development of facilities or infrastructure for the transmission and distribution of electricity—* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;* **Description:** The Electrical Grid Infrastructure is located outside urban areas. The Collector Substation will be rated 132kV/400kV whereas the overhead powerline will be up to 400kV.
Listing Notice 1: GNR 983	*Activity 12 - The development of—* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more* *(a) within a watercourse* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*

[1] It should be noted that all dimensions outlined in relation to Listing Notice 1, 2 and 3 are provisional and are subject to final design.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Description: The physical footprint of access/maintenance roads, electrical cabling and tower structures related to the Electrical Grid Infrastructure will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site. The total physical footprint for the infrastructure will not exceed 1800m^2 (subject to detailed design).
Listing Notice 1: GNR 983	*Activity 14 - The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.* **Description:** Fuel, transformer oil, cement and other chemical storage within the common Collector Substation will be greater than 80m³ but not exceeding 500m^3.
Listing Notice 1: GNR 983	*Activity 19 - The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;* **Description:** Access/maintenance roads and stormwater control infrastructure, as well as electrical cabling related to the Electrical Grid Infrastructure will collectively require the excavation, infilling or removal of soil exceeding 10m^3 from delineated watercourses on site. Such infilling or deposition contemplated will exceed the thresholds relevant to this Listed Activity and therefore triggering this activity.
Listing Notice 1: GNR 983	*Activity 24(ii) - The development of a road—* *(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* **Description:** The access roads required for the Electrical Grid Infrastructure will be developed in an area where no reserve exists, and will be approximately 9km in length and 8m in width in places where required for large construction equipment.
Listing Notice 1: GNR 983	*Activity 27 - The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation,* **Description:** The power lines are considered a linear activity and therefore this activity is not triggered by the proposed powerline infrastructure components, however the construction of the common Collector Substation, as well as the Eskom Camden MTS upgrades will collectively require the clearance of approximately 8 hectares of indigenous vegetation.
Listing Notice 1: GNR 983	*Activity 28 - Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* **Description:** The proposed project is considered a commercial/industrial development. The total area to be developed for the Electrical Grid Infrastructure is approximately 19 hectares and occurs outside an urban area, which is currently used for agriculture.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
Listing Notice 1: GNR 983	*Activity 30 - Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).* **Description:** The Electrical Grid Infrastructure is located within and will require vegetation clearance or disturbance of Eastern Highveld Grassland and Chrissiesmeer Panveld. Both ecosystems are confirmed to be listed in the National List of Ecosystems that are Threated and in Need of Protection (as indicated in GNR 1002 of 9 December 2011). Due to the fact that these ecosystems are listed as threatened it is assumed that various threatened or protected species may be found within the development area. The restricted activity of "cutting, chopping off, uprooting, damaging or destroying, any specimen" has been identified in terms of NEM:BA and is therefore applicable to the vegetation clearance that will be required to construct the development. In light of this, Activity 30 is considered applicable.
Listing Notice 1: GNR 983	*Activity 48 - The expansion of—* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or* *where such expansion occurs—* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;* **Description:** Transport of large infrastructure components related to the Electrical Grid Infrastructure will require the expansion of existing access and/or internal roads, culverts or similar drainage crossing infrastructure collectively exceeding 100m^2 or more beyond existing road or road reserves located within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site. Expansion of ~ 3 000m^2 is anticipated, subject to detail design, thereby exceeding the threshold value and triggering this activity.
Listing Notice 1: GNR 983	*Activity 56 - The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* **Description:** The Electrical Grid Infrastructure is located within a rural area. Transport of large infrastructure components related to the facility will require the widening of existing access and/or internal roads where no reserve exists and where such road is wider than 8 metres. Subject to detail design widening up to 5.9m, collectively exceeding 1km in length is anticipated, thereby exceeding the threshold value and triggering this activity.
Listing Notice 2: GNR 984	*Activity 9 - The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex,* **Description:** The Electrical Grid Infrastructure is located outside an urban area or industrial complex and will comprise overhead powerline infrastructure of up to 400kV exceeding 2km (total length of approximately 9km) in length, as well as substation infrastructure rated 132/400kV.
Listing Notice 3: GNR 985	*Activity 4 - The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	(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;* **Description:** Internal access/maintenance roads required by the Electrical Grid Infrastructure will be between 5m and 8m wide, and exceed 1km in length. The exact values will be confirmed following detailed design. Development activities planned thereby exceeding the activity threshold within the following areas: The Electrical Grid Infrastructure is located in the Mpumalanga Province outside urban areas, and partly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. The Electrical Grid Infrastructure is therefore currently both located within the extent (aa), and within 5km of the abovementioned private nature reserve (gg). In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority - Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb). Furthermore, roads required for the Electrical Grid Infrastructure will be located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc). Similarly, roads required for the Electrical Grid Infrastructure will be located within, and will require vegetation clearance or disturbance within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ee).
Listing Notice 3: GNR 985	*Activity 10 - The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(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, where such areas comprise indigenous vegetation; or* *(hh) Areas within a watercourse or wetland, or within 100 metres of a watercourse or wetland;*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Description: Fuel, transformer oil, cement and other chemical storage within the common Collector Substation will not exceed a combined capacity of 500m3, but individual component capacities will be between 30 - 80m^3. The storage contemplated above will all occur within the Mpumalanga Province outside urban areas, and partly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. The storage contemplated is therefore currently both located within the extent (aa), and within 5km of the abovementioned private nature reserve(gg). In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority - Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb). Furthermore, storage contemplated above will be located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc). Similarly, storage contemplated above will be located within, and will require vegetation clearance or disturbance within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) (ee) as well as being located within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site(hh).
Listing Notice 3: GNR 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; or* *iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA.* **Description:** The total area to be developed for the Electrical Grid Infrastructure is approximately 19 hectares thereby exceed the activity threshold of indigenous vegetation clearance within the following areas: The development activity contemplated occurs partly within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(i). Similarly, the development activity contemplated will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA), in excess of 300m^2 (ii). Further, development activity contemplated above will partly occur on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). The clearing contemplated is therefore currently located within the extent of the abovementioned private nature reserve(iii). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities.
Listing Notice 3: GNR 985	*Activity 14 - The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (a) within a watercourse, and (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;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(ff) Critical biodiversity 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;* **Description:** The physical footprint of access/maintenance roads, stormwater control infrastructure, substation and/or electrical cabling and tower structures related to the Electrical Grid Infrastructure will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site, and will occupy ~1800m2, subject to detailed design, within these regions. In addition, the development activity contemplated is located in the Mpumalanga Province outside urban areas, and partly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. The Electrical Grid Infrastructure is therefore currently both located within the extent (aa), and within 5km of the above mentioned private nature reserve(hh). In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority - Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb). Furthermore, the development activity contemplated will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site, which infrastructure will be located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(dd). Finally, the development activity contemplated will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site, located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ff).
Listing Notice 3: GNR 985	*Activity 15 - The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010.* *d Mpumalanga*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	ii. A protected area identified in terms of NEMPAA, excluding conservancies. **Description:** The Electrical Grid Infrastructure is considered a commercial and/or industrial development, and will occupy approximately 19 hectares (subject to detailed design) within several farm portions outside an urban area, currently zoned for agriculture, while being partly located on Portion 1 & 2 of Farm No. 322 (Welgelegen), which is a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. The Electrical Grid Infrastructure is therefore currently located within the extent of the above mentioned private nature reserve (ii).
Listing Notice 3: GNR 985	*Activity 18 - The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(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 area of a biosphere reserve, where such areas comprise indigenous vegetation;* **Description:** Transport of large infrastructure components related to the Electrical Grid Infrastructure will require the widening of existing access and/or internal roads by more than 4 metres or in excess of 1km within the Mpumalanga Province and outside urban areas. Subject to detail design widening up to 5.9m, collectively exceeding 1km in length is anticipated, thereby exceeding the threshold value and triggering this activity. Such widening will occur partly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. The development activity contemplated is therefore currently both located within the extent(aa), and within 5km of the above mentioned private nature reserve(gg). In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority - Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb). Furthermore, such widening will occur within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in Need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc). Finally, such widening will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ee).

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
Listing Notice 3: GNR 985	*Activity 23 - The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs —* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(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 area of a biosphere reserve, where such areas comprise indigenous vegetation;* **Description:** The physical footprint of access/maintenance roads, stormwater control infrastructure, substations and/or electrical cabling and tower structures related to the Electrical Grid Infrastructure will either traverse the delineated watercourses on site or be located within 32m of the outer extent of the delineated watercourses on site and will require expansion of ~ 3 000m2 withing these areas, subject to detail design, thereby exceeding the threshold value and triggering this activity. In addition, development activity contemplated occurs partly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. The development activity contemplated is therefore currently both located within the extent(aa), and within 5km of the above mentioned private nature reserve(gg). In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority - Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb). Furthermore, development activity contemplated will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site, which infrastructure will be located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc). Finally, the development activity contemplated will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site, located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(gg).
Generic EMPr relevant to an Application for Substation and	NEMA requires that an EMPr be submitted where an EIA has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
Overhead Electricity Transmission and Distribution Infrastructure	The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations, 2014, as amended, or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice, that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the applicant and the CA. GN 435 of 22 March 2019 identified a generic EMPr relevant to applications for substations and overhead electricity transmission and distribution infrastructure which require authorisation in terms of Section 42(2) of NEMA. Applications for overhead electricity transmission and distribution infrastructure that trigger Activity 11 of Listing Notice 1 or Activity 9 of Listing Notice 2 and any other listed or specified activities must use the generic EMPr. The objective of the generic EMPr is "to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature."
National Environmental Management: Waste Act (59 of 2008) (NEM: WA)	This Act provides for regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. The Act also provides for the licensing and control of waste management activities through GNR. 921 (2013): List of Waste Management Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment. The proposed project does not constitute a Listed Activity requiring a Waste Management Licence (WML) as defined in GNR 921. However, the contents of this EIA Report will include reasonable measures for the prevention of pollution and good international industry practice (GIIP).
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) was promulgated in June 2004 within the framework of NEMA to provide for the management and conservation of national biodiversity. The NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI). SANBI was established by the NEMBA with the primary purpose of reporting on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems. The biodiversity assessment identifies CBAs which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. Based on the preliminary desktop assessment and the terrestrial ecology report, a significant part of the Project Area falls within CBA (Irreplaceable and Optimal) and a large wetland area adjacent and to the north of the Vaal River (near the southern part of the site) is mapped as an Ecological Support Area (ESA). According to the description for the MBSP Terrestrial Assessment categories, CBAs are areas that are required to meet biodiversity targets (for biodiversity pattern and ecological process features). The management approach is that they should remain in a natural state. CBAs are areas of high biodiversity value which are usually at risk of being lost and usually identified as important in meeting biodiversity targets, except for Critically Endangered Ecosystems or Critical Linkages. CBAs in the Province can be divided into two sub-categories: — Irreplaceable (parts of the site are within this sub-category), and — Optimal (northern parts of the site are within this sub-category).

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Supplementary baseline terrestrial ecology studies will be undertaken during the EIA phase to inform the assessment of impacts and will include flora surveys of the project footprint to determine the presence of flora species of concern (SoC), and bird surveys of the area to define the potential risks to bird SoC. The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) Regulations with regards to alien and invasive species have been superseded by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. Specific management measures for the control of alien and invasive plants have been included in the Environmental Management Programme (EMPr).
National Environmental Management Protected Areas Act (No. 57 of 2003)	The purpose of the National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) is to, inter alia, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas. Section 50(5) of NEMPAA states that "no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority." According to the National Parks Area Expansion Strategy (NPAES), there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore outside the NPAES focus area. The Facility is located in the Mpumalanga Province outside urban areas, partly within a National Protected Area Expansion Strategy Focus area and within 5km of Portion 1 & 2 of Farm No. 322 (Welgelegen), which are declared as Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). This reserve is noted as having farming activity present, and is currently managed and actively utilised for agriculture. The land owner further was not aware of any protected area on these properties and intends to utilise any suitable legal avenues available to continue operation of the properties for the current land use of agriculture, in conjunction with the planned Renewable Energy land use subject to this application. The protected area and has undergone similar levels of degradation as surrounding areas due primarily to overgrazing, but also partially due to alien invasive plants. In addition, no conservation management activities were evident on site during the ecological field assessment. This pattern of over-utilization affects all grasslands on site, resulting in them being in moderate to poor condition. The habitat has been used for livestock production and is impacted by this land-use. The biodiversity specialist concluded that, on the basis of the current land use and levels of modification, the private nature reserve does not align with the objective and purpose of the protected area status. It is important to also note that the Project Proponent is engaging with the MTPA and the Management Authority (Landowner/s) to investigate the best way forward regarding the Langcarel Nature Reserve. The MTPA has undertaken a site visit on 01 June 2022. The MTPA has submitted a letter to the Department (letter dated, 20 June 2022) of the intent to issue a notice to withdraw the declaration of the Langcarel Private Nature Reserve in terms of the Mpumalanga Nature Conservation Act (Act No. 10 of 1998). A separate process is therefore underway to have it (or part thereof) withdrawn or de-proclaimed, as part of ongoing province-wide nature reserve verification efforts by the provincial authorities. Subject to the successful conclusion of this process, a Section 50 approval is not required for this project. Available information on the Nature Reserve (i.e., de-proclamation or removal of Nature Reserve status) and/or relevant approval (i.e., Section 50 Approval where applicable) will be submitted to the Department once available, possibly together with the FEIR, to date Section 50 Approval has been received for the affected land portions.
The National Water Act (No. 36 Of 1998)	The National Water Act, 1998 (Act No. 36 of 1998) (NWA) provides the framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment. The Act defines water source to include watercourses, surface water, estuary or aquifer. A watercourse is defined in the Act as a river or spring, a natural channel in which water flows

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	regularly or intermittently, a wetland, lake or dam into which or from which water flows, and any collection of water that the Minister may declare a watercourse. Section 21 of the Act outlines a number of categories that require a water user to apply for a Water Use License (WUL) and Section 22 requires water users to apply for a General Authorisation (GA) with the Department of Water and Sanitation (DWS) if they are under certain thresholds or meet certain criteria. The list of water uses applicable to the proposed Project include: *c) Impeding or diverting the flow of water in a watercourse;* *i) Altering the bed, banks, course or characteristics of a watercourse;* The DWS will make the final decision on water uses that are applicable to the project through a pre-application meeting after which a Water Use Authorisation Application (WUA) as determined by the risk assessment will be undertaken in compliance with procedural regulations published by the DWS within General Notice 267 (GN267). These regulations specify required information per water use and the reporting structure of required supporting technical information.
The National Heritage Resources Act (No. 25 Of 1999)	The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resources Agency (SAHRA) and lists activities that require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development. Part 2 of the NHRA details specific activities that require a Heritage Impact Assessment (HIA) that will need to be approved by SAHRA. Parts of Section 35, 36 and 38 apply to the proposed project, principally: — Section 35 (4) - No person may, without a permit issued by the responsible heritage resources authority- — destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite; — destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite. — Section 38 (1) Subject to the provisions of subsections (7), (8) and (9), 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, 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. In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed Project, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668). A desktop Heritage Scoping Report (**Appendix G-6**) has been carried out by a suitably qualified specialist, revealing: — no Stone Age or Iron Age archaeological sites are on record within the immediate study area but this could be due to a lack of focused research in the area. — no grave sites are indicated on archival maps or the genealogical society database within the impact areas, but burial sites can occur across the landscape and can be expected. — The study area is of low to moderate to high paleontological sensitivity and according to the South African Heritage Resources Information System (SAHRIS) palaeontological sensitivity map must be subjected to a palaeontological assessment in the impact assessment phase.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	– the study area forms part of a landscape characterised by wide scale cultivation and industrial facilities like power plants and mines. – the project area has been cultivated from prior to 1968 as indicated on historical maps and has remained under cultivation until present these activities would have impacted on surface indicators of heritage sites if any were ever present in the area. The proposed project will be loaded onto the SAHRIS portal for comment by SAHRA and/or Mpumalanga Heritage Resources Authority.
Mineral and Petroleum Resources Development Act (No. 28 of 2002)	The aim of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) is to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. Section 53(1) of the MPRDA provides that any person who intends to use the surface of any land in any way that may be contrary to any object of the MPRDA, or which is likely to impede any such object, must apply to the Minister of Mineral Resources (the Minister) for approval. Section 53 of the MPRDA provides a mechanism for ensuring that, inter alia, the mining of mineral resources is not detrimentally affected through the use of the surface of land and which may, for example, result in the sterilisation of a mineral resource. A Section 53 approval will be required due to the fact that the project is located on various mining right areas. The Amendment Regulations (GNR 420 of 27 March 2020) introduced a template for section 53 applications (Form Z) and the specific information that applicants will need to provide as part of a section 53 application.
Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	In South Africa, environmental noise control has been in place for three decades, beginning in the 1980s with codes of practice issued by the South African National Standards (formerly the South African Bureau of Standards, SABS) to address noise pollution in various sectors of the country. Under the previous generation of environmental legislation, specifically the Environmental Conservation Act 73 of 1989 (ECA), provisions were made to control noise from a National level in the form of the Noise Control Regulations (GNR 154 of January 1992). In later years, the ECA was replaced by the National Environmental Management Act 107 of 1998 (NEMA) as amended. The National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA) was published in line with NEMA and contains noise control provisions under Section 34: *(1) The minister may prescribe essential national standards –* *(a) for the control of noise, either in general or by specific machinery or activities or in specified places or areas; or* *(b) for determining –* *(i) a definition of noise; and* *(ii) the maximum levels of noise.* *(2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards.*
Conservation of Agricultural Resources Act (No. 43 of 1983)	The Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) provides for the implementation of control measures for soil conservation works as well as alien and invasive plant species in and outside of urban areas. In terms of the amendments to the regulations under the CARA, landowners are legally responsible for the control of alien species on their properties. Various Acts administered by the DFFE and the DWS, as well as other laws (including local by-laws), spell out the fines, terms of imprisonment and other penalties for contravening the law. Although no fines have yet been placed against landowners who do not remove invasive species, the authorities may clear their land of invasive alien plants and other alien species entirely at the landowners' cost and risk. The CARA Regulations with regards to alien and invasive species have been superseded by NEMBA Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
Civil Aviation Act (No. 13 of 2009)	Civil aviation in South Africa is governed by the Civil Aviation Act (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by South African Civil Aviation Authority (SACAA) as an agency of the Department of Transport (DoT). SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). The DEA Screening Tool Report identified Civil Aviation as having low sensitivity for the proposed Project, and as being located between 8 and 15km of other civil aviation aerodrome . SACAA and ATNS will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from these authorities as applicable.
Occupational Health and Safety Act (No. 85 of 1993)	The National Occupational Health and Safety Act (No. 85 of 1993) (OHSA) and the relevant regulations under the Act are applicable to the proposed project. This includes the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations is essential.
National Energy Act (No. 34 of 2008)	The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantitates, and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors. The main objectives of the Act are to: — Ensure uninterrupted supply of energy to the Republic; — Promote diversity of supply of energy and its sources; — Facilitate effective management of energy demand and its conservation; — Promote energy research; — Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy; — Ensure collection of data and information relating to energy supply, transportation and demand; — Provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development; — Provide for certain safety, health and environment matters that pertain to energy; — Facilitate energy access for improvement of the quality of life of the people of Republic; — Commercialise energy-related technologies; — Ensure effective planning for energy supply, transportation, and consumption; and — Contribute to sustainable development of South Africa's economy. In terms of the act, the Minister of Energy is mandated to develop and, on an annual basis, review and publish the Integrated Energy Plan (IEP) in the Government Gazette. The IEP analyses current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this to project future energy requirements, based on different scenarios. The IEP and the Integrated Resource Plan are intended to be updated periodically to remain relevant. The framework is intended to create a balance between energy demand and resource availability so as to provide low-cost electricity for social and economic development, while taking into account health, safety and environmental parameters.
Electricity Regulation Act (No. 4 of 2006)	The Electricity Regulation Act (No. 4 of 2006) (ERA) aims to: — Achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa;

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	— Ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency. effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in the Republic: — Facilitate investment in the electricity supply industry; — Facilitate universal access to electricity; — Promote the use of diverse energy sources and energy efficiency; — Promote competitiveness and customer and end user choice; and — Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public. The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

2.2 POLICIES AND PLANS

Table 2.2 summarised key policies and plans as an outline of the governance framework for the project.

Table 2.2: Applicable Regional Policies and Plans

APPLICABLE POLICY	DESCRIPTION OF POLICY
National Development Plan	The National Development Plan aims to eliminate poverty and reduce inequality by 2030. The NDP identifies a number of enabling milestones. Of relevance to the proposed development the NDP refers to the need to produce sufficient energy to support industry at competitive prices and ensure access for poor households, while reducing carbon emissions per unit of power by about one-third. In this regard the infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development. Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green low-carbon economy, is one of these challenges. In terms of implementation the NDP identifies three phases. The first two are of specific relevance to the proposed project. The first phase (2012–2017) notes that ensuring the supply of energy and water is reliable and sufficient for a growing economy. The second phase (2018–2023) involves building on the first phase to lay the foundations for more intensive improvements in productivity. The provision of affordable and reliable energy is a key requirement for this to take place. Chapter 4, Economic infrastructure, notes that economic infrastructure provides the foundation for social and economic development. In this regard South Africa must invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The plan envisages that, by 2030, South Africa will have an energy sector that promotes: — Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. — Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. More specifically, South Africa should have adequate

APPLICABLE POLICY	DESCRIPTION OF POLICY
	supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted. The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation. In this regard coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources, will play a much larger role. This proposed project indirectly supports renewable generation by allowing for export.
Integrated Resource Plan 2010 – 2030	The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the then Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. The IRP recognises that Solar photovoltaic (PV), wind and concentrated solar power (CSP) with storage present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain. The proposed grid connection indirectly supports these technologies by allowing transmission and distribution of the electricity generated at the renewable energy plants.
New Growth Path	Government released the New Economic Growth Path Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water, and housing.
National Infrastructure Plan	The South African Government adopted a National Infrastructure Plan (NIP) in 2012. The NIP aims to transform the South African economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. It outlines the challenges and enablers which needs to be addressed in the building and developing of infrastructure. The Presidential Infrastructure Coordinating Commission (PICC) was established by the Cabinet to integrate and coordinate the long-term infrastructure build. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools and dams will contribute to improved economic growth. The proposed grid connection indirectly supports this plan by allowing transmission and distribution of the electricity generated at the renewable energy plants.
Integrated Energy Plan	The development of a National IEP was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South

APPLICABLE POLICY	DESCRIPTION OF POLICY
	Africa which guides future energy infrastructure investments and policy development. The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives are identified, namely: — Objective 1: Ensure security of supply. — Objective 2: Minimise the cost of energy. — Objective 3: Promote the creation of jobs and localisation. — Objective 4: Minimise negative environmental impacts from the energy sector. — Objective 5: Promote the conservation of water. — Objective 6: Diversify supply sources and primary sources of energy. — Objective 7: Promote energy efficiency in the economy. — Objective 8: Increase access to modern energy. The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others. Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives. As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios: — The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term. — The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy. — The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply. — The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met. The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth. By 2020, various import options become available, and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs. In all scenarios the energy mix for electricity generation becomes more diverse

APPLICABLE POLICY	DESCRIPTION OF POLICY
	over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy. An assessment of each scenario against the eight objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered. In terms of promoting job creation and localisation potential the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with natural gas and coal making a smaller contribution. The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type.
National Protected Area Expansion Strategy, 2010	The National Protected Area Expansion Strategy 2010 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). According to the NPAES, there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore **outside the NPAES focus area**.

2.3 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

Table 2.3: Provincial Plans

APPLICABLE PLAN	DESCRIPTION OF PLAN
Mpumalanga Growth and Development Path	The primary objective of the Mpumalanga Economic Growth and Development Path (MEGDP) (2011) is to foster economic growth that creates jobs, reduce poverty and inequality in the Province. The MEGDP identifies supporting the development of clean forms of energy such as wind and hydro power generation opportunities, as well as opportunities including gas production from landfill and organic waste, as one of the key interventions to facilitate growth and job creation in the manufacturing sector. A focal point of the MEGDP is massive investments in infrastructure as a key driver of job creation across the economy, with alternative energy production identified as one of the key opportunities in the Mpumalanga Economic sectors. The proposed grid connection indirectly supports this plan by allowing transmission and distribution of the electricity generated at the renewable energy plants.

APPLICABLE PLAN	DESCRIPTION OF PLAN
Mpumalanga Spatial Development Framework (MSDF), 2019	The Mpumalanga Spatial Development Framework (SDF) (2019) identifies that tourism is an important economic sector and has emerged as a robust driver of growth for emerging economies. The SDF also notes that a significant portion of Mpumalanga's land area is classified as Moderate to High-Very High agricultural potential which can be utilised for agricultural production. However, there are other factors affecting the agricultural sector including loss of agricultural land to other activities, availability of water, contamination of the water used for irrigation by other economic activities, and access to the market. The SDF further notes that mining is the largest economic sector in the province and has assisted other sectors such as manufacturing and power generation, to grow in the province. However, the mining sector has posed some key challenges, including soil and water contamination and environmental pollution, development of mines on good agricultural soil thus threatening food security, restriction of animal movement due to open cast mining thus affecting the ecosystem etc. It also notes that Mpumalanga's manufacturing plants and coal fired power plants are the key polluters of air, with climate change also identified as a key challenge in the province. Therefore, the province must carefully design interventions that provide a gradual shift from mining-oriented sectors to the sustainable economic sectors to maintain sustained growth of the provincial economy. The SDF notes that a significant amount of the country's electricity comes from coal-fired stations in Mpumalanga. It also observes that there is a steady increase in the demand for electricity in the province, mostly attributed to residential, commercial and industrial development, including mining and heavy industry. The Provincial SDF also notes that the abundance of coal has led to the development of many coal-fired power stations in the province, however these coalfields are depleting, therefore making it necessary to consider renewable power sources in Mpumalanga. The SDF also recognises that Mpumalanga's Coal Mining and Coal Fired Power Plant region (mainly the Highveld area) will be under immense pressure for environmental considerations and as a result, the region will witness a possible decline in demand of coal and large-scale employment. The SDF proposes to diversify the regional economy and facilitate the gradual transition of economic activities in the region. The proposed grid connection indirectly supports this plan by allowing transmission and distribution of the electricity generated at the renewable energy plants.
Mpumalanga Industrial Development Plan	In terms of industry, the purpose of the Mpumalanga Industrial Development Plan (MIDP) (2015) is to promote the establishment of new industries and promote growth of existing industries in the province. It is however noted that the Msukaligwa Municipality (within which the project falls under) is not directly impacted by the 2025 MIDP and its proposed priority hubs. The proposed grid connection indirectly supports this plan by allowing transmission and distribution of the electricity generated at the renewable energy plants.
Mpumalanga Conservation Act (No. 10 of 1998)	This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project: — Various species are protected; — The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species. The Act provides lists of protected species for the Province. According to the Mpumalanga Nature Conservation Act, a permit is required for the removal of any species on this list.

Table 2.4: District and Local Municipality Plans

APPLICABLE PLAN	DESCRIPTION OF PLAN
Gert Sibande Municipality Integrated Development Plan	According to the Municipal Systems Act (Act 32 of 2000) (MSA), all municipalities have to undertake an Integrated Development Plan (IDP) process. The IDP is a legislative requirement thus it has legal status and supersedes all other plans that guide development at local government level. The Gert Sibande Municipality (GSM) IDP Review (2019/ 2020) and Final IDP (2020/2021) has identified the following development priorities: — Municipal Transformation and Organisational Development — Basic Service Delivery and Infrastructure Development — Local Economic Development — Municipal Financial Viability and Management — Good Governance and Public Participation — Spatial Development Analysis and Rationale The main goal and strategic objective of the Basic Service Delivery and Infrastructure Development priority is a reliable and sustainable service. One of the main strategic objectives for reaching the goal is the provision of basic services such as water and electricity to an approved minimum level of standards in a sustainable manner, as per the national guidelines. The proposed grid connection indirectly supports this plan by allowing transmission and distribution of the electricity generated at the renewable energy plants.
Msukaligwa Local Municipality IDP	The Msukaligwa Local Municipality Revised IDP (2020/2021) has identified the following key Municipal priorities: — Revenue collection. — Access to basic services by communities. — Job creation and economic development. — Infrastructure maintenance and upgrading. — Community participation in the affairs of the municipality. — Fight against fraud and corruption. — Capable and responsive organizational structure. — Capabilities of the municipal ICT. — Integrated human settlements One of the main strategic objectives for the access to basic services priority is to provide sustainable and reliable services to communities. Most of the basic services are rendered within the municipality, however some rural areas are still faced with some challenges in the provision water, sanitation and electricity. The Municipality, through the IDP, aims to facilitate the provision of electricity, with a number of key projects planned to be implemented over the period of five years linked to the Municipal IDP. The proposed grid connection supports this plan by allowing transmission and distribution of the electricity generated at the renewable energy plants.
Msukaligwa Spatial Development Framework	The Msukaligwa SDF is informed by a number of spatial objectives, including: — Providing a spatial structure that facilitates access to services for all communities. — Protecting strategic water sources and sensitive eco-systems. — Providing space for the diversification of the local economy. — Eliminating past spatial settlement patterns. The provision of space of the diversification of the local economy is of specific relevance to the proposed development.

APPLICABLE PLAN	DESCRIPTION OF PLAN
	The SDF highlights the key role and spatial extent of mining in the Msukaligwa Municiaplity, including reference to the Camden coal-fired power station located in proximity to the proposed development. Over the longer term the rehabilitation of mining areas and a range of alternative peri-urban uses should be considered for the impacted areas in view of the decrease reliance on coal. Commercial Agriculture also represents a key economic activity in the Municipality. However, the SDF notes that climate change will pose a risk to the agricultural sector. The proposed grid connection indirectly supports this plan by allowing transmission and distribution of the electricity generated at the renewable energy plants.

2.4 INTERNATIONAL ENVIRONMENTAL AND SOCIAL STANDARDS

2.4.1 IFC PERFORMANCE STANDARDS

The International Finance Corporation (IFC) is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development in developing countries. The IFC is a member of the World Bank Group (WBG) and is headquartered in Washington, D.C., United States. It was established in 1956 as the private sector arm of the WBG to advance economic development by investing in strictly for-profit and commercial projects that purport to reduce poverty and promote development.

The IFC's stated aim is to create opportunities for people to escape poverty and achieve better living standards by mobilizing financial resources for private enterprise, promoting accessible and competitive markets, supporting businesses and other private sector entities, and creating jobs and delivering necessary services to those who are poverty-stricken or otherwise vulnerable. Since 2009, the IFC has focused on a set of development goals that its projects are expected to target. Its goals are to increase sustainable agriculture opportunities, improve health and education, increase access to financing for microfinance and business clients, advance infrastructure, help small businesses grow revenues, and invest in climate health.

The IFC is owned and governed by its member countries but has its own executive leadership and staff that conduct its normal business operations. It is a corporation whose shareholders are member governments that provide paid-in capital, and which have the right to vote on its matters. Originally more financially integrated with the WBG, the IFC was established separately and eventually became authorized to operate as a financially autonomous entity and make independent investment decisions. It offers an array of debt and equity financing services and helps companies face their risk exposures, while refraining from participating in a management capacity. The corporation also offers advice to companies on making decisions, evaluating their impact on the environment and society, and being responsible. It advises governments on building infrastructure and partnerships to further support private sector development.

The IFC’s Sustainability Framework articulates the Corporation’s strategic commitment to sustainable development and is an integral part of IFC’s approach to risk management. The Sustainability Framework comprises IFC’s Policy and Performance Standards on Environmental and Social Sustainability, and IFC’s Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC’s commitments, roles, and responsibilities related to environmental and social sustainability. IFC’s Access to Information Policy reflects IFC’s commitment to transparency and good governance on its operations and outlines the Corporation’s institutional disclosure obligations regarding its investment and advisory services. The Performance Standards (PSs) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the PSs to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives. The PSs may also be applied by other financial institutions (FIs).

The Project is considered a Category B project in terms of the IFC Policy on E&S Sustainability (2012), having the potential to cause limited adverse environmental or social risks and/or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures.

The objectives and applicability of the eight PSs are outlined in **Table 2.5**.

Table 2.5: IFC Performance Standards Applicability to the Project

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts			
Overview	Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.		
Objectives	– To identify and evaluate environmental and social risks and impacts of the project. – To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. – To promote improved environmental and social performance of clients through the effective use of management systems. – To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. – To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.		
Aspects	1.1	Policy	The IFC Standards state under PS 1 (Guidance Note 23) that "*the breadth, depth and type of analysis included in an ESIA must be proportionate to the nature and scale of the proposed project's potential impacts as identified during the course of the assessment process*." This document is the draft deliverable from the Scoping and EIA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr (**Appendix H**) has been compiled during the EIA phase of the project. A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlines in the EMPr will serve as the basis for an ESMS for the proposed Project.
	1.2	Identification of Risks and Impacts	
	1.3	Management Programmes	
	1.4	Organisational Capacity and Competency	
	1.5	Emergency Preparedness and Response	
	1.6	Monitoring and Review	
	1.7	Stakeholder Engagement	
	1.8	External Communication and Grievance Mechanism	
	1.9	Ongoing Reporting to Affected Communities	
Performance Standard 2: Labour and Working Conditions;			
Overview	Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.		
Objectives	– To promote the fair treatment, non-discrimination, and equal opportunity of workers. – To establish, maintain, and improve the worker-management relationship. – To promote compliance with national employment and labour laws.		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	— To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. — To promote safe and healthy working conditions, and the health of workers. — To avoid the use of forced labour.		
Aspects	2.1	— Working Conditions and Management of Worker Relationship — Human Resources Policy and Management — Working Conditions and terms of Engagement — Workers organisation — Non- Discrimination and Equal Opportunity — Retrenchment — Grievance Mechanism	The construction activities will require contractors for completion. A safe working environment and fair contractual agreements must be in place. The operational phase will have permanent employees for day-to-day activities as well as contractors who will all need a safe working environment and fair contractual agreements. Whilst PS2 will be applicable to the Project, it is not intended to be addressed in detail in this ESIA stage. Recommendations are provided concerning development of a detailed Human Resources (HR) and Occupational Health and Safety (OHS) system by the developer and its partners as the Project moves towards implementation. In addition, measures to address the Interim Advice for IFC Clients on Supporting Workers in the Context of COVID-19 are referenced. The EMPr (**Appendix H**) has incorporated the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors.
	2.2	— Protecting the Workforce — Child Labour — Forced Labour	
	2.3	Occupational health and Safety	
	2.4	Workers Engaged by Third Parties	
	2.5	Supply Chain	
Performance Standard 3: Resource Efficiency and Pollution Prevention			
Overview	Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world.		
Objectives	— To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. — To promote more sustainable use of resources, including energy and water. — To reduce project related GHG emissions.		
Aspects	3.1	— Policy Resource Efficiency — Greenhouse Gases — Water Consumption	PS3-related impacts, such as the management of construction waste, hazardous substances, and stormwater are assessed in **Section 9** of this report. There are no material resource efficiency issues associated with the Project. The project is not GHG emissions intensive and a climate resilience study or a GHG emissions-related assessment is not deemed necessary for a project of this nature. However, the project seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase has been addressed in **Section 8.9** of the EMPr (**Appendix H**).
	3.2	— Pollution Prevention — Air Emissions — Stormwater — Waste Management — Hazardous Materials Management	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		— Pesticide use and Management	The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures has been included in the EMPr (**Appendix H**) Land contamination of the site from historical land use (i.e. low intensity agricultural / grazing) is not considered to be a cause for concern. The waste generation profile of the project is not complex. Waste mitigation and management measures have been included in **Section 8.4** of the EMPr (**Appendix H**). Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel, cement etc.) and stored sanitary sewage in the operational phase. The EMPr and emergency preparedness and response plan identified these anticipated hazardous materials and recommends relevant mitigation and management measures (refer to **Section 8.3** of the EMPr (**Appendix H**)) The WBG General EHS Guidelines identify Sulphur Hexafluoride (SF6) gas as being commonly used as a gas insulator for electrical equipment. The guidelines require its use to be minimised, and in cases where it is used for applications involving high voltages (>350 kV), equipment with a low leakage- rate (<99%) should be used. It is assumed that this may be present in HV circuit breakers and the GIS switchgear for this project. Equipment should be specified to comply with the International Electrotechnical Commission (IEC) which is more stringent than the IFC standard setting a maximum leakage standard of 0.1% per year for equipment operated at above 52 kV and 0.5% per year for equipment below 52 kV.
Performance Standard 4: Community Health, Safety, and Security			
Overview	Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts.		
Objectives	— To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. — To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.		
Aspects	4.1	— Community Health and Safety — Infrastructure and Equipment Design and Safety — Hazardous Materials Management and Safety — Ecosystem Services — Community Exposure to Disease — Emergency Preparedness and Response	The requirements included in PS 4 have been addressed in this S&EIA process and the development of the EMPr. During the construction phase there will be a significant increase in vehicular traffic along public roads, largely due to the need for importation of construction material. Pedestrian and road safety risks have been qualitatively evaluated in this S&EIA process and the clients' standard safety and security measures, as well as potential additional measures recommended by WSP, which has been detailed in **Section 8** of the EMPr (**Appendix H**). The following generic plans have been included in the EMPr: — Emergency Response Plan; — HIV and COVID-19 Management Plan; and — Security Policy.
	4.2	Security Personnel	
Performance Standard 5: Land Acquisition and Involuntary Resettlement			

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
Overview	Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.		
Objectives	— To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. — To avoid forced eviction. — To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. — To improve, or restore, the livelihoods and standards of living of displaced persons. — To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.		
Aspects	5.1	— Displacement — Physical Displacement — Economic Displacement — Private Sector Responsibilities under Government Managed Resettlement	PS5 is not applicable to the proposed project as no physical or economic displacement or livelihood restoration will be required. The proposed Project is located on privately owned land that is utilised for agriculture by the landowners. The significance of all potential agricultural impacts is kept low by the very small proportion of the land that is impacted.
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
Overview	Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.		
Objectives	— To protect and conserve biodiversity. — To maintain the benefits from ecosystem services. — To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.		
Aspects	6.1	Protection and Conservation of Biodiversity	A small part of the Project Area falls within CBAs (Irreplaceable and Optimal) and within Ecological Support Areas. A Biodiversity Impact Assessment (**Appendix G-5**) as well as an Avifaunal Impact Assessment (**Appendix G-2**)and Freshwater Ecology Impact Assessment (**Appendix G-6**) have been undertaken. The methodologies for the specialist assessments include a combination of literature review, in-field surveys and sensitivity mapping. This substantively complies with the PS 6 general requirements for baseline and impact assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa. The prevalence of invasive alien species will be determined, and mitigation and management measures have been included in **Section 9.1** of the EMPr (**Appendix H**).
Performance Standard 7: Indigenous People			
Overview	Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability		

	to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.		
Objectives	— To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. — To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. — To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. — To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle. — To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. — To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.		
Aspects	7.1	General — Avoidance of Adverse Impacts — Participation and Consent	As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area. The Project does not involve displacement. PS7 will not be triggered.
	7.2	Circumstances Requiring Free, Prior, and Informed Consent — Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use — Critical Cultural Heritage — Relocation of Indigenous Peoples from Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use	
	7.3	Mitigation and Development Benefits	
	7.4	Private Sector Responsibilities Where Government is Responsible for Managing Indigenous Peoples Issues	
Performance Standard 8: Cultural Heritage			
Overview	Performance Standard 8 recognizes the importance of cultural heritage for current and future generations.		
Objectives	— To protect cultural heritage from the adverse impacts of project activities and support its preservation. — To promote the equitable sharing of benefits from the use of cultural heritage.		
Aspects	8.1	Protection of Cultural Heritage in Project Design and Execution	A Heritage Scoping Report (**Appendix G-8**) has been carried out by a suitably qualified specialist, revealing that archaeological sites (Stone Age and Historic Archaeological), cultural heritage sites, burial grounds or isolated artifacts are unlikely to be present on the affected landscape. A Chance Find Procedure has been included **Section 9.1** of the EMPr (**Appendix H**)

2.4.2 WORLD BANK GROUP ENVIRONMENTAL HEALTH AND SAFETY GUIDELINES

In support of the Performance Standards, the World Bank Group (WBG) has published a number of Environmental Health and Safety (EHS) Guidelines. The EHS Guidelines are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility. The EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards, particularly in those aspects related to PS3: Pollution Prevention and Abatement, as well as certain aspects of occupational and community health and safety.

Where host country regulations differ from the levels and measures presented in the EHS Guidelines, projects seeking international funding may be expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is required. The following IFC / WBG EHS Guidelines have been generally consulted during the preparation of the EIA in order to aid the identification of EHS aspects applicable to the project:

- *Electric Power Transmission and Distribution (2007)* - information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas
- *General EHS Guidelines* – this includes a section on a range of environmental, occupational health and safety, community health and safety, and construction activities that would apply to the project. The guideline also contains recommended guidelines adopted form the World Health Organisation (WHO) for ambient air and water quality, which are referred to in the relevant impact assessment sections in the ESIA report.

2.4.3 EQUATOR PRINCIPLES

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing, and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EPs apply globally to all industry sectors and to five financial products 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, 4) Bridge Loans and 5) Project-Related Refinance and Project-Related Acquisition Finance. The relevant thresholds and criteria for application is described in detail in the Scope section of the EP. Currently 125 Equator Principles Financial Institutions (EPFIs) in 37 countries have officially adopted the EPs, covering the majority of international project finance debt within developed and emerging markets. EPFIs commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

While the EPs are not intended to be applied retroactively, EPFIs apply them to the expansion or upgrade of an existing project where changes in scale or scope may create significant environmental and social risks and impacts, or significantly change the nature or degree of an existing impact. The EPs have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market.

The EPs have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry and have supported member banks in developing their own Environmental and Social Risk Management Systems.

The requirements and applicability of the EPs are outlined in **Table 2.6**

It should be noted that Principles 8 and 10 relate to a borrower's code of conduct and are therefore not considered relevant to the S&EIA process and have not been included in this discussion.

Table 2.6: Requirements and Applicability of the Equator Principles

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
Principle 1: Review and Categorisation		
Overview	When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise such project based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of the IFC. Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale, and stage of the Project, and with the level of environmental and social risks and impacts. The categories are: – Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; – Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and – Category C: Projects with minimal or no adverse environmental and social risks and/or impacts.	Based upon the significance and scale of the Project's environmental and social impacts, the proposed project is regarded as a Category B project i.e. a project with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.
Principle 2: Environmental and Social Assessment		
Overview	For all Category A and Category B Projects, the EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate/ offset/ remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts, whether prepared by the client, consultants or external experts. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken. For other Category B and potentially C Projects, a limited or focused environmental or social assessment may be appropriate, applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process. The client is expected to include assessments of potential adverse Human Rights impacts and climate change risks as part of the ESIA or other Assessment, with these included in the Assessment Documentation.	This document is the third deliverable (i.e. draft EIAr) from the S&EIA process undertaken for the proposed Project. The impact assessment has been undertaken during this phase of the S&EIA process. The assessment has comprehensively assessed the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr (**Appendix H**) has also be compiled. A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlined in the EMPr will serve as the basis for an ESMS for the proposed Project.
Principle 3: Applicable Environmental and Social Standards		

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
Overview	The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI's due diligence will include, for all Category A and Category B Projects globally, review and confirmation by the EPFI of how the Project and transaction meet each of the Principles. For Projects located in Non-Designated Countries, the Assessment process evaluates compliance with the then applicable IFC PS and WBG EHS Guidelines. For Projects located in Designated Countries, compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.	As South Africa has been identified as a non-designated country, the reference framework for environmental and social assessment is based on the IFC PS. In addition, this S&EIA process has been undertaken in accordance with NEMA (the host country's relevant legislation). A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlined in the EMPr (**Appendix H**) will serve as the basis for an ESMS for the proposed Project.
Principle 4: Environmental and Social Management System and Equator Principles Action Plan		
Overview	For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree on an Equator Principles Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.	A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlined in the EMPr (**Appendix H**) will serve as the basis for an ESMS for the proposed Project.
Principle 5: Stakeholder Engagement		
Overview	EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. To accomplish this, the appropriate assessment documentation, or non-technical summaries thereof, will be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner. The borrower will take account of and document the process and results of the consultation, including any actions agreed resulting from the consultation. Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. All Projects affecting Indigenous Peoples will be subject to a process of Informed Consultation and Participation and will need to comply with the rights and protections for Indigenous Peoples contained in relevant national law, including those laws	The S&EIA process includes an extensive stakeholder engagement process which complies with the South African EIA Regulations. The process includes consultations with local communities, nearby businesses, and a range of government sector stakeholders (state owned enterprises, national, provincial and local departments). The stakeholder engagement process solicits interest from potentially interested parties through the placement of site notices and newspaper advertisements as well as written and telephonic communication. The stakeholder engagement process is detailed in **Section 4.1**

	implementing host country obligations under international law.	
Principle 6: Grievance Mechanism		
Overview	For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The borrower will inform the Affected Communities and Workers about the grievance mechanism in the course of the stakeholder engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a culturally appropriate manner, and is readily accessible, at no cost, and without retribution to the party that originates the issue or concern.	The EMPr (**Appendix H**) includes a *Grievance Mechanism Process for Public Complaints and Issues* ***(Section 9.31)*** . This procedure effectively allows for external communications with members of the public to be undertaken in a transparent and structured manner.
Principle 7: Independent Review		
Overview	For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.	This principle will only become applicable in the event that that the project is developed in the future.
Principle 9: Independent Monitoring and Reporting		
Overview	To assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting for all Category A, and as appropriate, Category B projects. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required.	This principle will only become applicable in the event that that the project is developed in the future.

3 SCOPING PHASE SUMMARY

3.1 PROCEDURAL PROCESS

The application form was compiled and submitted to the DFFE on **22 February 2022**. The application form was acknowledged on **28 February 2022.** The application form was updated and submitted to the DFFE on **08 April 2022**.

The DFFE reference number allocated to this application is **14/12/16/3/3/2/2134**. This reference number will appear on all official correspondence with the authorities and the public regarding the Proposed Project. A copy of the acknowledgement of receipt of the application is included in **Appendix K**.

The Draft Scoping Report (DSR) was released for public review between 25 February and 28 March 2022. Subsequently the scoping report was finalised and submitted to the DFFE on 08 April 2022 for their review and approval. The submission of the final scoping report was within 44 days of receipt of the application by the DFFE as required by GNR 982.

The approval of the Final Scoping Report (FSR) and the plan of study for the environmental impact assessment was received on **25 May 2022** and is included in **Appendix J**.

3.2 AUTHORITY CONSULTATION

A pre-application meeting was held on **19 October 2021** with the DFFE in order to discuss the proposed project. The minutes of this meeting are included in Appendix E. In addition, WSP notified a number of commenting authorities of the Proposed Project via a notification letter, these included:

- DMRE;
- DFFE: Biodiversity and Conservation;
- DFFE: Protected Areas;
- MDARDLEA;
- DWS;
- Vaal WMA Authority;
- SAHRA;
- MHRA;
- MTPA;
- CAA;
- ATNS;
- DD (SA Army);
- AMA;
- SAWS;
- SANRAL;
- Gert Sibande District Municipality;
- Msukaligwa Local Municipality; and
- Dr Pixley Ka Seme Local Municipality.

WSP received comments on the DSR from the DFFE on 22 March 2022. The comments and responses have been outlined in **Table 3.1** and included in the SER. The responses to the DFFE comments were applicable as at the time of final scoping submission and based on the project description included in the final scoping report. In addition to the above, WSP received comments on the FSR from the DFFE on **25 May 2022**. The comments and responses have been outlined in **Table 3.2** and included in the SER (**Appendix F**). A request for extension to the submission deadline of the FEIR was submitted to the DFFE in terms of EIA Regulation 3(7). A 60-day extension was approved on 24 June 2022.

Table 3.1: Comments received from the DFFE regarding the DSR

COMMENT	RESPONSE
Listed Activities The Department has noted that activity 14 of Listing Notice 1 and 10 of Listing Notice 3 are applied for as it relates to the infrastructure for the storage or storage and handling of a dangerous goods, in which fuel, transformer oil, cement and chemical storage onsite will be greater than 80m³ but not exceeding 500m³. As such, please ensure that the environmental impacts of fuel, cement and chemical storage are fully assessed, and mitigation measures are provided.	WSP acknowledges the comment and can confirm that the environmental impacts of fuel, cement and chemical storage will be fully assessed, and mitigation measures will be provided and included in the EMPr.
It has been noted that words such as should have been used in the description of the portion of the proposed project to which the applicable listed activity relates. Please refrain from using these words.	WSP can confirm that the use of the word "Should" has been removed from the application form and the description of the portion of the proposed project to which the applicable listed activity relates.
The Department has noted that activities 12, 27 and 28 of Listing Notice 1 and activities 12, 14, 18 and 23 of Listing Notice 3 are applied for as it relates to the footprint of the substation, powerline, access road and non-linear activities and the application form on page 12 of 37 indicated that the total footprint will be confirmed once final design have been provided/subject to finalisation based on technical, final design and environmental requirements. Please ensure that clarity regarding the total footprint of the powerline, access road and non-linear activities are included in the final SR and as well as the amended application form as confirmation of the activities triggered by the proposed development.	WSP can confirm that clarity regarding the total footprint of the access roads and non-linear activities have been included in the FSR and the amended application form as confirmation of the activities triggered by the proposed development.
It is noted that activity 30 of Listing Notice 1 has been applied for and the motivation is that the facility infrastructure is located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland, etc. It is unclear as to which process or activity identified in terms of Section 53(1) of NEM:BA is required. As such, you are requested to clarify or provide information regarding the process or activity identified in terms of NEM:BA.	WSP confirm that the development will be located within the Eastern Highveld Grassland, Eastern Temperate Freshwater Wetlands and Chrissiesmeer Panveld. All three ecosystems are confirmed to be listed in the National List of Ecosystems that are Threated and in Need of Protection (as indicated in GNR 1002 of 9 December 2011). Due to the fact that these ecosystems are listed as threatened it is assumed that various threatened or protected species may be found within the development area. The restricted activity of "cutting, chopping off, uprooting, damaging or destroying, any specimen" has been identified in terms of NEM:BA and is therefore applicable to the vegetation clearance that will be required to construct the development. In light of this, Activity 30 is considered applicable. WSP can confirm that protected species have been identified on site and are listed in the Terrestrial Ecology Scoping Study included in Appendix I of the FSR. Furthermore, the associated impacts on threatened and protected species will be assessed during the EIA Phase, and relevant mitigation and management measures provided in the EMPr.
Please ensure that all relevant listed activities are applied for, are specific and can be linked to the development activity or infrastructure as described in the project description. In addition, the onus is thus on the applicant and the environmental	WSP can confirm that all relevant listed activities have been applied for. Furthermore, the descriptions of applicability in the amended application form and Table 3-1 of the FSR are specific and have been linked to the development

COMMENT	RESPONSE
If the activities applied for in the application form differ from those mentioned in the final SR, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms.	EAP: Although the activities do not differ, WSP can confirm that an amended application form has been submitted as the activity applicability descriptions have been updated as requested. WSP can confirm that the most recent application form template has been utilised.
Alternatives Please provide a description of any identified alternatives for the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity as per Appendix 2 of GN R.982 of 2014 (as amended).	WSP can confirm that two location alternatives for the proposed project have been identified. Alternatives are considered feasible and reasonable with no notable advantages and disadvantages. Additional text to this effect has been included in Section 2.5 of the FSR as required.
Alternatively, you should submit written proof of an investigation and motivation if no reasonable or feasible alternatives exist in terms of Appendix 2.	WSP can confirm that two location alternatives for the substation have been identified. Both alternatives are considered feasible and reasonable with no notable advantages and disadvantages. Additional text to this effect has been included in Section 2.5 of the FSR as required. Both alternatives will be assessed during the EIA Phase where the preferred alternative will be confirmed.
Public Participation Process Please ensure that all issues raised, and comments received during the circulation of the draft SR from registered I&APs and organs of state (including this Department's Biodiversity and Protected Areas Section), which have jurisdiction in respect of the proposed activity are adequately addressed in the final SR.	WSP can confirm that all issues raised, and comments received during the circulation of the draft SR from registered I&APs and organs of state have been included in the SER and adequately addressed and responded to. WSP can confirm that comments from the Biodiversity Directorate of the DFFE were received and are included in the SER. Furthermore, consultation with the Protect Areas Directorate has been undertaken and they will be provided with a copy of the FSR. Any further comments from these two DFFE Directorates received post submission of the FSR will be considered and adequately addressed during the EIA Phase.
Proof of correspondence with the various stakeholders must be included in the final SR. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.	Proof of correspondence with the various stakeholders is included in Appendix B and Appendix D of the SER.
The Public Participation Process must be conducted in terms of Regulations 39, 40 41, 42, 43 & 44 of the EIA Regulations 2014, as amended.	WSP confirm that the Public Participation Process is being conducted in terms of Regulations 39, 40, 41, 42, 43 & 44 of the EIA Regulations 2014, as amended
A comments and response trail report (C&R) must be submitted with the final SR. The C&R report must incorporate all historical comments for this development. The C&R report must be a separate document from the main report.	WSP can confirm that all issues raised, and comments received during the circulation of the draft SR from registered I&APs and organs of state have been included in a comment of response report included in Section 2.3 of the SER. WSP can confirm that the SER will also be submitted as a separate report.

COMMENT	RESPONSE
Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "Noted" is not regarded as an adequate response to I&AP's comments.	WSP confirm that all comments from I&APs have been copied verbatim and responded to clearly. Furthermore, the response "Noted" has not been utilised.
The final SR must provide evidence that all identified and relevant competent authorities have been given an opportunity to comment on the proposed development particularly the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA), South African Heritage Resources Agency (SAHRA), the District and Local Municipalities.	WSP confirms that the FSR provides evidence that all identified and relevant competent authorities have been given an opportunity to comment on the proposed development including Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA), South African Heritage Resources Agency (SAHRA), the District and Local Municipalities.
Layout & Sensitivity Maps A copy of the layout and environmental sensitivity map must be submitted with the final SR and all available biodiversity information must be used in the finalisation of these maps.	A layout (Figure 2.2) and environmental sensitivity map (Figure 5-28) have been included in the FSR.
The layout map must indicate the following: — Positions of the solar facility and all associated infrastructure (includes the coordinates of each infrastructure); — All supporting onsite infrastructure e.g. roads (existing and proposed); — Permanent laydown area footprint; — Substation(s) and/or transformer(s) sites including their entire footprint; — Proposed infrastructure related to the proposed development; — Connection routes (including pylon positions) to the distribution/transmission network; and — All existing infrastructure on the site.	A layout map of the development is included in Figure 2-2 of the FSR. The co-ordinates of the development area and relevant infrastructure are included in Table 2-2 and Table 2-3 of the FSR. This layout map will be updated as require in the EIA phase. Please note that corridors have been included for the connection routes as pylon positions will only be confirmed subject to micro-siting and final design.
The environmental sensitivity map must indicate the following: — The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected; — Buffer areas; and — All "no-go" areas.	An environmental sensitivity map (Figure 5-28) has been included in the FSR.
The above layout maps must have a clear legend with information communicating with that on the map, be overlain with the sensitivity map which shows neighbouring energy developments and existing grid infrastructure.	WSP can confirm that both the layout and sensitivity map have clear legends. Furthermore, both maps include the relevant requested information.
According to the Biodiversity map on page 100 of the DSR, the proposed development is located within the Protected Area National Park and Nature Reserve. You are required to provide details of the National Park or Nature Reserve. Furthermore, proof of approval in terms of Section 50 of NEM:PA obtained before submission of the application of the proposed development must be submitted with the final SR.	The Protected Area reference on page 100 of the DSR refers to the Langcarel Private Nature Reserve. It has been confirmed that this Nature Reserve was gazetted with no 3256 of 1967 and notice 61. This reserve is however noted as having farming activity present and is currently managed actively and entirely for livestock and crop agriculture. The management and land use thereof is therefore inconsistent with the Private Nature Reserve status and has not, and continues to not be, managed and utilised as a private nature reserve. The landowner further disputes the nature reserve status of the properties and intends to utilise any suitable legal avenues available to continue operation of the properties for the current land use of agriculture, in

COMMENT	RESPONSE
	conjunction with the planned Renewable Energy land use subject to this application. WSP can confirm that the relevant approval is being obtained in terms of Section 50 of NEM:PAA. As agreed during the consultation meeting dated 31 March 2022 with the Competent Authority, this approval will be available during the course of the EIA phase. The minutes of the meeting have been included in Appendix C-2 of this SER.
It has been noted that the location of the proposed development is situated in an area with Eastern Highveld Grassland, which is endangered and or vulnerable. Therefore, you are required to explain why the site is considered suitable for the proposed development.	It should be noted that even though the development is located within the vulnerable Eastern Highveld Grassland, the conditions on site are not considered pristine. The proposed development area is largely utilised for agricultural activities with large portions being cultivated, and others subject to cattle grazing. Section 2.6 of the FSR outlines the need and desirability of the project which includes the benefits of the location close to the Camden Power Station and ash dump including other collieries in the area, which has been listed for decommissioning in the coming years. The location of the development will also allow for the use of the existing power transmission infrastructure that would otherwise become defunct post decommissioning. The terrestrial ecologist notes that the project study area consists largely of natural habitat within a rural area. Currently, the rates of transformation within the vegetation in this general region is moderately high, although on-site habitats have not been transformed to as high degree as surrounding areas. The ecologist further noted that it is possible that sensitive habitats on site can be minimised or avoided with the application of appropriate mitigation or management measures, and therefore that the development is not considered fatally flawed and should be subjected to further study in accordance with the specialist Plan of Study. Subsequently, the layout of the development will be updated such that high sensitivity areas and buffers are avoided as far as possible in consideration of the specialist sensitivity findings. Considering all of the above and in conjunction with layout consideration of the highly sensitive areas determined by the ecological specialist, suitable area within the Eastern Highveld Grassland habitats may be utilised towards development.
The delineated water-bodies (Figure 5-16) on page 95 of the DSR indicate the sensitive areas with buffer according to the legend, however, the buffers of those areas are not indicated on the map. Please ensure that the legend of the maps is clear and communicate with the details of the maps.	It must be noted that the sensitive areas reflected on Figure 5-16 outline the relevant delineated surface water structure inclusive of the buffer, thereby indicating that the surface water body together with the buffer is considered the sensitive area. The legend therefore correctly communicates the detail of the map and is inclusive of the buffer.
According to figure 5-14, the site is located within the Freshwater Ecosystem Priority Areas (FEPA), therefore, you are required to indicate the impacts of the area by the proposed development.	Potential impacts on the Aquatic Environment are indicated in Section 6.4 of the FSR. These impacts will be assessed during the EIA Phase.

COMMENT	RESPONSE
Specialist Assessments The EAP must ensure that the terms of reference for all the identified specialist studies must include the following: A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisation.	WSP can confirm that the specialist studies to be undertaken in the EIA phase will be undertaken in line with Appendix 6 of the EIA Regulations, 2014, as amended, or as required under the gazetted specialist protocols (GNR 320 of 20 March 2020 and GNR 1150 of 30 October 2020). Therefore, the requested information will be included.
Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed.	All relevant specialist assumptions and limitations have been included Section 1.6. These will be updated as required during the EIA Phase.
Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the 'no-go' areas.	WSP acknowledge the DFFE's definition of 'No-go' areas. No-go areas will be re-evaluated and assessed during the EIA phase, based on further specialist field assessments. Where specialist definitions of 'no-go' areas differ from the Department's definition; these will be clearly indicated. To date, specialists have clearly indicated where it is suitable for linear infrastructure (water pipelines, roads, powerline infrastructure etc.) to traverse a no-go area where required.
Should the specialist definition of 'no-go' area differ from the Department's definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer if applicable.	
All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA.	All specialist studies to be appended to the Final EIA Report will be final. Specialist reports will provide detailed/practical mitigation measures for the preferred alternative and recommendations and will not recommend further studies to be completed post EA with the exception of pre-construction walkthroughs, search and rescue and micro-siting. The Specialist Studies will sufficiently inform the EA decision phase.
Should a specialist recommend specific mitigation measures, these must be clearly indicated.	All specific mitigation measures, will be clearly indicated and included in the EMPr during the EIA Phase.
Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defendable reasons; and were necessary, include further expertise advice.	In the EMPr, WSP will clearly indicate the most reasonable recommendation and substantiate this with defendable reasons should any specialist recommendations be contradictory. To date no contradictory recommendations have been received.
It is further brought to your attention that Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes (as per the Screening Report), which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e. "the Protocols"), have come into effect. Please note that specialist assessments must be conducted in accordance with the requirements of these protocols.	WSP can confirm that the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes (as per the Screening Report), which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e. "the Protocols") are being considered as applicable.
In addition, the Specialist Declaration must also indicate the name of scientific organisation/council and member number and the status of the registration/membership of each specialist.	Specialist Declarations included in the FSR do indicate the name of scientific organisation/council and member number and the status of the registration/membership of each specialist.
Cumulative Impact Assessment The cumulative impacts of the proposed development must be undertaken as per the requirements of the EIA Regulations.	Through the use of the DFFE web-based environmental screening tool as well as the Environmental Geographical Information System (E-GIS), WSP have confirmed that

COMMENT	RESPONSE
	there are no similar projects within 30km radius of the development to date. WSP confirm that cumulative impacts will be considered in the EIA phase. This will be re-affirmed during the EIA Phase.
Environmental Management Programme (EMPr) Ensure that the generic EMPr is submitted for the management of impacts of the substation that will be constructed as part of this development.	This information will be included in the EMPr to be compiled in the EIA Phase.
The EMPr for the facility must comply with the requirements of Appendix 4 in the EIA Regulation, as amended.	WSP confirm that the EMPrs to be submitted in the EIA phase, will comply with the requirements of Appendix 4 in the EIA Regulation, as amended
Specific comments You are requested to submit the application form signed by both the Environmental Assessment Practitioner (EAP) and the Applicant. The application form must be submitted with the final SR.	WSP confirm that a signed amended application form will be submitted with the FSR
General You are further reminded to comply with Regulation 21(1) of the NEMA EIA Regulations 2014, as amended, which states that: *"If S&EIR must be applied to an application, the applicant must, within 44 days of receipt of the application by the competent authority, submit to the competent authority a scoping report which has been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority"*	WSP confirms that the FSR will be submitted to the DFFE within 44 days of the receipt of the application, in line with the regulated timeframes.
You are further reminded that the final SR to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of Scoping report in accordance with Appendix 2 and Regulation 21(1) of the EIA Regulations 2014, as amended.	WSP confirm that the FSR complies with all the requirements in terms of the scope of assessment and content of Scoping report in accordance with Appendix 2 and Regulation 21(1) of the EIA Regulations 2014, as amended. Please refer to Table 1-5 of the final Scoping Report for the checklist against the regulatory requirements.
Further note that in terms of Regulation 45 of the EIA Regulations 2014, as amended, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).	WSP notes that the application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations.
You are hereby reminded of Section 24F of the National Environmental Management Act, Act No. 107 of 1998, as amended, that no activity may commence prior to an Environmental Authorisation being granted by the Department.	WSP and the Applicant take note of this reminder.
Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed.	All relevant specialist assumptions and limitations have been included Section 1.6. These will be updated as required during the EIA Phase.

In addition to the above, WSP received comments on the FSR from the DFFE on 18 My 2022. The comments and responses have been outlined in **Table 3.2** and included in the SER.

Table 3.2: Comments received from the DFFE regarding the FSR

COMMENT	RESPONSE
Listed Activities There are discrepancies identified regarding to the listed activities and sub-activities as well as the description of the activities in the application form and final scoping report that really need to be addressed. In the comments dated 25 March 2022, you were advised to ensure that only relevant listed activities are applied for, are specific and can be linked to the development activity or infrastructures as described in the project description. This is the responsibility of the EAP to ensure only relevant information is included in the report. For example, activity 11 in the application form and final scoping report, refer to different sub-activities, which the description is also not in line with the activity triggered. Please ensure the EIAr address all the listed activities applied for	The Listed Activities captured in the FSR and amended Application Form were as set out in the relevant Listing Notices. However, based on this comment, these have been further evaluated and updated accordingly. It can be confirmed that only the applicable activities and sub-activities have been included in the draft EIR and amended Application Form, to ensure that the relevant sub-activities triggered by the project are applied for. Please refer to Section 2.1 of the draft EIR for the updated description of the activities and sub-activities applicable to the proposed development.
Activity 11 of Listing Notice 1 has been applied for and the power line capacity for the proposed activity is between 34 and 275 kilovolts. However, the portion of the proposed project to which the applicable listed activity relates mentioned that "The Electrical Grid Infrastructure is located outside urban areas. The Collector Substation will be rated 132kV/400kV whereas the overhead power line planned will be up to 400kV. Where required from a technical perspective however, the grid connection capacity implemented may be reduced to 132kV if necessary". Please provide the exact capacity of the proposed activity as per the applicable listed activity (i.e. activity 11 of Listing Notice 1).	WSP confirms that the proposed project involves the construction of an up to 400kV Grid Connection infrastructure which is located outside the urban areas, and therefore triggers the 275kV or greater aspect of the activity referred to. The application form has been corrected to reflect the applicable listed Activities.
For activity 12 of Listing Notice 1, you are required to provide the total footprint of the proposed infrastructure in square meters.	WSP can confirm that the total physical footprint has been provided in square metres as required and has been updated accordingly in the relevant Listed Activity contained in Section 2.1 as well as the amended Application Form.
The Department has noted that activity 14 of Listing Notice 1 and 10 of Listing Notice 3 are applied for as it relates to the infrastructure for the storage or storage and handling of a dangerous goods, in which fuel, transformer oil, cement and chemical storage onsite will be greater than 80m³ but not exceeding 500m³. As such, please ensure that the environmental impacts of fuel, cement and chemical storage are fully assessed, and mitigation measures are provided.	WSP confirms that environmental impacts associated with fuel, cement and chemical storage have been assessed by the specialist studies. WSP also confirms that the EMPr also suggest mitigation measures for impacts that might arise from the storage or storage and handling of a dangerous goods.
The CA has noted on page 12 of 37 of the application form in the description of the portion of the project that relates to activity 27 of Listing Notice 1 you have use of the word "may be required". Please refrain from using words such as "may be required" in relation to the applicable listed activities.	WSP acknowledges this comment and has removed the phase from the application form
Please ensure that all relevant listed activities are applied for, are specific and can be linked to the development activity or infrastructure as described in the project description. In addition, the onus is thus on the applicant and the	The listed activities applied for have been further revised in the draft EIR to ensure that only applicable activities and sub-activities have been applied for.

COMMENT	RESPONSE
environmental assessment practitioner (EAP) to ensure that all the applicable listed activities are included in the application. Failure to do so may result in unnecessary delays in the processing of the application.	Furthermore, the descriptions of applicability have been updated and are specific (where possible) and have been linked to the development activity or infrastructure as described in the project description. Please refer to Section 2.1 of the draft EIR for the updated description of the proposed project to which the applicable listed activity relates.
If the activities applied for in the application form differ from those mentioned in the final EIAr, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms.	The listed activities initially applied for have been further revised in the draft EIR to ensure that only applicable activities and sub-activities have been applied for. WSP can confirm that an amended Application Form has been submitted as the activity applicability descriptions have been updated as requested in these comments. WSP can confirm that the most recent application form template has been utilised.
Project Description: It is noted that listed activity 14 of Listing Notice 1 and activity 14 of Listing Notice 3 are applied for as it relates to the infrastructure for the storage and handling of dangerous goods, in which fuel, transformer oil, cement and chemical storage onsite will be greater than 80m³ but not exceeding 500m³. However, section 5 of the application form on page 6 of 37 does not provide any description of the infrastructure for the storage and handling of dangerous goods. As such. You are requested to provide the exact type and capacity of the dangerous goods applicable to the proposed development.	Please note that based on the comments on the FSR, the listed activities initially applied for have been reviewed. With regards to the description of infrastructure on the Application Form, additional text to this effect has been included in Section 5 of the Application Form, as well as in section 6.3 of the draft EIR. It is important to note that a detailed project description, particularly exact specifications of the project components will be based on the approved scope of EPC Contractor. and cannot be determined at this stage. It has been confirmed by the Proponent that the total combined storage capacity on site will not exceed 500 m^3. A condition to this effect has been incorporated into the EMPr for consideration during final design phase and site establishment.
Alternatives: Please provide a description of any identified alternatives for the proposed activity(ies) i.e., power line and substation, that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity as per Appendix 2 of GN R.982 of 2014 (as amended).	WSP confirms that the alternatives have been identified for all planned infrastructure. The project alternatives are discussed in **Section 6.5** of this report.
Alternatively, you should submit written proof of an investigation and motivation if no reasonable or feasible alternatives exist in terms of Appendix 2.	WSP confirms that the alternatives have been identified for all planned infrastructure. The project alternatives are discussed in **Section 6.5** of this report.
Public Participation: Please ensure that all issues raised, and comments received during the circulation of the SR from registered I&APs and organs of state (including this Department's Biodiversity and Protected Areas Section), which have jurisdiction in respect of the proposed activity are adequately addressed in the final EIAr.	WSP can confirm that all issues raised and comments received during the circulation of the DSR and draft EIR, as well as those received on the FSR, from registered I&APs and organs of state (including those mentioned in this comment) have been and will be included in the final EIR and adequately addressed and responded to.
Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.	Proof of correspondence with the various stakeholders is included in Appendix B and Appendix D of the SER and will be included in the final EIR.
The Public Participation Process must be conducted in terms of Regulations 39, 40, 41, 42, 43 & 44 of the EIA Regulations 2014, as amended.	WSP confirm that the Public Participation Process is being conducted in terms of Regulations 39, 40, 41, 42, 43 & 44 of the EIA Regulations 2014, as amended.

COMMENT	RESPONSE
A comments and response trail report (C&R) must be submitted with the final EIAr. The C&R report must incorporate all historical comments for this development. The C&R report must be a separate document from the main report.	WSP can confirm that all issues raised and comments received during the circulation of the draft SR from registered I&APs and organs of state have been included in a comment of response report included in Section 2.3 of the SER. WSP can confirm that the SER will also be submitted as a separate report.
Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "Noted" is not regarded as an adequate response to I&AP's comments.	WSP confirm that all comments from I&APs have been copied verbatim and responded to clearly. Furthermore the response "Noted" has not been utilised.
The final EIAr must provide evidence that all identified and relevant competent authorities have been given an opportunity to comment on the proposed development particularly the **Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs** (MDARDLEA), **Mpumalanga Tourism and Parks Agency** (MTPA), **Langcarel Private Nature Reserve**, South African Heritage Resources Agency (SAHRA) and the District and Local Municipalities	WSP can confirm that final EIR will provide evidence that all identified and relevant authorities have been given an opportunity to comment on the proposed development including Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA), Mpumalanga Tourism and Parks Agency (MTPA), Langcarel Private Nature Reserve (via the respective landowner), South African Heritage Resources Agency (SAHRA), the District and Local Municipalities.
Layout & Sensitivity Map A copy of the layout and environmental sensitivity map must be submitted with the final EIAr and all available biodiversity information must be used in the finalisation of these maps.	A conceptual layout map (Scoping Phase), as well as the optimised/revised layout map (EIA Phase) have been included in the draft EIR. This layout map will be updated as required in the final EIR phase. A revised layout and environmental sensitivity map are included in Figure 6.2 and Figure 10.8 respectfully of the draft EIR.
The layout map must indicate the following: — The power line corridor; — All supporting onsite infrastructure e.g. roads (existing and proposed); — Permanent laydown area footprint; — Substation(s) and/or transformer(s) sites including their entire footprint; — Connection routes (including pylon positions) to the distribution/transmission network; and — All existing infrastructure on the site.	The revised layout and environmental sensitivity map are included in Figure 6.2 and Figure 10.8 respectfully of the draft EIR, and includes all the relevant detail as required in this comment. Please note that corridors have been included for the connection routes as pylon positions will only be confirmed subject to micro-siting and final design.
The environmental sensitivity map must indicate the following: — The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected; — Buffer areas, i.e., 1km of the Protected Area, etc, and — All "no-go" areas.	A consolidated environmental sensitivity map has been compiled based on the sensitivities and buffers outlined in the relevant specialist studies. Please refer to Figure 10.8 of the draft EIR for the relevant sensitivity map. It is however important to note that the part of the shown as a Protected Area is not being managed as a nature reserve and a separate process is underway to have it (or part thereof) de-proclaimed as part of ongoing province-wide reserve verification efforts by the provincial authorities. According to the Terrestrial Biodiversity Report, assuming that this area would no longer be treated as a conservation area, the landscapes inside this boundary have been allocated to conservation plan categories that most closely match the surrounding areas and the buffer area would not be applicable. It is therefore assumed that any areas of natural habitat within the "Protected Area" (i.e. excluding any modified areas)

COMMENT	RESPONSE
	would have been designated as CBA1, the next-highest category. This is on the basis that these areas are within two different listed ecosystems (Chrissiesmeer Panveld, listed as Endangered, and Eastern Highveld Grassland, listed as Vulnerable) and it is likely that the conservation planning process.
The above maps must have a clear legend with information communicating with that on the map, be overlain with the sensitivity map and shows neighbouring existing grid infrastructure that form part of the Camden Renewable Energy Complex	WSP can confirm that both the layout and sensitivity map have clear legends. Furthermore, both maps include the relevant requested information.
According to the Biodiversity map on page 109 of the FSR, the proposed development is located within the Protected Area National Park and Nature Reserve as well as Protected Area Environment: Modified and Natural. You are required to provide details of the National Park or Nature Reserve and Protected Area Environment: Modified and Natural.	WSP confirms that the details of the Protected Area are provided in the EIAr.
It has been noted that the location of the proposed development is situated in an area with Eastern Highveld Grassland, which is endangered and or vulnerable. Therefore, you are required to explain why the site is considered suitable for the proposed development and specialists' findings must be taken into account while addressing this issue.	Eskom's four coal-fired power stations have been targeted for decommissioning in the short term: Komati, Camden, Grootvlei, and Hendrina. Eskom is looking to decommission 5 400MW of electricity from coal generation by the year 2022, increasing to 10 500MW by 2030 and 35 000MW by 2050. Simultaneously Eskom has been looking at options for repurposing these power stations with the core aims of reusing existing power transmission infrastructure, developing new generation capacity, providing ancillary services, and mitigating socio-economic impact. The proposed Camden Renewable Energy Complex, inclusive of the Project, is ideally located to form part of this proposed repurposing of the Camden power station and will help Eskom achieve its diversification goal. The Camden up to 400kV grid connection project will also ensure optimate use of the existing substation infrastructure and leverage the Camden MTS and existing grid connections into that MTS for wheeling/transmission across the country.
The sensitivity map must be redesigned and consider Specialist recommendations as well as MTPA comments regarding sensitive areas. Please be advised that Google maps will not be accepted.	WSP confirms that all sensitivities have been considered in relation to land use of the site and as per the specialist fieldwork. The Map is not a google map.
Specialist Assessment: The following Specialist Assessments will form part of the EIAr: — Soils and Agricultural Potential Assessment; — Archaeological and Cultural Heritage Assessment; — Palaeontology Impact Assessment; — Visual Impact Assessment; — Biodiversity Impact Assessment (inclusive of terrestrial biodiversity, plant species and animal species); — Freshwater Impact Assessment; — Avifauna Impact Assessment; — Social Impact Assessment; and — Desktop Geotechnical Assessment.	WSP can confirm that the Specialist Assessments, as outlined in this comment, have been included as part of the EIR. Please refer to **Appendix G of the EIAr**.

COMMENT	RESPONSE
The EAP must ensure that the terms of reference for all the identified specialist studies include the following: A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisations. You are advised to provide a table listing all the specialist studies undertaken with the recommendation for the proposed development	WSP can confirm that the specialist studies have been undertaken in line with Appendix 6 of the 2014 EIA Regulations, as amended, or, where relevant, in line with the gazetted specialist protocols of GNR 320 and GNR 1150. All specialist studies include a detailed description of the methodologies, project infrastructure descriptions and locations and recommendations for authorisations. The specialist studies can be found in **Appendix G** of the EIAr.
Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed.	All specialist assessments include applicable limitations to the studies, as well as the timing/season of the field survey, where applicable, and relevance thereof to the studies/assessments.
Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the 'no-go' areas.	WSP acknowledge the DFFE's definition of 'No-go' areas. The relevant specialist assessments have indicated 'No-go' areas, as well as areas where it is suitable for linear infrastructure (water pipelines, roads, powerline infrastructure etc.) to traverse a no-go area where required. Where specialist deviations or qualifications are applicable, these have been noted in Section 10. 1.
Should the specialist definition of 'no-go' area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer.	
All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternatives and recommendations, and must not recommend further studies to be completed post EA	All specialist studies conducted have been included in **Appendix G** of the EIR. The Specialist studies include detailed mitigation measures to prevent or avoid adverse impacts on the receiving environment, which have been incorporated into the EIR and EMPr. The Specialist recommendations and conclusions are included in **Section 9.17** of this EIR. There are no recommendations or requirements from the Specialists to conduct further studies post EA. The Avifauna Specialist has also recommended a pre-construction inspection (avifaunal walk-through) to identify SCC that may be breeding within the infrastructure footprints.
Should a specialist recommend specific mitigation measures, these must be clearly indicated.	Recommendations and mitigation measures provided by the relevant specialists have been included in the Draft EIR and EMPr.
It is brought to your attention that Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation, which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols"), and in Government Notice No. 1150 of 30 October 2020, have come into effect. Please note that specialist assessments (for all environmental themes identified by screening tool) must be conducted in accordance with these protocols unless proof is provided to demonstrate that the specialist assessments were commissioned prior to 50 days after the promulgation of GN 320 and after promulgation of GN1150 (30 October 2020).Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and	WSP confirms that specialist studies will be conducted in accordance with these protocols unless proof is provided to demonstrate that the specialist assessments were commissioned prior to 50 days after the promulgation of GN 320 and after promulgation of GN1150 (30 October 2020). Furthermore, the specialists have not specified contradicting recommendations. All recommendations are aligned and are considered practical and able to be implemented.

COMMENT	RESPONSE
substantiate this with defendable reasons; and were necessary, include further expertise advice.	
It has been noted that the conclusions by the Terrestrial Ecological specialist on page 56 with the use of the word "may" and the Aquatic specialist on page 30 indicating that "once the layout design has been finalised, the EIA phase of the assessment will continue" indicate that at this stage adequate assessment has not been undertaken and the area is suitable for the proposed development. Therefore, ensure detailed assessment is undertaken and submitted in the final report.	This comment is noted and relates to the Specialist inputs (reports) for the Scoping Phase of the proposed SEF project. Once the FSR was approved the proposed SEF project proceeded into a detailed EIA phase which involved detailed specialist assessments. WSP can confirm that detailed assessments (including terrestrial biodiversity and aquatic assessments) have been undertaken during the EIA Phase of the proposed SEF and the specialist assessments area included the draft EIR.
Cumulative Impact Assessment: The cumulative impacts of the proposed development must be undertaken as per the requirements of the EIA Regulations.	In assessing the cumulative impacts of the proposed Camden I 400kV, renewable energy projects within a 30km radius of the proposed project, that have received an EA or have a Basic Assessment (BA) or EIA process in progress have been considered. Through the use of the DFFE web-based environmental screening tool as well as the Environmental Geographical Information System (E-GIS), WSP have confirmed that there are no similar projects within 30km radius of the development to date. Therefore, with the exception of the other proposed Camden developments forming part of the Camden Renewable Energy Complex, no other renewable energy projects within a 30km radius have been considered in this S&EIA process. Please refer to **Section 9.15** of this EIR for the assessment of the cumulative impacts associated with the proposed development. The specialists assessments also include a detailed assessment of the identified cumulative impacts associated with the proposed Camden I 400kV, as detailed in the relevant specialist reports.
Environmental Management Programme (EMPr): Ensure that two generic EMPrs are submitted for the management of impacts of both the powerline and substation that will be constructed as part of this development.	The generic EMPr for the development and expansion for overhead electricity transmission and distribution infrastructure has been included for the Camden I 400kV powerlines; and the Development and Expansion of Substation Infrastructure for the Transmission and Distribution of Electricity, and overhead powerline infrastructure has been included for the Camden I 400kV onsite substation. Please refer to Appendix D and Appendix E of the EMPr (Appendix H).
Issues regarding S50 approval in terms of NEM: PAA In the comments dated 25 March 2022, you were advised to obtain approval in terms of S50 of NEM: PAA to be submitted with the FSR, considering that Section 50 (5) of NEM: PAA says that "no development, construction or farming may be permitted in a nature reserve without written approval of the management authority".	At the time of lodging the Application for EA together with the DSR submission, the Landowner of the project properties declared as Private Nature Reserve (Langcarel Nature Reserve) was not aware of the Protected Area status of the properties. In addition, the Terrestrial Biodiversity Report did not confirm the proclamation status of the Nature Reserve. However, comments received on the DSR from the Mpumalanga Tourism and Parks Agency (MTPA) confirmed the gazetting of the Langcarel Nature Reserve. Furthermore, discussions with the DFFE Protected Areas Directorate, the Management Authority (Landowner) of the area declared as a Private Nature Reserve, as well as the MTPA were undertaken in confirming the validity of the Protected Area, as well as the requirements of approval in terms of Section 50 of NEMP:AA. It is important to note that the Project Proponent is engaging with the MTPA and the Management Authority (Landowner/s) to investigate the best way forward regarding the
It has been noted that when describing how listed activities are triggered, you confirmed that the site is located within the Nature Reserve. You further indicated that there are farming activities taking place within the Nature Reserve. Considering that Section 50(5) requires that approval must be obtained even for farming, your reasons provided that the site is not a Nature Reserve is deemed inadequate.	

COMMENT	RESPONSE
	Langcarel Nature Reserve. The MTPA has undertaken a site visit on 01 June 2022. The MTPA has submitted a letter to the Department (letter dated, 20 June 2022) of the intent to issue a notice to withdraw the declaration of the Langcarel Private Nature Reserve in terms of the Mpumalanga Nature Conservation Act (Act No. 10 of 1998). Available information on the Nature Reserve (i.e., de-proclamation or removal of Nature Reserve status) will be submitted to the Department once available, possibly together with the FEIR
During the meeting held on 31 March 2022, you indicated that the landowner is not aware that the site is located within the Nature Reserves. However, it was indicated that, considering that MTPA mentioned in their comments dated 25 March 2022, that the site is located within the Nature Reserve, it is your responsibility (as an EAP on behalf of the Applicant) to determine whether the site falls within the Nature Reserve or not. You were further advised (by DFFE: Protected Area officials) that comments from MTPA would not be disregarded, therefore, this matter must be addressed accordingly prior submission of the EIA report.	At the time of lodging the Application for EA together with the DSR submission, the Landowner of the project properties declared as Private Nature Reserve (Langcarel Nature Reserve) was not aware of the Protected Area status of the properties. In addition, the Terrestrial Biodiversity Report did not confirm the proclamation status of the Nature Reserve. However, comments received on the DSR from the Mpumalanga Tourism and Parks Agency (MTPA) confirmed the gazetting of the Langcarel Nature Reserve. Furthermore, discussions with the DFFE Protected Areas Directorate, the Management Authority (Landowner) of the area declared as a Private Nature Reserve, as well as the MTPA were undertaken in confirming the validity of the Protected Area, as well as the requirements of approval in terms of Section 50 of NEMP:AA. It is important to note that the Project Proponent is engaging with the MTPA and the Management Authority (Landowner/s) to investigate the best way forward regarding the Langcarel Nature Reserve. The MTPA has undertaken a site visit on 01 June 2022. The MTPA has submitted a letter to the Department (letter dated, 20 June 2022) of the intent to issue a notice to withdraw the declaration of the Langcarel Private Nature Reserve in terms of the Mpumalanga Nature Conservation Act (Act No. 10 of 1998). Available information on the Nature Reserve (i.e., de-proclamation or removal of Nature Reserve status) will be submitted to the Department once available, possibly together with the FEIR
It has been noted that even the FSR compiled by you as an EAP, makes reference to the findings of the Terrestrial Ecological specialist on page 109, Figure 5-17, and the Avifaunal specialist on page 18 submitted as part of the FSR, that the site is located within the Nature Reserve or part of the Nature Reserve. Therefore, you are required to provide proof that the site is not located within the Nature Reserve.	
Considering that the gazette dated 15 February 1967 (Gazette No 3256) confirmed that the area falls within the Nature Reserve, this shows that detailed investigation was not undertaken by the EAP on behalf of the Applicant, confirming that the site falls within the Nature Reserve.	
Strategic Infrastructure Project (SIP) confirmation letter: It has been noted that there is no SIP confirmation letter included in the application form. You are advised to submit the confirmation letter, should the project be considered as a SIP. The confirmation letter can be obtained from SIP Coordinator at SibuyiV@eskom.co.za.	WSP can confirm that the applicant will register as SIPs after EA has been granted.
General: The applicant is hereby reminded to comply with the requirements of Regulation 45 of GN R982 of 04 December 2014, as amended, regarding the time allowed for complying with the requirements of the Regulations.	The reminder to meet timeframes stipulated Regulation 45 of GN R982 of 04 December 2014, as amended, is noted. An extension request, in terms of the provision within EIA Regulation 3(7), has been submitted to the Department and subsequently approved for extension to the submission deadline of the FEIR by 60 days. The final EIR is due to the DFFE by 02 November 2022.
You are hereby reminded of Section 24F of the National Environmental Management Act, Act No. 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.	WSP and the Applicant take note of this reminder.

3.3 STAKEHOLDER CONSULTATION

Stakeholders were identified and will continue to be identified through several mechanisms. These include:

- Utilising existing databases from other projects in the area;
- Networking with local business owners, non-governmental agencies, community-based organisations, and local council representatives;
- Field work in and around the project area;
- Advertising in the press;
- Placement of community notices;
- Completed comment sheets; and
- Attendance registers at meetings.

All Stakeholders identified to date have been registered on the project stakeholder database. The EAP endeavoured to ensure that individuals/organisations from referrals and networking were notified of the Proposed Project. Stakeholders were identified at the horizontal (geographical) and vertical extent (organisations level).

A list of stakeholders captured in the project database is included in Appendix A of the SER (**Appendix F)**.

Table 3.3 provides a breakdown of stakeholders currently registered on the database while **Figure 3.1** illustrates the number of stakeholders per representative sector.

Table 3.3: Breakdown of Stakeholders currently registered on the database

REPRESENTATIVE SECTOR	FURTHER EXPLANATION	NO. STAKEHOLDERS
Government Departments	All tiers of government, namely, national, provincial, local government and parastatal organisations including: — Department of Mineral Resources and Energy (DMRE); — DFFE: Biodiversity and Conservation; — DFFE: Protected Areas; — Mpumalanga Department Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA); — Department of Water and Sanitation (DWS); — Vaal Water Management Area (WMA) Authority; — South African Heritage Resource Agency (SAHRA); — Mpumalanga Heritage Resources Authority (MHRA); — Mpumalanga Tourism and Parks Agency (MTPA); — Civil Aviation Authority (CAA); — Air Traffic and Navigation Services (ATNS); — Department of Defence (SA Army) (DD); — Astronomy Management Authority (AMA); — South African Weather Services (SAWS); — South African National Roads Agency Limited (SANRAL); — Gert Sibande District Municipality; — Msukaligwa Local Municipality; and — Dr Pixley Ka Seme Local Municipality	84

REPRESENTATIVE SECTOR	FURTHER EXPLANATION	NO. STAKEHOLDERS
Business and consultants	Local and neighbouring businesses in the area. Representatives of consulting organisations that provide services in the area; Prospecting/Mineral rights holders within the broader project area which may have an interest in the development These include: — Langcarel (Pty) Ltd (Mooiplaats Colliery) MC Mining — ANKER COAL — Exxaro Coal Mpumalanga — South 32 — KANGRA COAL — Hoyohoyo Mining (Pty) Ltd — Bulemin Resources	14
Non-governmental organisations (NGOs) and community-based organisations	Agricultural unions, churches, and environmental NGOs	24
General public	Local communities, farmers, and other such individuals who may have an interest in the project	5

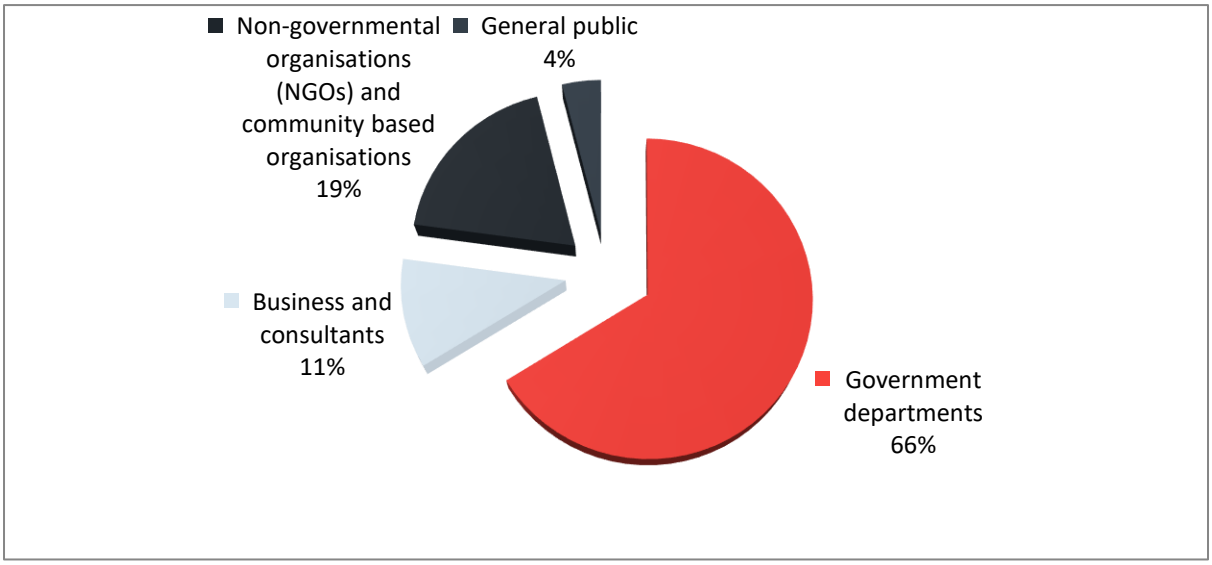


Figure 3.1: Pie chart showing the breakdown of the stakeholder currently registered on the database

All concerns, comments, viewpoints and questions (collectively referred to as 'issues') received to date have been documented and responded to in a Comment and Response Report. The following key issues were highlighted during the scoping phase:

— Job creation for local residents; and
— Impacts on the biodiversity of the area with specific reference to Critical Biodiversity Areas and Langcarel Private Nature Reserve.

3.3.1 STAKEHOLDER NOTIFICATION

DIRECT NOTIFICATION

Notification of the proposed Project was issued to potential Stakeholders, via direct correspondence (i.e. site notices and e-mail) on **25 February 2022**. The notification letter circulated is included in Appendix F-3 of the SER (**Appendix F**). Proof of notification is included in the SER (i.e., **Appendix F**).

NEWSPAPER ADVERTISEMENTS

In accordance with the requirements of GNR 982, as amended, the proposed project was advertised in two local newspapers. The purpose of the advertisement was to notify the public about the proposed project and to invite them to register as stakeholders. A copy of the advertisement is included in Appendix F-1 of the SER (**Appendix F**). The relevant scoping phase advertisement dates are listed in **Table 3.4**

Table 3.4: Dates on which the Adverts were published

NEWSPAPER	PUBLICATION DATE	LANGUAGE
Standerton Advertiser	25 February 2022	English and Zulu
Highvelder	25 February 2022	Afrikaans

SITE NOTICES

The official site notices were erected as per GNR 982, as amended, on the boundary fence of the proposed site. In addition, general project notices, announcing the Proposed Project and inviting stakeholders to register, will be placed at various locations in and around the project area. A copy of the site notice is included in Appendix B-2 of the SER (**Appendix F**).

3.4 SCOPING STUDY FINDINGS

The scoping phase identified a number of impacts associated with the proposed Camden I 400kV Grid Connection. The findings of the preliminary significance ratings undertaken during the scoping phase for the construction phase and operational phase are included in **Table 3.5, Table 3.6** and **Table 3.7**, respectfully.

Table 3.5: Construction Phase Impacts

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Air Quality	Dust Emissions	Negative	3	1	**Low**	**No**
Noise and Vibrations	Noise and Vibration Emissions	Negative	3	1	**Low**	**No**
Topography, & Geology	Constructability	Negative	3	1	**Low**	**No**
Soils, Land Capability	Loss of agricultural potential by soil degradation	Negative	4	3	**High**	**Yes**

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
and Agricultural Potential	Loss of agricultural potential by occupation of land	Negative	4	3	**High**	
Surface water	Loss of aquatic species of special concern	Negative	3	3	**Medium**	**Yes**
	Damage or loss of riparian and wetlands systems and disturbance of the waterbodies during construction	Negative	3	3	**Medium**	
	Potential impact on localised surface water quality	Negative	3	3	**Medium**	
	Impact on habitat change and fragmentation related to hydrological regime changes	Negative	3	3	**Medium**	
Groundwater	Ground Contamination	Negative	3	1	**Low**	**No**
Hazardous Substances and Pollutants	Soil, groundwater and surface water contamination	Negative	3	3	**Medium**	**No**
Waste Generation	Generation of General Waste	Negative	3	2	**Medium**	**No**
	Generation of Hazardous Waste	Negative	3	2	**Medium**	
	Sanitation Waste	Negative	3	2	**Medium**	
Biodiversity	Loss and Fragmentation of Vegetation and Habitat	Negative	4	3	**High**	**Yes**
	Impacts on CBAs and broad-scale ecological processes	Negative	4	3	**High**	
	Loss and Displacement of Fauna	Negative	4	3	**High**	
	Proliferation of alien invasive plant species	Negative	4	3	**High**	
Avifauna	Displacement due to disturbance and habitat transformation during the Construction Phase	Negative	4	3	**High**	**Yes**

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Visual and Landscape	Potential visual intrusion resulting from large construction vehicles and equipment	Negative	3	2	**Medium**	**Yes**
	Potential visual effect of construction activities	Negative	3	2	**Medium**	
	Potential visual effect of material stockpiles.	Negative	3	2	**Medium**	
	Potential impacts of increased dust emissions from construction activities and related traffic	Negative	3	2	**Medium**	
	Potential visual scarring of the landscape as a result of site clearance and earthworks	Negative	3	2	**Medium**	
	Potential visual pollution resulting from littering on the construction site	Negative	3	1	**Low**	
Heritage and Cultural Resources	Disturbance to known Cultural Resources	Negative	3	2	**Medium**	**Yes**
	Chance Find of Cultural Resources	Negative	3	2	**Medium**	
Palaeontology	Chance Find of Palaeontological resources	Negative	3	2	**Medium**	**Yes**
Socio-Economic	Creation of local employment, training, and business opportunities	Positive	2	3	**Medium**	**Yes**
	Impact of construction workers on local communities	Negative	3	3	**Medium**	
	Risk to safety, livestock, and farm infrastructure	Negative	3	3	**Medium**	
	Increased risk of grass fires	Negative	3	3	**Medium**	
	Nuisance impacts associated with construction related activities	Negative	3	3	**Medium**	
	Impacts associated with loss of farmland	Negative	3	3	**Medium**	

Table 3.6: Operational Phase Impacts

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Soils, Land Capability and Agricultural Potential	Enhanced agricultural potential through increased financial security for farming operations	Positive	3	3	**Medium**	**Yes**
	Interference with farming operations	Negative	4	3	**High**	
Surface Water	Increased runoff, sedimentation and erosion	Negative	3	3	**Medium**	**Yes**
Biodiversity	Proliferation of alien invasive plant species	Negative	3	3	**Medium**	**Yes**
Avifauna	Collisions	Negative	4	3	**High**	
	Electrocution	Negative	4	3	**High**	
Visual	Potential alteration of the visual character of the area;	Negative	4	3	**High**	**Yes**
	Potential visual intrusion resulting from grid connection infrastructure dominating the skyline in a largely natural / rural area	Negative	4	3	**High**	
	Potential impacts of increased dust emissions from maintenance activities and related traffic	Negative	3	3	**Medium**	
	Potential visual effect on surrounding farmsteads	Negative	4	3	**High**	
	Potential alteration of the night time visual environment as a result of operational and security lighting	Negative	3	3	**Medium**	
Social	Improve energy security and support the renewable energy sector	Positive	3	3	**Medium**	**Yes**
	Creation of employment and business opportunities	Positive	3	3	**Medium**	
	Generate income for affected landowners	Positive	3	3	**Medium**	
	Visual impact and impact on sense of place	Negative	4	3	**High**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Potential impact on farming operations during maintenance	Negative	3	3	**Medium**	

Table 3.7: Initial Cumulative Impacts

RECEPTOR	DESCRIPTION	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Soils, Land Capability and Agricultural Potential	Cumulative Agricultural Impacts	Negative	4	3	**High**	**Yes**
Biodiversity	Cumulative impacts on biodiversity	Negative	4	3	**High**	**Yes**
Avifauna	Cumulative Collision impacts	Negative	4	3	**High**	**Yes**
	Cumulative Electrocution Impacts	Negative	4	3	**High**	
Visual	Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially alter the sense of place and visual character of the area	Negative	4	3	**High**	**Yes**
	Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially exacerbate visual impacts on visual receptors	Negative	4	3	**High**	
Social	Cumulative impact on sense of place	Negative	4	3	**High**	**Yes**

3.5 SCOPING RECOMMENDATIONS

All alternatives are considered both feasible and reasonable with no apparent advantages or disadvantages at this stage of the project. All alternatives will be described and assessed in more detail during the EIA Phase. **Table 3.8** provides a summary of the scoping phase alternatives assessment.

Table 3.8: Alternatives Summary

ALTERNATIVE CATEGORY	ALTERNATIVE IDENTIFIED IN SCOPING	ASSESSMENT IN EIA PHASE (YES / NO)
Project Alternative	**Site/layout alternative 1** — 400kV Powerline Alignment Alternative 1 (direct line) — Common Collector Substation Alternative 1 — Loop in Loop Out (LILO) Grid Alternative 1	Yes
	Site/layout alternative 2 — 400kV Powerline Alignment Alternative 2 (Preferred)(direct line) — Common Collector Substation Alternative 2 (Preferred) — Loop in Loop Out (LILO) Grid Alternative 2	Yes

4 EIA METHODOLOGY

The EIA process was initiated in accordance with Appendix 3 of GNR 982 pertaining to applications subject to an S&EIR process.

4.1 DETAILED ENVIRONMENTAL ASSESSMENT

4.1.1 SPECIALIST STUDIES

Specialist studies were undertaken during the EIA phase to consider and assess environmental impacts associated with the proposed project. The outcomes of these studies are included in the relevant reports contained in **Appendix G**. **Table 4.1** provides a list of the Specialist Studies that have been undertaken

Table 4.1: Details of Specialists

SPECIALIST FIELD	SPECIALIST NAME	COMPANY
Agriculture	Johann Lanz	Independent consultant
Avifauna	Chris van Rooyen	Chris van Rooyen Consulting
Terrestrial Ecology	David Hoare	David Hoare Consulting (Pty) Ltd
Plant Species assessment		
Animal Species assessment		
Aquatic	Brian Colloty	EnviroSci Pty Ltd
Groundwater	Adam Sanderson	WSP Group Africa (Pty) Ltd
Heritage	Jaco van der Walt	Beyond Heritage
Palaeontology	Prof Marion Bamford	
Socio-economic	Tony Barbour	Tony Barbour Environmental Consulting
Visual	Kerry Schwartz	SLR Consulting (Pty) Ltd

4.1.2 CUMULATIVE ASSESSMENT

Due to the number of renewable energy applications in the area, the specialist assessments include a detailed cumulative environmental impact statement. The cumulative impact statement is provided in **Section 9.15**. The assessment of cumulative impacts considered existing and proposed projects within a 30 km radius of the proposed Camden I 400kV. It is noted that there are no other wind and solar projects within a 30 km radius of the project that have received EA. This information was sourced from the DFFE web based environmental screening tool, as well as the Environmental Geographical Information Systems (E-GIS) webpage. The

cumulative assessment considers a worst-case scenario with regards to the proposed Camden Renewable Energy Complex, that is, all eight proposed subprojects will be implemented.

4.2 IMPACT ASSESSMENT METHODOLOGY

The EIR uses a methodological framework developed by WSP to meet the combined requirements of international best practice and NEMA 2014 EIA Regulations (GNR 982), as amended.

As required by the 2014 EIA Regulations as amended, the determination and assessment of impacts will be based on the following criteria:

- Nature of the Impact
- Significance of the Impact
- Consequence of the Impact
- Extent of the impact
- Duration of the Impact
- Probability if the impact
- Degree to which the impact:
  - can be reversed;
  - may cause irreplaceable loss of resources; and
  - can be avoided, managed or mitigated.

Following international best practice, additional criteria have been included to determine the significant effects. These include the consideration of the following:

- Magnitude: to what extent environmental resources are going to be affected;
- Sensitivity of the resource or receptor (rated as high, medium and low) by considering the importance of the receiving environment (international, national, regional, district and local), rarity of the receiving environment, benefits or services provided by the environmental resources and perception of the resource or receptor); and
- Severity of the impact, measured by the importance of the consequences of change (high, medium, low, negligible) by considering inter alia magnitude, duration, intensity, likelihood, frequency and reversibility of the change.

It should be noted that the definitions given are for guidance only, and not all the definitions will apply to all of the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

4.2.1 METHODOLOGY

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record

interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[2], indirect[3], secondary[4] as well as cumulative[5] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[6] presented in **Table 4.2.**

Table 4.2: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

4.2.2 IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact

[2] Impacts that arise directly from activities that form an integral part of the Project.
[3] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[4] Secondary or induced impacts caused by a change in the Project environment.
[5] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[6] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan. The mitigation sequence/hierarchy is shown in **Figure 4.1** below.

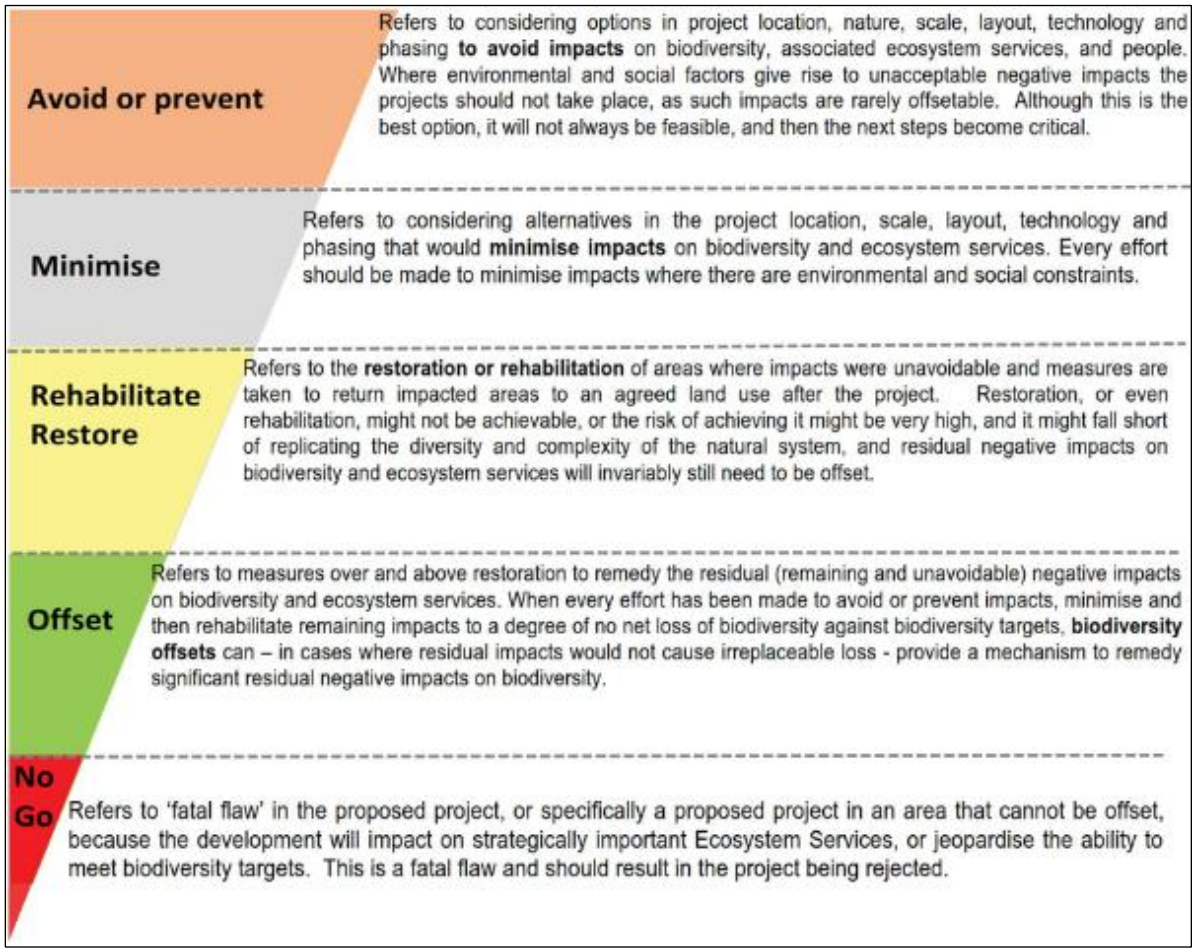


Figure 4.1: Mitigation Sequence/Hierarchy

4.3 STAKEHOLDER ENGAGEMENT

Stakeholder engagement (public participation) is a requirement of the S&EIA process. It consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the S&EIA decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to

understand the risks, impacts, and opportunities of the proposed project. The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues, and solutions.

It is important to note that since the proposed individual projects associated with the Camden Renewable Energy Complex, subject to a S&EIA Process, are located within the same geographical area, an integrated stakeholder engagement process (public participation) is being undertaken for these projects. A SER (**Appendix F**) has been compiled and included in the Draft EIR detailing the projects' compliance with Chapter 6 of the NEMA EIA Regulations 2014, as amended

4.3.1 STAKEHOLDER AND AUTHORITY CONSULTATION

There will continue to be ongoing communication between WSP and stakeholders throughout the S&EIR process. These interactions include the following:

- Interactions with stakeholders will be recorded in the comment and response report;
- Feedback to stakeholders will take place both individually and collectively;
- Written responses (email, faxes or letters) will be provided to stakeholders acknowledging issues and providing information requested (dependent on availability) and
- A letter will sent out to all registered stakeholders notifying them of the outcome of the environmental authorisation process

As per the GNR 982, particular attention will be paid to landowners, and neighbouring communities, specifically where literacy levels and language barriers may be an issue.

4.3.2 PUBLIC REVIEW

This Draft EIR will be placed on public review for a period of 30 days from 7 September 2022 to 10 October 2022, at the following public places:

- Gert Sibande District Municipality;
- Ermelo Public Library;
- Thusiville Public Library;
- Msukaligwa Local Municipality Ermelo Office;
- WSP website (https://www.wsp.com/en-ZA/services/public-documents); and
- Datafree Website (https://wsp-engage.com/).

All registered stakeholders and authorising/commenting state departments will be notified of the public review period as well as the locations of the draft EIR via email and SMS.

4.3.3 COMMENT AND RESPONSE

All concerns, comments, viewpoints and questions (collectively referred to as 'issues') will continue to be documented and responded to adequately in the Comment and Response Report. The Comment and Response Report records the following:

- List of all issues raised;
- Record of who raised the issues;
- Record of where the issues were raised;
- Record of the date on which the issue was raised; and
- Response to the issues.

The updated Comment and Response Report has been included in the SER in **Appendix D.**

4.3.4 SUBMISSION AND DECISION MAKING

The EAP must submit the final EIR to the competent authority within 106 days of the acceptance of the scoping report. A request for extension to the submission deadline of the FEIR was submitted to the DFFE in terms of EIA Regulation 3(7). A 60-day extension was approved on 24 June 2022. The final EIR is due to the DFFE on 02 November 2022. Once submitted, the delegated competent authority (i.e. the DFFE) will be allocated 107 days to review the final EIR in order to either grant or refuse and environmental authorisation.

The final EIR will be placed on stakeholder review for a reasonable time period during the DFFE's final review and decision-making process. All comments on the Final EIR should be submitted directly to the DFFE. The delegated competent authority must issue their decision within this specified timeframe.

4.3.5 NOTIFICATION OF ENVIRONMENTAL AUTHORISATION

All stakeholders will receive a letter at the end of the process notifying them of the authority's decision, thanking them for their contributions, and explaining the appeals procedure as outlined in the national Appeal Regulations, 2014 (GNR 993 of 2014).

4.4 SPECIALIST STUDIES IDENTIFIED BY DFFE WEB-BASED ENVIRONMENTAL SCREENING TOOL

DFFE has developed the National Web-based Environmental Screening Tool in order to flag areas of potential environmental sensitivity related to a site as well as a development footprint and produces the screening report required in terms of regulation 16 (1)(v) of the EIA Regulations (2014, as amended). The *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* (GN 960 of July 2019) states that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, is compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the EIA Regulations, 2014 as of 04 October 2019.

The Screening Report generated by the National Web-based Environmental Screening Tool contains a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmentally sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected.

A screening report for the proposed project was generated on 14 September 2021 and is attached as **Appendix D**. The Screening Report for the project identified various sensitivities for the site. The report also generated a list of specialist assessments that should form part of project based on the development type and the environmental sensitivity of the site. Assessment Protocols in the report provide minimum information to be included in a specialist report to facilitate decision-making.

Table 4.3 below provides a summary of the sensitivities identified for the development footprint.

Table 4.3: Sensitivities Identified in the Screening Report

THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVIY
Agricultural Theme	✓			
Animal Species Theme		✓		
Aquatic Biodiversity Theme	✓			
Archaeological and Cultural Heritage Theme	✓			
Civil Aviation Theme				✓
Defence Theme	✓			
Palaeontology Theme	✓			
Plant Species Theme			✓	
Terrestrial Biodiversity Theme	✓			

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report as determined by the screening tool (please refer to **Section 4.4.1** below for the EAP motivation applicable to this list):

- Agricultural Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Palaeontology Impact Assessment
- Landscape/Visual Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Freshwater Impact Assessment
- Avifauna Impact Assessment
- A Geotechnical Assessment
- Civil Aviation Impact Assessment
- Radio Frequency Interference (RFI) Assessment
- Plant Species Assessment
- Animal Species Assessment

4.4.1 MOTIVATION FOR SPECIALIST STUDIES

The report recognises that "it is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the footprint situation."

As summarised in **Table 4.3** above, the following specialist assessments have been commissioned for the project based on the environmental sensitivities identified by the Screening Report:

- Soils and Agricultural Potential Assessment;
- Archaeological and Cultural Heritage Assessment;
- Palaeontology Impact Assessment;
- Visual Impact Assessment ;
- Biodiversity Impact Assessment (inclusive of terrestrial biodiversity, plant species and animal species);
- Freshwater Assessment;
- Avifauna Impact Assessment;
- Social Impact Assessment;
- Desktop Geotechnical Assessment; and
- Desktop Traffic Assessment.

Four of the identified specialist studies will not be undertaken as part of the S&EIA process for the proposed Project. Motivation for the exclusion of these specialist studies is provided below:

- **Detailed Geotechnical**

  A desktop Geotechnical Assessment has been commissioned and has been incorporated into this report. No geotechnical fatal flaws were identified. However, a detailed Geotechnical Assessment will not be undertaken as part of the S&EIA Process as this will be undertaken during the detailed design phase.

- **RFI Assessment**

  A RFI Study will not be undertaken. The proposed development area is not located within any Astronomy Advantage Area. The South African Weather Service (SAWS) confirmed that there is no impact to their infrastructure or its operation and therefore SAWS has no objection to the planned Solar PV Facility. Other relevant telecommunications stakeholders will be engaged with as part of the Public Participation Process.

- **Civil Aviation**

- According to the DFFE Screening Tool Report, civil aviation is regarded as having low sensitivity. The proposed development site is located between 8 and 15 km of civil aviation aerodromes. A formal Civil Aviation Assessment will not be undertaken as part of the S&EIA Process. Nevertheless, the relevant Authorities have been included on the project stakeholder database. As of the 1st of May 2021, Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments. Where required, an Application for the Approval of Obstacles will also be submitted to ATNS and the required permits will be obtained prior to the development of the project. The South African Civil Aviation Authority (SACAA) was included on the project stakeholder database. Comments received from this stakeholder to date have been captured and responded to within the Comments and Responses Report (CRR) included in the SER (Appendix D) of this EIR.

- **Defence**

  This theme was identified as very high due to the fact that the OHPL ties into the Camden MTS which is inside the Camden Power Station property which is classified as a National Key Point under the National Key Point Act (Act No. 102 of 1980). The Department of Defence and Eskom will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from this authority as applicable.

  Eskom consent for grid connection is required and extensive consultation with Eskom Grid Access unit will be held towards cost estimate and grid access points as needed, along with adhering to their grid specifications and transferring of the infrastructure to Eskom ultimately

Specialist assessments were conducted in accordance with the *Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes*, which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e. "the Protocols"). The assessment protocols followed are indicated in **Table 4 4**.

Table 4.4: Assessment protocols followed

SPECIALIST ASSESSMENT	ASSESSMENT PROTOCOL
Agricultural Impact Assessment	Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources by onshore wind and/or solar photovoltaic energy generation facilities where the electricity output is 20 megawatts or more, gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998).
Aquatic Impact Assessment	Protocol for specialist assessment and minimum report content requirements for the environmental impacts on aquatic biodiversity (Government Gazette 43110, 20 March 2020).
Terrestrial Biodiversity Assessment	Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species, terrestrial plant species and terrestrial biodiversity.
Terrestrial Plant Species Assessment	Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species.
Terrestrial Animal Species Assessment	Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species.
Avifaunal Impact Assessment	The Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species.
Social Impact Assessment	As of September 2020, there are no sensitivity layers on the Screening Tool for Socio-economic- features. Part A has therefore not been compiled for this assessment.

5 NEED AND DESIRABILITY

South Africa is faced with significant increases in electricity demand and a shortage in electricity supply. South Africa is the seventh coal producer in the world, with approximately 77% of the country's electricity generated from coal. This large dependence on coal and its use has also resulted in a variety of negative impacts on the environment, including the contribution to climate change. South Africa is also the highest emitter of greenhouse gases in Africa; attributed to the country's energy-intensive economy that largely relies on coal-based electricity generation.

Renewable energy development is regarded as an important contribution to meeting international and national targets of reducing reliance on fossil fuels, such as coal, which contribute towards greenhouse gas emissions and resultant climate change. The need and desirability of proposed Project has been considered from an international, national and regional perspective. It also should be noted that the proposed 400kV grid connection will indirectly support the renewable energy sector via transmission and distribution of the electricity generated at the renewable energy facilities.

5.1 INTERNATIONAL PERSPECTIVE

The proposed project will align with internationally recognised and adopted agreements, protocols and conventions. This includes the Kyoto Protocol (1997) which calls for countries internationally to reduce their greenhouse gas emissions through cutting down on their reliance on fossil fuels and investing in renewable energy technologies for electricity generation. The proposed SEF and WEF will therefore add capacity to the energy sector and generate electricity without greenhouse gas emissions and meet international requirements in this regard.

South Africa is also signatory to the United Nations' Development Programmes' (UNDP) Sustainable Development Goals (SDGs), particularly SGD 7 relating to affordable and clean energy. The proposed SEF and WEF qualifies as a clean technology that will generate 200MW of affordable energy to contribute to South Africa's energy mix.

The project will also greatly contribute to the countries' efforts to reduce their carbon emissions and play their role as part of the Paris Climate Accord. The Paris Agreement is a legally binding international treaty signed by 196 countries at the COP 21 in Paris, on the 12$^{th\ of}$ December 2015 to combat climate change. The goal of the Paris Accord is to limit global warming to well below 2 degrees Celsius, compared to industrial levels to avoid catastrophic natural disasters which are driven by the global temperature increase. Therefore, to achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate-neutral world by 2050.

The authorization of the Project will further align with South Africa's National Climate Response White Paper which outlines the countries efforts to manage the impacts of climate change and to contribute to the global efforts to stabilize the Greenhouse gases concentrations in the atmosphere.

5.2 NATIONAL PERSPECTIVE

It must be noted that the Camden up to 400kV Grid Connection project is not a generation project, but the project is needed to support and enable the planned renewable generation projects.

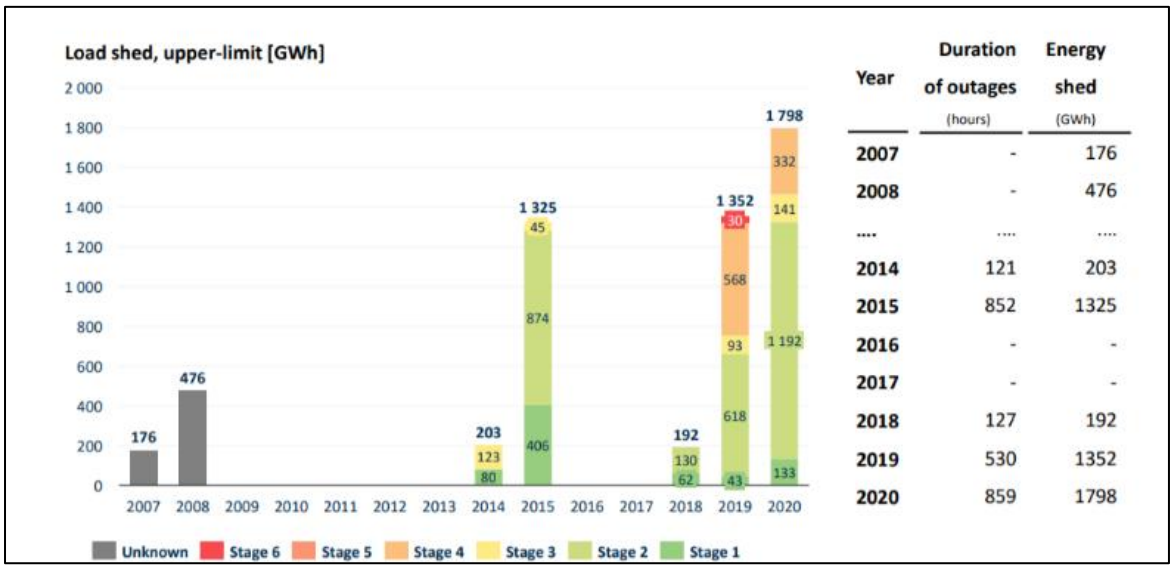
The South African Government, through the IRP, has set a target to secure 17 800 MW of renewable energy by 2030. This is an effort to diversify the country's energy mix in response to the growing electricity demand and promote access to clean sources of energy.

The National Development Plan (NDP) is aimed at reducing and eliminating poverty in South Africa by 2030. The NDP also outlines the need to increase electricity production by 2030, with 20 000 MW of electricity capacity generated from renewable sources in order to move to less carbon-intensive electricity production. The Plan also envisages that South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.

The authorisation of the Project will further align with South Africa's National Climate Response White Paper which outlines the countries efforts to manage the impacts of climate change and to contribute to the global efforts to stabilize the greenhouse gases concentrations in the atmosphere.

The proposed Camden Renewable Energy Complex, which includes this Project, will pave the way for the Just Energy Transition (JET)[7] in South Africa and promote the transition from a fossil fuel-based economy to a low carbon economy. The proposed Project aims towards the aforementioned national energy targets of diversification of energy supply and the promotion of clean energy, by providing the requisite grid connection infrastructure for the transmission of generation projects, in particular the Camden Renewable Energy Complex. Wind and solar energy developments contribute to reduced emissions and subsequently climate change whilst promoting industrial development and job creation.

The proposed Project will also aid in overcoming the power shortages that are currently faced in the country. In 2020, South Africa witnessed its longest recorded hours of load shedding, with the power being off for 859 hours of the year as shown in **Figure 5.1**. The South African Government has taken strides to try reducing these power cuts through the implementation of bid Windows in REIPPP and lifting the independent power generation threshold to 100MW, but it is still expected that the country will undergo more load shedding. Over the years the construction of Wind facilities has become cheaper, and less time-consuming. Thus, acting as a faster and more efficient method of meeting the ever-growing demand for electricity in the country.



Year	Duration of outages (hours)	Energy shed (GWh)
2007	-	176
2008	-	476
....	....	....
2014	121	203
2015	852	1325
2016	-	-
2017	-	-
2018	127	192
2019	530	1352
2020	859	1798

Figure 5.1: Load shedding hours over the years in South Africa

In addition, the Council for Scientific and Industrial Research (CSIR) reported that renewable energy assisted in relieving pressure on the constrained South African power system during load shedding in the first quarter of 2019. This indicates that renewable energy is a key factor in ensuring that the country does not face further load shedding in the future.

5.3 REGIONAL AND LOCAL PERSPECTIVE

It must be noted that the Common Collector Substation and 400kV Grid Connection project is not a generation project but the project is needed to project critical supporting infrastructure to the planned renewable generation projects.

[7] The Just Transition is described as the transition towards a low-carbon and climate-resilient economy that maximizes the benefits of climate action while simultaneously improving the welfare of the workers and their communities.

JUST ENERGY TRANSITION

Coal power stations and the coal mining industry play a vital component in the economic and social components of the local Mpumalanga economy. Shifting to a low carbon economy will thus need to offset or exceed the benefits being realized by fossil fuels in the province. Thus, a key factor to ensuring the success of the Just Energy Transition is not only to focus on the transition from fossil fuels to renewable energy resources but to simultaneously ensure the Just Transition of jobs and skills.

The transition towards renewable energy will improve the socio-economic conditions of the Gert Sibande District Municipality. The Gert Sibande District Municipality recorded an unemployment rate of 26.7% in 2017, with the majority of its employed in the trade and community services sectors. The Project will aid in solving two of the leading challenges faced by the Gert Sibande District Municipality, namely the cost of electricity and lack of adequate employment opportunities. The Project will support the first large-scale wind energy facilities being developed in Mpumalanga. The proponent foresees this project as being the catalyst to realizing a true Just Energy Transition for Mpumalanga. As various career opportunities are presented by the wind industry, and these are divided into four pillars that are aligned with the value chain. These four pillars are project development, component manufacturing, construction, and operation & maintenance as shown in **Figure 5.2**

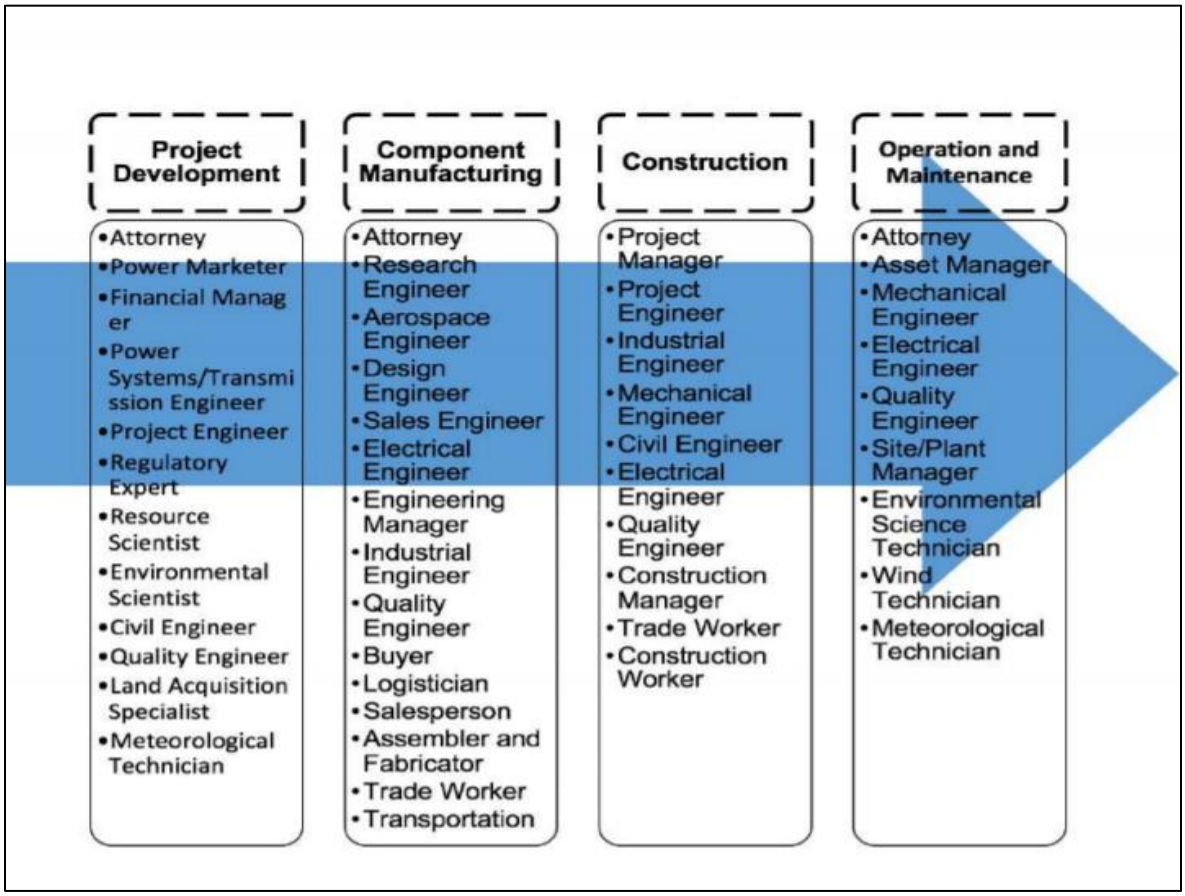


Figure 5.2: Career Opportunities presented by the Wind Industry (Source: https://www.res4africa.org/wp-content/uploads/2020/09/RES4Africa-Foundation-A-Just-Energy-Transition-in-South-Africa.pdf)

Figure 5.2 shows that the wind industry will create job opportunities throughout the supply chain. The wind industry will contribute to the Just transition in South Africa to ensure that there are no job losses but rather job transfers and skill exchange. For these opportunities to arise, renewable energy projects need to be approved in Mpumalanga to ensure that the transition from fossil fuels to renewable energy happens gradually and takes off effectively. This includes the requisite transmission infrastructure necessary to support the planned generation projects within the province.

MULTIPLE LAND USE

Unlike opencast coal mining within the broader Camden study area, the Project facilitates multiple land use functions within the development area. Multiple land use functions such as operating the wind farm, solar facility and Green hydrogen and ammonia facility in tandem with agricultural activities or even underground coal mining. This will boost the economic activities in the area which will in turn increase job opportunities in that area and help improve the local community's welfare without jeopardizing the environment.

DESIRABILITY OF THE PROJECT SITE

As mentioned previously, four of Eskom's coal-fired power stations have been targeted for decommissioning in the short term: Komati, Camden, Grootvlei, and Hendrina. Eskom is looking to decommission 5 400MW of electricity from coal generation by the year 2022, increasing to 10 500MW by 2030 and 35 000MW by 2050. Simultaneously Eskom has been looking at options for repurposing these power stations with the core aims of reusing existing power transmission infrastructure, developing new generation capacity, providing ancillary services, and mitigating socio-economic impact.

The proposed Camden Renewable Energy Complex, inclusive of the Project, is ideally located to form part of this proposed repurposing of the Camden power station and will help Eskom achieve its diversification goal.

The Camden up to 400kV grid connection project will also ensure optimate use of the existing substation infrastructure and leverage the Camden MTS and existing grid connections into that MTS for wheeling/transmission across the country.

6 PROJECT DESCRIPTION

6.1 SITE LOCATION

The proposed Project will be developed in an area south-west of Ermelo, in Mpumalanga. The proposed Project falls within the Msukaligwa Local Municipality of the Gert Sibande District Municipality.

The eight projects of the Camden Renewable Energy Complex are located within the same geographical area and are inevitably linked and integrated. As such, the overall locality of the Camden Renewable Energy Complex is included in **Figure 6.1.** The project site, substation and up to 400kV Powerline alignment (*the project under consideration for this DEIR*), including associated alternatives, is indicated in **Figure 6.2**

The details of the properties associated with the proposed Project (substation and powerline) alternatives, including the 21-digit Surveyor General (SG) codes for the cadastral land parcels are outlined in **Table 6.1** and **Table 6.2.**

Table 6.1: Affected Farm Portions – Common Collector Substations

FARM NAME	21 DIGIT SURVEYOR GENERAL CODE OF EACH CADASTRAL LAND PARCEL
Common Collector Substation Alternative 1	
Portion 2 of Welgelegen Farm No. 322	T0IT00000000032200002
Common Collector Substation Alternative 2 (Preferred)	
Portion 1 of Welgelegen Farm No. 322	T0IT00000000032200001
Expansion of Camden Substation	
Portion 0 of Farm No. 329 (Camden Power Station)	T0IT00000000032900000

Table 6.2: Affected Farm Portions – up to 400kV Powerlines

FARM NAME	21 DIGIT SURVEYOR GENERAL CODE OF EACH CADASTRAL LAND PARCEL
400kV Powerline Alignment Alternative 1 (direct line)	
Portion 14 of Mooiplaasts Farm No. 290	T0IT00000000029000014
Portion 2 of Welgelegen Farm No. 322	T0IT00000000032200002
Portion 1 of Welgelegen Farm No. 322	T0IT00000000032200001
Portion 2 of Uitkomst 292	T0IT00000000029200002
Portion 12 of Uitkomst 292	T0IT00000000029200012

FARM NAME	21 DIGIT SURVEYOR GENERAL CODE OF EACH CADASTRAL LAND PARCEL
Portion 20 of Mooiplaasts Farm No. 290	T0IT00000000029000020
Portion 0 of Farm No. 329 (Camden Power Station)	T0IT00000000032900000
400kV Powerline Alignment Alternative 2 (Preferred)(direct line)	
Portion 1 of Welgelegen Farm No. 322	T0IT00000000032200001
Portion 14 of Mooiplaats Farm No. 290	T0IT00000000029000014
Portion 2 of Uitkomst 292	T0IT00000000029200002
Portion 12 of Uitkomst 292	T0IT00000000029200012
Portion 20 of Mooiplaats Farm No. 290	T0IT00000000029000020
Portion 0 of Farm No. 329 (Camden Power Station)	T0IT00000000032900000
Loop in Loop Out (LILO) Grid Alternative 1	
Portion 1 of Welgelegen Farm No. 322	T0IT00000000032200002
Loop in Loop Out (LILO) Grid Alternative 2	
Portion 2 of Welgelegen Farm No. 322	T0IT00000000032200001

It must be noted that the Applicant seeks authorisation for the full assessment corridor (250m either side of centre line) to enable micro-siting post final design.

Table 6.3: Substation Alternative Co-ordinates

POINT	LONGITUDE	LATITUDE
Alternative 1		

POINT	LONGITUDE	LATITUDE
		
A1-1	26°40'27.62"S	30° 2'23.58"E
A1-2	26°40'29.07"S	30° 2'29.61"E
A1-3	26°40'36.80"S	30° 2'26.08"E
A1-4	26°40'39.63"S	30° 2'19.71"E
Alternative 2 (Preferred)		

POINT	LONGITUDE	LATITUDE

A2-1	26°38'44.08"S	30° 4'10.50"E
A2-2	26°38'47.63"S	30° 4'14.25"E
A2-3	26°38'57.67"S	30° 4'3.08"E
A2-4	26°38'54.03"S	30° 3'59.66"E

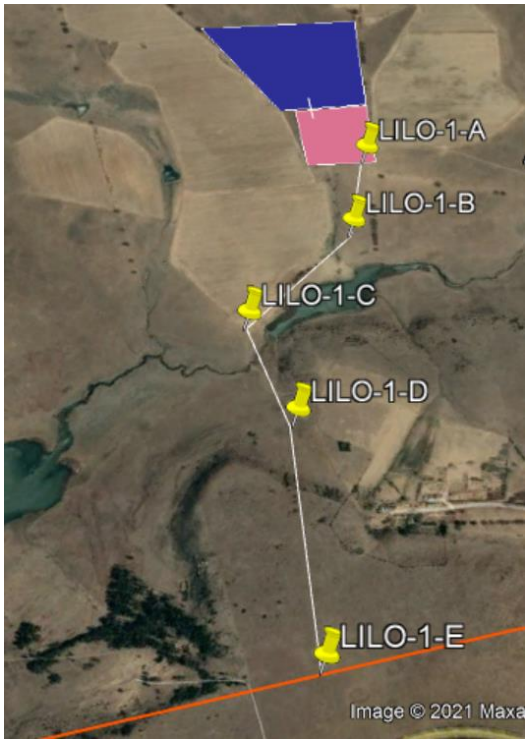
Camden MTS Expansion

POINT	LONGITUDE	LATITUDE
MTS1	26°37'2.19"S	30° 5'8.98"E
MTS2	26°36'58.19"S	30° 5'32.14"E
MTS3	26°37'2.91"S	30° 5'30.75"E
MTS4	26°37'7.08"S	30° 5'9.88"E

Table 6.4; Powerline Co-ordinates (centre-line)

POINT	LONGITUDE	LATITUDE
400 kV Powerline Alignment Alternative 1		
		
A1-A	26°40'29.80"S	30° 2'41.33"E
A1-B	26°40'8.97"S	30° 2'57.54"E
A1-C	26°39'31.77"S	30° 4'13.02"E
A1-D	26°37'53.90"S	30° 4'45.82"E
A1-E	26°37'24.41"S	30° 4'43.72"E
A1-F	26°36'59.67"S	30° 4'59.51"E
A1-G	26°36'58.98"S	30° 5'6.73"E
A1-H	26°37'5.84"S	30° 5'16.50"E
400kV Powerline Alignment Alternative 2 (Preferred)		

POINT	LONGITUDE	LATITUDE
		
Length (km)	Approximately 4.5km	
A2-A	26°38'43.11"S	30° 4'10.20"E
A2-B	26°38'35.81"S	30° 4'32.43"E
A2-C	26°37'53.90"S	30° 4'45.82"E
A2-D	26°37'24.41"S	30° 4'43.72"E
A2-E	26°36'59.67"S	30° 4'59.51"E
A2-F	26°36'58.98"S	30° 5'6.73"E
A2-G	26°37'5.84"S	30° 5'16.50"E
LILO-Grid Alternative		

POINT	LONGITUDE	LATITUDE
		
Length (km)	Approximately 2.5km	
LILO-1-A	26°40'29.91"S	30° 2'40.50"E
LILO-1-B	26°40'35.38"S	30° 2'51.08"E
LILO-1-C	26°40'52.12"S	30° 2'58.92"E
LILO-1-D	26°40'50.86"S	30° 3'15.08"E
LILO-1-E	26°40'57.98"S	30° 3'47.59"E
LILO Grid Alternative 2		

POINT	LONGITUDE	LATITUDE

Length (km)	Approximately 0.5km	
LILO-2-A	26°38'46.28"S	30° 4'9.82"E
LILO-2-B	26°38'47.93"S	30° 4'29.21"E

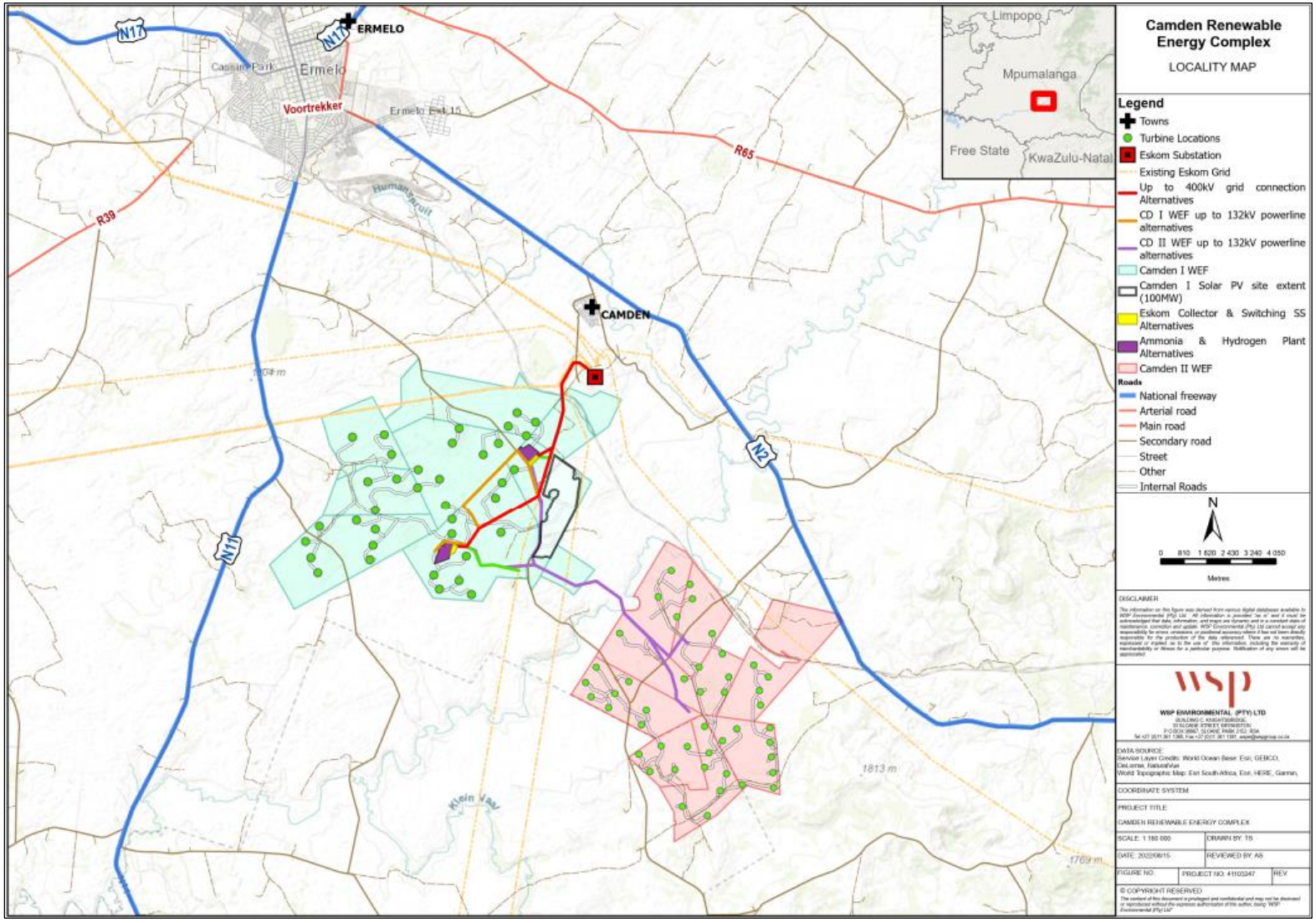


Figure 6.1: Locality map for the proposed Camden Renewable Energy Complex, near Camden in the Mpumalanga Province

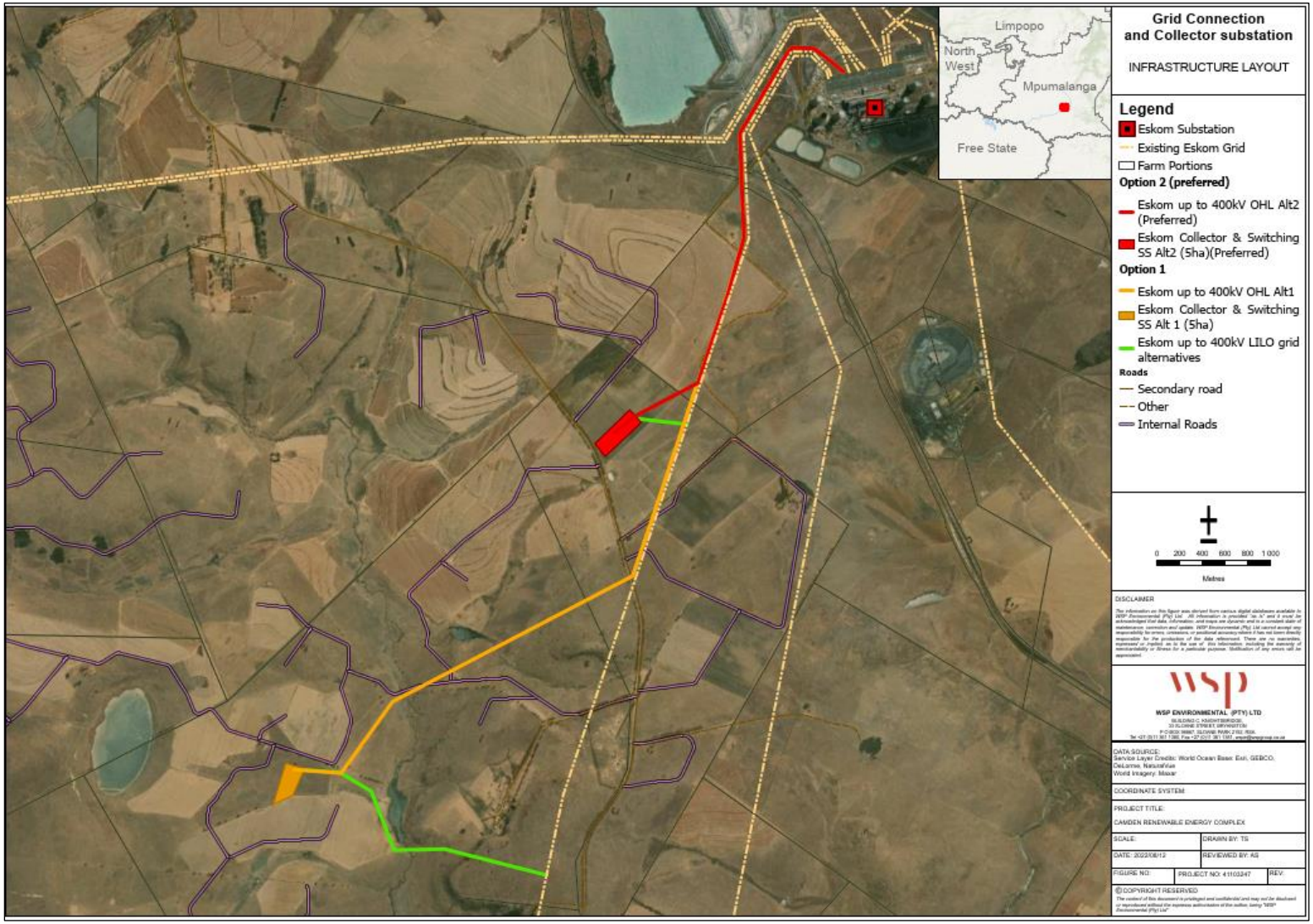


Figure 6.2: Proposed Project and associated main components

6.2 ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION

Electricity is carried at high voltages (kilovolts, or kV) along transmission lines in order to reduce the electrical losses that occur over long distances between power generation and consumption points. In order for electricity to be transmitted safely and efficiently over long distances, it must be at a high voltage and a low current.

The voltages at which power is generated at the power generation facility are too low for transmission over long distances. To overcome this problem, transformers are installed at the power stations and substations to increase the voltage level. Transformer's step-up the voltage from, for example, 11 or 22 kV to higher voltages such as 66 kV, 132kV, 220 kV, 275 kV, 400 kV or 765 kV, and feed the generated power into Eskom's national grid.

When the electricity arrives at a distribution substation, bulk supplies of electricity are taken for primary distribution to towns and industrial areas, groups of villages, farms and similar concentrations of consumers. The lines are fed into intermediate substations where transformers reduce (step-down) the voltage level. This could be 11 kV in large factories and 380/220 Volts in shops and homes. Power is distributed to end-users via reticulation power lines and cables. Figure illustrates a typical distribution system.

As of March 2019, South Africa's transmission network comprised 32,802 km of line length, 167 substations and 152,135 MVA of transformer capacity. All the high voltage lines, plus the transformers and related equipment, form the transmission system also known as the national grid.

6.2.1 COMPONENTS OF A TYPICAL TRANSMISSION LINE SYSTEM

The main components of a typical electrical transmission system include the following:

TRANSMISSION STRUCTURES

Transmission structures are the most visible components of the power transmission system. Their function is to inter alia, keep the high-voltage conductors separated from their surroundings and from each other. Some structure designs reflect the specific function of the structure, while others have come about as a result of technological progress. Structure design alternatives for this project are discussed in **Section 6.5**.

CONDUCTORS

Conductors carry the power through and from the grid. Generally, several conductors per phase are strung from structure to structure. The number of conductors per phase depends on the performance of the line, typically, more than one conductor per phase is used when the operating voltage exceeds 132kV. Conductors are constructed primarily of aluminium, aluminium-alloy, steel or other types of materials as appropriate.

SUBSTATIONS

The very high voltages used for power transmission are converted at substations to lower voltages for further distribution and consumer use. Substations vary in size and configuration but may cover several hectares; they are cleared of vegetation and typically surfaced with gravel. They are fenced, and are normally reached by a permanent access road. In general, substations include a variety of indoor and outdoor electrical equipment such as switchgear, transformers, control and protection panels and batteries, and usually include other components such as control buildings, fencing, lighting etc.

For the substation to perform it needs sophisticated protection equipment to detect faults and abnormal conditions that may occur on the network. Action may consist for example, of automatically tripping a transmission line to cater for abnormal conditions such as lightning strikes, fires or trees falling on transmission lines. This action is necessary for safety reasons in the event of an accident or to maintain electricity supply and limit the disruption caused.

Figure 6.3 provides an illustration of a typical substation layout.

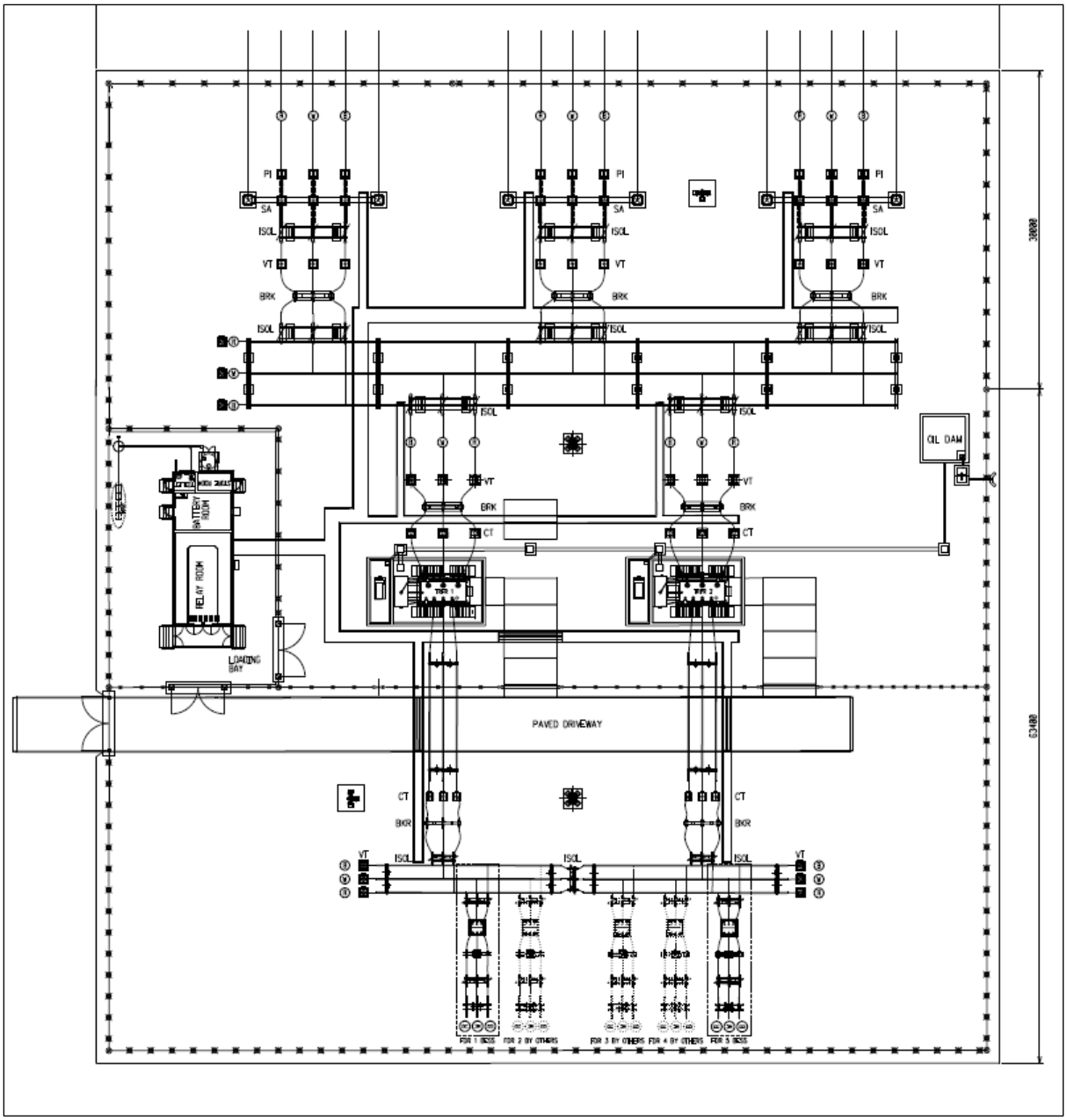


Figure 6.3: Typical Substation Layout (note: for illustration purposes only)

TRANSFORMERS

Transformers are major items found in a transmission or distribution substation. There may be a number of different types of transformers in a substation such as power transformers, voltage transformers or current transformers.

A power transformer is a very simple device piece of electrical equipment where alternating current (AC) is led through a primary coil of wire, which produces an alternating magnetic field in the ring-shaped core of soft iron. This in turn creates a voltage in a secondary coil, from which the output current can be drawn. If the secondary coil has more turns than the primary coil, the output voltage is higher than the input voltage. This is a step-up transformer. A step-down transformer has more turns in the primary coil than in the secondary coil to reduce the voltage.

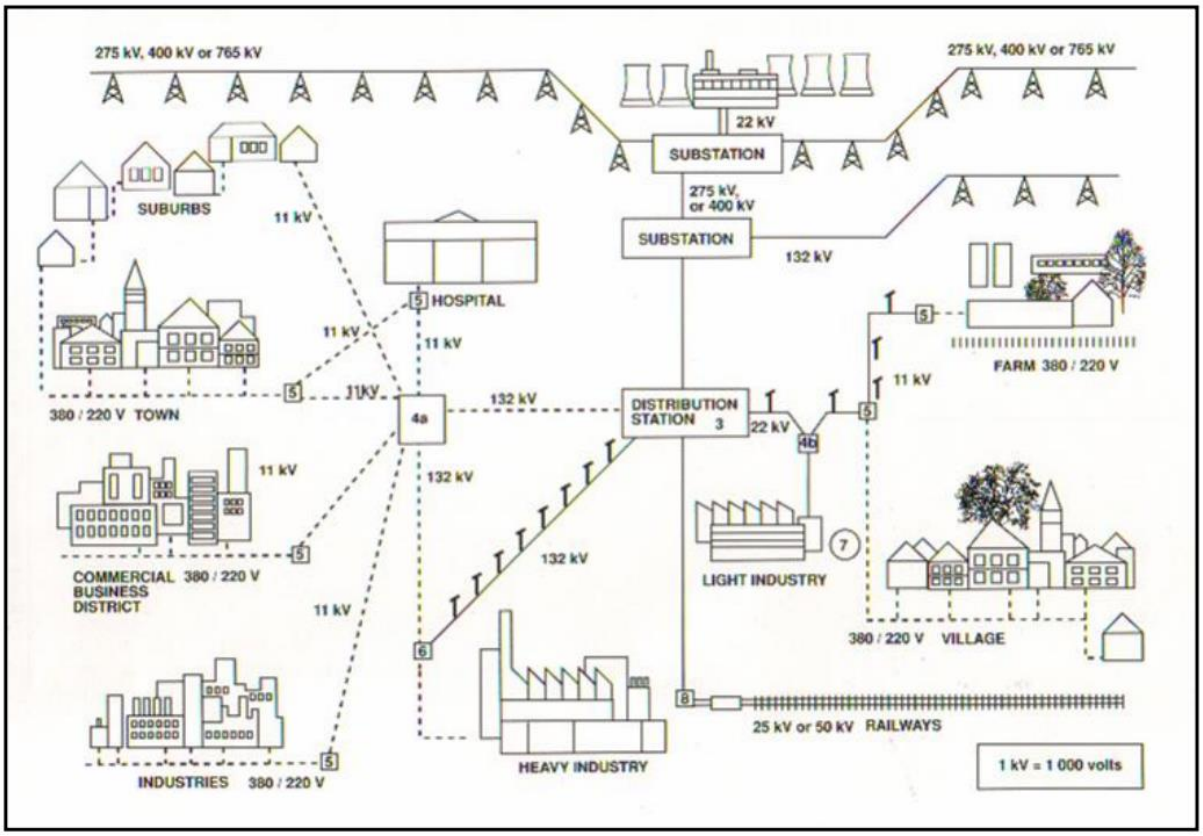


Figure 6.4: Typical Distribution System

6.3 PROJECT INFRASTRUCTURE

The proposed project entails the construction of 1 x up to 400kV transmission line and common collector substation at the proposed Camden Renewable Energy Complex located south-west of Ermelo, in Mpumalanga. The transmission line will connect to the existing Eskom Substation located at the Camden Power Station which lies approximately 5km northeast of the project site, or alternative connect via a Loop-In-Loop-Out (LILO) alternative into the existing Eskom Camden – Incandu 400kV transmission line. This proposed project will also include the extension of the existing main transmission substation (MTS) at the Camden Power Station to allow for the proposed new up to 400kV transmission line connection.

The proposed project will thus comprise the following key components:

- Construction of 1 x up to 400kV transmission line (either single or double circuit) between the Camden Renewable Energy Complex and the Camden MTS. The powerline will have a 500m assessment corridor (250m on either side of the centre line) to allow for micro-siting. A Loop-In-Loop-Out corridor alternative is also assessed, which will include two connecting powerlines (LILO) into the existing Eskom Camden-Incandu 400kV transmission powerline line towards the South-West of the project site.
- Establishment of the common collector substation (with a footprint of approximately 5ha) at the Renewable Energy Complex which includes but is not limited to:
  - A high voltage substation yard to allow for multiple 132kV and 400kV feeder bays and transformers, with infrastructure to allow for step-up to 400kV as required.
  - Standard substation electrical equipment, i.e., transformers, busbars, office area, operation and control room, workshop, and storage area, feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be needed.
  - The control building, telecommunication infrastructure, oil dam(s) etc,

- Workshop and office area within the collector substation footprint,
- Fencing around the Substation
- All the access road infrastructure to and within the substation
- Expansion of the Camden MTS Substation (with a footprint of approximately 1ha), including standard substation electrical equipment as may be needed (feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be needed).
- Associated infrastructure including but not limited to lighting, fencing, and buildings required for operation (ablutions, office, workshop and control room, security fencing and gating, parking area, concrete batching plant (if required), waste storage/disposal and storerooms).

6.3.1 COMPONENTS OF THE TRANSMISSION LINES

A brief overview of the physical/technical requirements of the project is as follows:

- 1 x up to 400kV transmission line (either single or double circuit) between the Camden Renewable Energy Complex and the Camden MTS. In the case of the Loop-In-Loop-Out alternative, dual (2) connecting lines of similar specification are assessed.
- Straight line distance between Camden Renewable Energy Complex and the Camden MTS is approximately 5km from the preferred common substation alternative.
- Servitude width for 1 x up to 400kV transmission line (single and double circuit) is 55m to 60m. The servitude width for 1x up to 132kVA transmission line is 32m. A 500m corridor will be assessed (250m on either side of the centre line) to allow for mico-siting. In the case of the Loop-In-Loop-Out alternative this servitude will apply to each of the two connecting power lines.
- Height of 1 x 400kV power line structure is on average 48m, but may reach up to 50m in exceptional circumstances depending on the complexity and slope of the terrain. The maximum height for an up to 132kV powerline structure is 40m.
- Minimum conductor clearance is between 8.1 and 12.6m.
- Span length between pylon structures is typically up to 200 - 250m apart, depending on complexity and slope of terrain.

The design of the up to 400kV structures is unknown at present as the choice is dependent on the conditions at the exact position of the transmission structures on the chosen line route. Various pylon design types are being considered (and will be determined during the detailed design engineering phase), and may include any of the following:

- Up to 400kV (single or double circuit)
  - Cross rope suspension
  - Intermediate or suspension towers
  - Inline and angle strain self-supporting towers
  - Guyed “V” Structure
- Up to 132kV (single or double circuit)
  - Intermediate self-supporting monopole
  - Inline or angle-strain self-supporting monopole
  - Suspension self-supporting monopole
  - Triple pole structure
  - Steel lattice structure

The above designs may require anchors with guy-wires or be anchorless. For up to 132kV structures, concrete foundation sizes may vary depending on design type up to 80m^2 (10m by 8m), with depths reaching up to 3.5m typically in a rectangular ‘pad’ shape. For up to 400kV structures footprint sizes may vary depending on design type up to 110m^2 (10.5m by 10.5m), with concrete foundations of up to 80m^2 and depths reaching up to 3.5m typically depending on the number and design of the foundations (to be determined during the detailed design

engineering phase). The actual number of structures required will vary according to the final route alignment determined.

A working area of approximately 100m x 100m is needed for each of the proposed structures to be constructed.

6.3.2 CLEARANCE REQUIREMENTS FOR TRANSMISSION LINE

For safety reasons, transmission lines require certain minimum clearance distances. These are as follows:

- The minimum vertical clearance distance between the ground and the transmission line is 6.7m.
- The minimum vertical clearance to any fixed structure that does not form part of the transmission line is 9.4m - 11m.
- The minimum distance between an up to 400kV transmission line and an existing road is 60m – 120m (depending on the type of road).
- Any farming activity can be practiced under the conductors provided that safe working clearances and building restrictions are adhered to.
- Minimum servitude to other parallel lines.

6.3.3 PROPOPOSED ASSOCIATED INFRASTRUCUTRE

The proposed transmission integration project will require the following with respect to the permanent infrastructure:

- Where the transmission line crosses a fence between neighbouring landowners and there is no suitable gate in place, a suitable gate will be erected in consultation with the landowner. These gates are necessary in order to ensure access to the line for maintenance and repair purposes.
- Existing road infrastructure will be used as far as possible to provide access for construction vehicles during the construction of the line. Thereafter, the roads are used for inspection and maintenance purposes. Where appropriate, roads may be upgraded to access transmission lines and substations. Where no roads exist, access roads may be created for maintenance and inspection purposes.
- Expansion of the Camden MTS Substation (with a footprint of approximately 1ha), including standard substation electrical equipment as may be needed (feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be needed).Fibre Optic cable could be strung on the earth cable if required for telecommunication. The control building, telecommunication infrastructure, oil dam(s) etc,
- Workshop and office area within the collector substation footprint,
- All the access road infrastructure to and within the substation

6.4 PROJECT ACTIVITIES

The typical steps involved in the construction and operation of an overhead powerline (OHPL) is summarised below:

Planning Phase

- Step 1: Surveying of the development area and negotiation with affected landowners; and
- Step 2: Final design and micro-siting of the infrastructure based on geotechnical, topographical conditions and potential environmental sensitivities.

Construction Phase

- Step 3: Vegetation clearing;
- Step 4: Assembly and erection of infrastructure on site;
- Step 5: Stringing of conductors; and
- Step 6: Rehabilitation of disturbed areas and protection of erosion sensitive areas.

Operation Phase

— Step 7: Continued maintenance during operation.

6.4.1 PLANNING PHASE

The EIA process forms part of the scope definition stage of a project. The aim of this process is to identify the possible routes where the project can be implemented with minimal impact on the environment.

The actual location of the structures across which the conductors are spanned is determined by a number of factors, including negotiation with landowners, environmental features and technical requirements. As a result of these factors, it is impossible to predict the exact position of structures within the EIA process. The inherent variation that is likely in the final placement of the structures is factored into the EIA through the assessment of transmission line corridors which are 300m wide (150m either side of centre line).

A final EIR is produced and provided to the DFFE with all the alternative routes assessed during the EIA process. Recommendations for the least impacting route are provided for consideration during authorisation. The DFFE will issue an environmental authorisation based on the information provided.

A project specific EMPr is drafted for the project which details the specific controls that must be in place for the duration of the construction phase. The Generic DFFE EMPrs for substations and OHPLs will be included in the project specific EMPr.

SURVEY AND LINE DESIGN

Topographical surveys are conducted subsequent to identifying and securing the servitude. This is normally done by means of air-borne laser equipment to develop aerial photos, or physically walked in-field where smaller footprints are considered. The topographical profile and plans are then used by the design engineers to determine the quantity and optimal placement of the structures and conductor spans and design of the structure foundations, structures, buildings, etc. All the above information would be required by the contractor before commencing construction.

NEGOTIATION AND REGISTRATION OF A SERVITUDE

The proposed transmission line will require the registration of a 55 - 60 m wide servitude (27.5m – 30m either side of the centre-line) across all land traversed.

The servitudes do not imply that the holder of the servitude (anticipated to ultimately be Eskom) is the owner of the land but merely that the holder has a right to convey electricity over that land, subject to certain provisions. The registration of a servitude can be a lengthy process, as it requires contractual negotiation with each affected landowner. Once this is complete, an application for registration of the servitude is lodged with the Registrar of Deeds to register the rights. Once the holder of the servitude exercises the option granted by the landowner, construction can commence.

6.4.2 CONSTRUCTION PHASE

CONSTRUCTION SCHEDULE

Construction of the OHPL is anticipated to take between 8 – 24 months.

SITE ESTABLISHMENT AND TRANSPORTATION OF MATERIAL AND EQUIPMENT TO SITE

The selected Contractor will establish a temporary site camp including, but not be limited to, temporary offices, laydown areas for equipment and materials, storage facilities, ablutions, waste storage and handling area, and parking area. The location and extent of the Contractor's camp, to be established within the Project area, will be undertaken in line with specifications detailed within the EMPr. Materials are to be collected on a daily basis from the contractor laydown area for the construction activities along the servitude. This limits areas to be impacted for storage along the servitude as well as for security purposes when activities cease at the end of each day.

Building materials will most likely be sourced from Ermelo. A significant reduction in heavy vehicle trips can be achieved by using mobile batch plants. In addition to this, temporary construction material stockpile yards could be commissioned on vacant land near the proposed site. Delivery of materials to the mobile batch plant and the

stockpile yard could be staggered to minimise traffic disruptions. It is assumed that the batching plants being considered for the greater Camden Renewable Energy Complex will be utilised.

Components are expected to be locally sourced and transported to site using appropriate National and Provincial routes. It is expected that the components will generally be transported to site with normal heavy load vehicles. Mobile plant required for the installation of the OHPL will be determined by the contractor.

VEGETATION CLEARING

Due to the nature of the vegetation within the Project area, which is predominantly sparse, low shrubs and grasses, limited vegetation clearing will be required. Clearing of vegetation will be limited to pylon areas to facilitate installation of each pylon and that required for the substation and associated infrastructure footprints. Clearing will be done in phases along the OHPL route as required prior to installation activities.

INSTALLATION OF OHPL

Standard OHPL installation methods will be employed, which entails the excavations for foundations (**Figure 6.5**), planting of tower (concrete casting may be required) and stringing of the conductors (**Figure 6.6**).

As identified in Section 2.5.3, a number of tower options could be utilised with a maximum height up to 50m above ground level, which are reported to have a life expectancy of more than 25 years. The actual height of the pylons will vary based on the site topography to maintain the specified clearance of the transmission lines.

Once the pylons have been installed, the lines will be strung. The Contractor in collaboration with Eskom will be responsible for functional testing and commissioning of the OHPL. This consists of connecting the line from the common collector substation to the Camden MTS.

Figure 6.5: Construction of structure foundations

Figure 6.6: Stringing of conductors (power lines)

EXPANSION OF CAMDEN MTS SUBSTATION

At least one additional busbar and platform will be constructed adjacent to the existing Camden MTS to allow for the connection of the Camden Renewable Energy Complex. The area to be cleared will be approximately 1ha size. Infrastructure installed at the Camden MTS will be informed by detailed design engineering phase and Eskom requirements, but will comprise of standard substation electrical equipment, i.e., transformers, busbars, office area, operation and control room, workshop, and storage area, including standard substation electrical equipment as may be needed (feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wavetrappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be needed).

The Camden MTS expansion/upgrade works will entail the following activities, or as directed by Eskom:

- Conduct geotechnical investigations to determine founding conditions;
- Conduct site survey;
- Vegetation clearance and construction of access road/s (as needed);
- Site grading and levelling;
- Construction of foundations;
- Transportation of substation equipment, as needed. This may include, but not be limited to standard substation electrical equipment as may be needed: feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders. The exact component layout and specifications will be determined in conjunction with Eskom during detailed engineering design;
- Installation/construction of substation infrastructure detailed above;
- Rehabilitation of disturbed area and protection of erosion sensitive areas; and
- Testing (including quality control) and commissioning (in consultation with the switching specialist).

DEMOBILISATION

Upon completion of the installation phase, any temporary infrastructure will be removed, and the affected areas rehabilitated.

6.4.3 OPERATIONAL PHASE

Once ownership is transferred, Eskom will be responsible for managing the operations of the OHPL and the common collector substation in line with their internal management systems. Eskom is considered to have the requisite expertise to operate and maintain the transmission line. Eskom will adhere to all existing Safety Codes and Guidelines for the operation and maintenance of the OHPL infrastructure.

During the operational phase, there will be little to no Project-related movement along the servitude as the only activities are limited to maintaining the servitude (including maintenance of access roads and cutting back or pruning of vegetation to ensure that vegetation does not affect the OHPL) and maintenance activities are not hampered, inspection of the powerline infrastructure and repairs when required. Inspections are likely to be on an annual basis.

Limited impact is expected during operation since there will not be any intrusive work done outside of maintenance in the event that major damage occurs to site infrastructure. Operation of the OHPL will involve the following activities, discussed below.

SERVITUDE MANAGEMENT AND ACCESS ROAD MAINTENANCE

Servitude and access road maintenance is aimed at eliminating hazards and facilitating continued access to the OHPL. The objective is to prevent all forms of potential interruption of power supply due to overly tall vegetation/climbing plants or establishment of illegal structures within the right servitude. It is also to facilitate ease of access for maintenance activities on the transmission line. During the operational phase of the project, the servitude will be maintained to ensure that the OHPL functions optimally and does not compromise the safety of persons within the vicinity of the line and to ensure maintenance activities are not hampered.

TRANSMISSION LINE MAINTENANCE AND OPERATIONS

Eskom will develop comprehensive planned and emergency programmes through its technical operations during the operation and maintenance phase for the OHPL. The maintenance activities will include:

- Eskom's Maintenance Team will carry out periodic physical examination of the OHPL and its safety, security and integrity.
- Defects that are identified will be reported for repair. Such defects may include defective conductors, flashed over insulators, defective dampers, vandalised components, amongst others.
- Maintenance / repairs will then be undertaken.

6.4.4 DECOMISSIONING PHASE

Decommissioning will be considered when the OHPL is regarded obsolete and will be subject to a separate authorisation and impact assessment process. This is not expected to occur in the near future.

6.5 IDENTIFICATION OF ALTERNATIVES

The EIA Regulations of 2014 (as amended) require that the S&EIA process must identify and describe alternatives to the proposed activity that were considered, or motivation for not considering alternatives. Different types or categories of alternatives could be considered including different locations, technology types, and project layouts.

At the scoping level the evaluation of alternatives is provided at a high level in the absence of detailed environmental comparators for each alternatives; due to the two-staged nature of the S& EIA process it is more suitable to identify and describe the potential alternatives on a high level basis within scoping, and to perform a more detailed analysis of alternatives (with environmental comparators) in the EIA phase of the project. As such, the S&EIA will holistically assess the impacts and risks of each alternative in a comparative way, as suggested by Appendix 2 of the EIA Regulations of 2014 (as amended).

All alternatives outlined below are considered both feasible and reasonable with no apparent advantages or disadvantages at this stage of the project. All alternatives have been described and assessed by specialist and are be discussed in detailed in this report.

6.5.1 SUBSTATION ALTERNATIVES

Two substation alternatives have been identified for investigation. The two alternatives are illustrated on **Figure 6.7**. **Table 6.5** outlines the corner co-ordinates of the substation alternative sites.

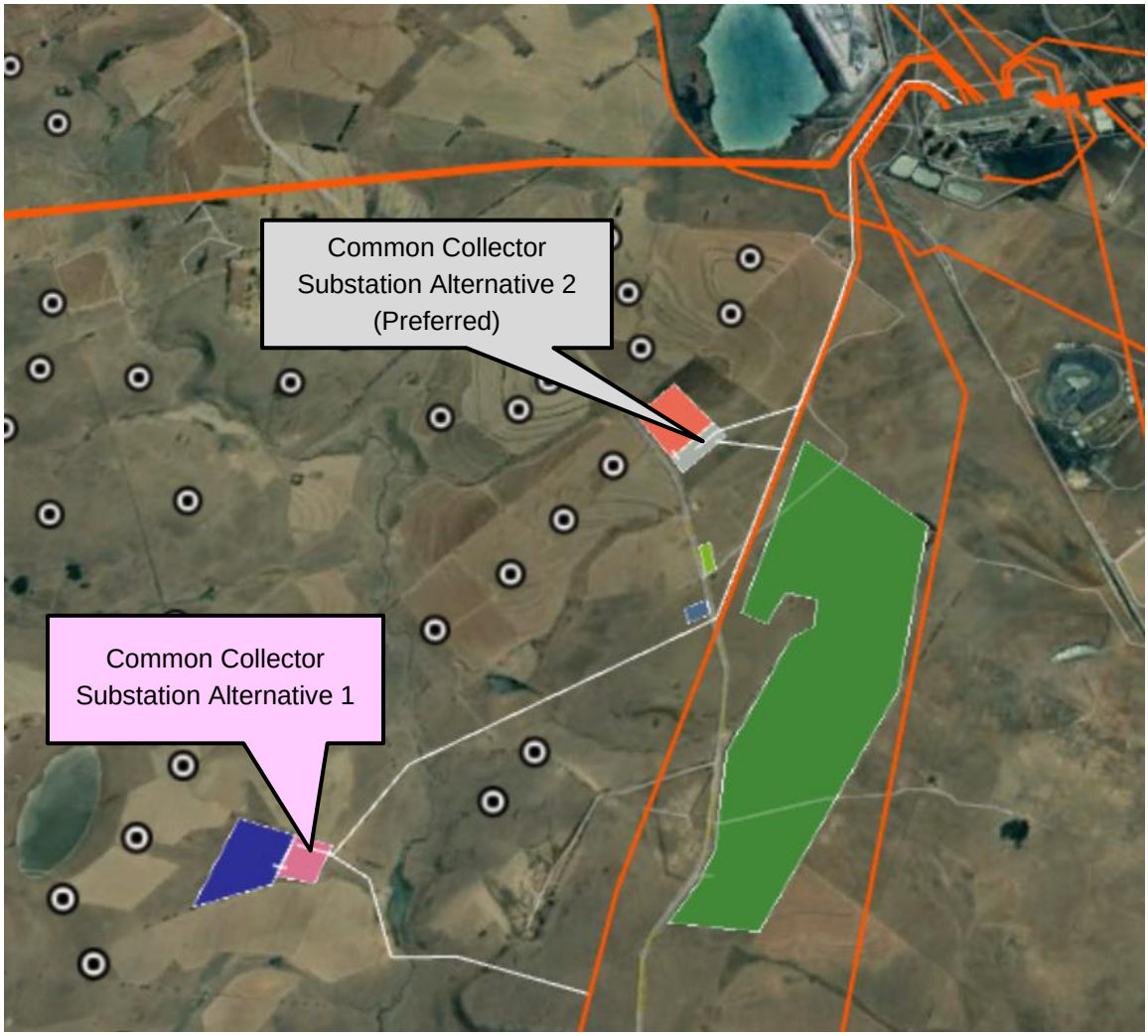


Figure 6.7: Common Collector Substation Alternatives

Table 6.5: Substation Alternative co-ordinates

POINT	LATITUDE	LONGITUDE
Alternative 1		

POINT	LATITUDE	LONGITUDE
		
A1-1	26°40'27.62"S	30° 2'23.58"E
A1-2	26°40'29.07"S	30° 2'29.61"E
A1-3	26°40'36.80"S	30° 2'26.08"E
A1-4	26°40'39.63"S	30° 2'19.71"E
Alternative 2 (Preferred)		

POINT	LATITUDE	LONGITUDE
		
A2-1	26°38'44.08"S	30° 4'10.50"E
A2-2	26°38'47.63"S	30° 4'14.25"E
A2-3	26°38'57.67"S	30° 4'3.08"E
A2-4	26°38'54.03"S	30° 3'59.66"E
Camden MTS Expansion		
		
MTS1	26°37'2.19"S	30° 5'8.98"E
MTS2	26°36'58.19"S	30° 5'32.14"E

POINT	LATITUDE	LONGITUDE
MTS3	26°37'2.91"S	30° 5'30.75"E
MTS4	26°37'7.08"S	30° 5'9.88"E

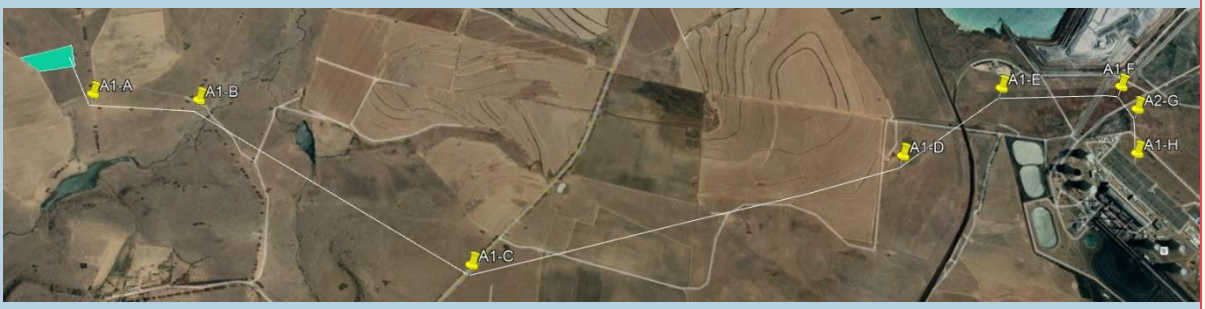
6.5.2 ALIGNMENT ALTERNATIVES

Four alignment alternatives have been identified. A 500m assessment corridor (250m either side of centre line) was investigated for each alternative. These include the following:

- Typical OHPL routes (direct connection) from the common collector substation to the Camden MTS:
  - Alternative 1
  - Alternative 2 (Preferred)
- LILO Alternatives from the common substation alternatives to the existing Eskom OHPL:
  - LILO Alternative 1
  - LILO Alternative 2-(Preferred)

The co-ordinates for the bend points of each of the above alternatives are included in **Table 6.6. It must be noted that the Applicant seeks authorisation for the full assessment corridor (250m either side of centre line) to enable micro-siting post final design.**

Table 6.6: Powerline Co-ordinates (Centre line)

POINT	LATITUDE	LONGITUDE
400kV Powerline Alignment Alternative 1		
		
Length (km)	Approximately 9km	
A1-A	26°40'29.80"S	30° 2'41.33"E
A1-B	26°40'8.97"S	30° 2'57.54"E
A1-C	26°39'31.77"S	30° 4'13.02"E
A1-D	26°37'53.90"S	30° 4'45.82"E
A1-E	26°37'24.41"S	30° 4'43.72"E
A1-F	26°36'59.67"S	30° 4'59.51"E

POINT	LATITUDE	LONGITUDE
A1-G	26°36'58.98"S	30° 5'6.73"E
A1-H	26°37'5.84"S	30° 5'16.50"E
400kV Powerline Alignment Alternative 2 (Preferred)		
		
Length (km)	Approximately 4.5km	
A2-A	26°38'43.11"S	30° 4'10.20"E
A2-B	26°38'35.81"S	30° 4'32.43"E
A2-C	26°37'53.90"S	30° 4'45.82"E
A2-D	26°37'24.41"S	30° 4'43.72"E
A2-E	26°36'59.67"S	30° 4'59.51"E
A2-F	26°36'58.98"S	30° 5'6.73"E
A2-G	26°37'5.84"S	30° 5'16.50"E
LILO Grid Alternative 1		

POINT	LATITUDE	LONGITUDE
		
Length (km)	Approximately 2.5km	
LILO-1-A	26°40'29.91"S	30° 2'40.50"E
LILO-1-B	26°40'35.38"S	30° 2'51.08"E
LILO-1-C	26°40'52.12"S	30° 2'58.92"E
LILO-1-D	26°40'50.86"S	30° 3'15.08"E
LILO-1-E	26°40'57.98"S	30° 3'47.59"E
LILO Grid Alternative 2		
		
Length (km)	Approximately 0.5km	
LILO-2-A	26°38'46.28"S	30° 4'9.82"E

POINT	LATITUDE	LONGITUDE
LILO-2-B	26°38'47.93"S	30° 4'29.21"E

6.5.3 ADVANTAGES AND DISADVANTAGES

Table 6.7: Advantages and disadvantages of alternatives proposed

ADVANTAGES	DISADVANTAGES
Substation Site Alternative 1	
— This option represents a shorter connecting line	— Almost entirely within a natural habitat area and will result in habitat fragmentation. — This option represents a longer connecting line from it (both direct and LILO), as well as needing to cross water features (one in the LILO alternative) and 2 in the direct alternative. — It is more costly and incurs more disturbance.
Substation Site Alternative 2-Preferred	
— Does not affect any natural habitat as it is entirely within a cultivated land — Will result in no plant species of conservation concern being affected — Preferred from a social perspective — Alternative 2 site is on dolerite so no fossils would be expected to occur above or below ground, so this would be the preferred site a far as the palaeontology is concerned	— This option is nearer to the access road. This will result in more dust settling on the electronic components therefore more maintenance would be required.
400kV Powerline Alignment Alternative 1	
-	— Longest alternative at approximately 9km — Crosses the most amount of natural habitat and two fresh water features
400kV Powerline Alignment Alternative 2- Preferred	
— Shortest alternative traversing fewer properties, approximately 4.5km — Crosses the least amount of natural habitat, and will result in no plant species of conservation concern being affected —	-
LILO Grid Alternative 1	

— Shortest route through agricultural land — Uses existing infrastructure in the Eskom line — Allows for potential future expansion of grid connection by having added capacity in the province should anyone be able to use it — Closer to the road and so less access-road length	
LILO Grid Alternative 2-- Preferred	
	— Crosses a water course — Longest alternative at approximately 2.5km

6.5.4 TOWER ALTERNATIVES

Direct current (DC) power generated at the Camden Renewable Energy Complex will be converted into Alternating current (AC) power in inverters (or vice versa), and the voltage will be stepped up to a medium voltage in the inverter transformers. The medium voltage cables within the Camden Renewable Energy Complex will be run underground (except where a technical assessment suggest that overhead lines are applicable) to a common point before being fed to the facilities' 132kV onsite substations. The power will then be fed from the individual facilities (i.e. 2 x wind energy facilities and 1 x solar energy facility) via three distinct 132kV OHPLs to the common substation where the voltage will once again be stepped up to 400 kV (step-up may also occur withinthe Camden MTS depending on Eskom grid connection requirements). Thereafter the up to 400kV or up to 132kV OHPL will connect the Camden Renewable Energy Complex to the National Grid at the Camden MTS.

The following up to 400 kV structure alternatives are available for the project. It must be noted these are for illustration purposes only and will be subject to detail design prior to selection and determination of the exact specifications. These have been considered during the EIA phase and during the design phase:

- Up to 400kV Structures
  - Guyed "V" single circuit structure (**Figure 6.8**);
  - Self-supporting strain structure (usually utilised at a bend) (**Figure 6.9**);
  - Self-supporting single circuit structure (**Figure 6.10**);
  - Self-supporting double circuit structure; and
  - Cross rope suspension structure (**Figure 6.11**);
- Up to 132kV Structures:
  - Intermediate self-supporting monopole (single or double circuit) (**Figure 6.12**);
  - Inline or angle-strain self-supporting monopole (single or double circuit) **(Figure 6.13**);
  - Suspension self-supporting monopole (single or double circuit) (**Figure 6.14)**
  - Triple pole structure; and
  - Steel lattice structure (single or double circuit) (**Figure 6.15**).

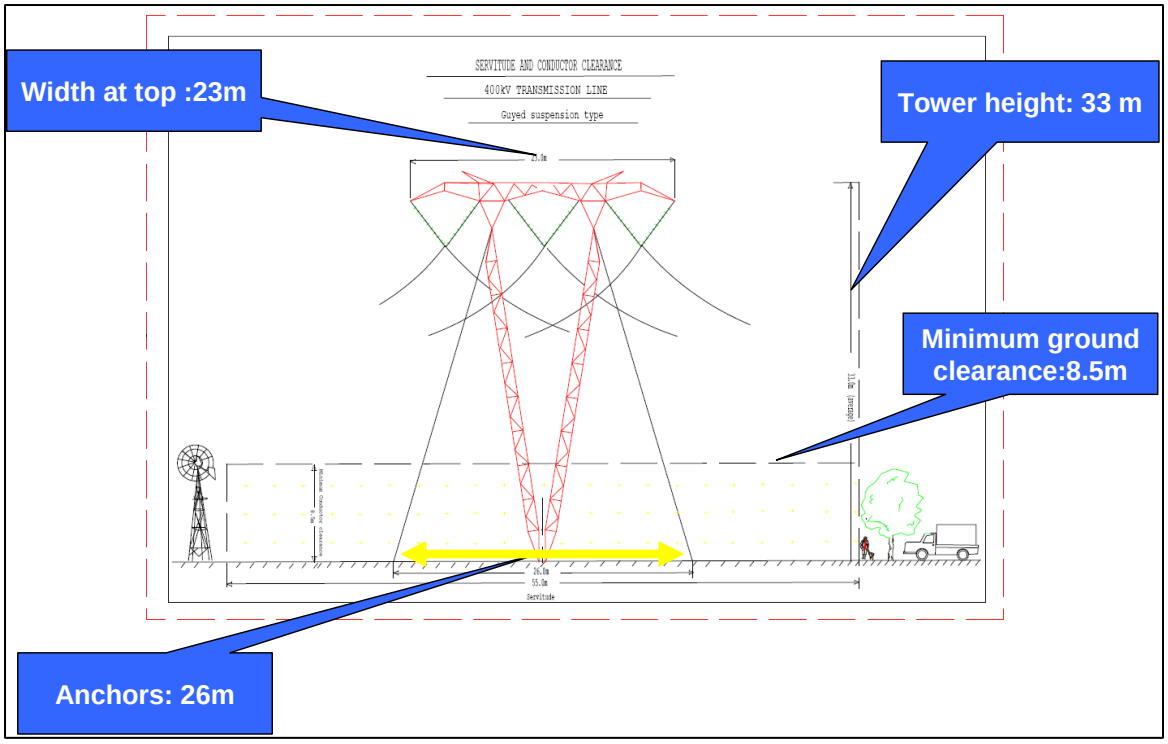


Figure 6.8: Guyed "V" Single Circuit Structure (illustrative only, subject to detailed design)

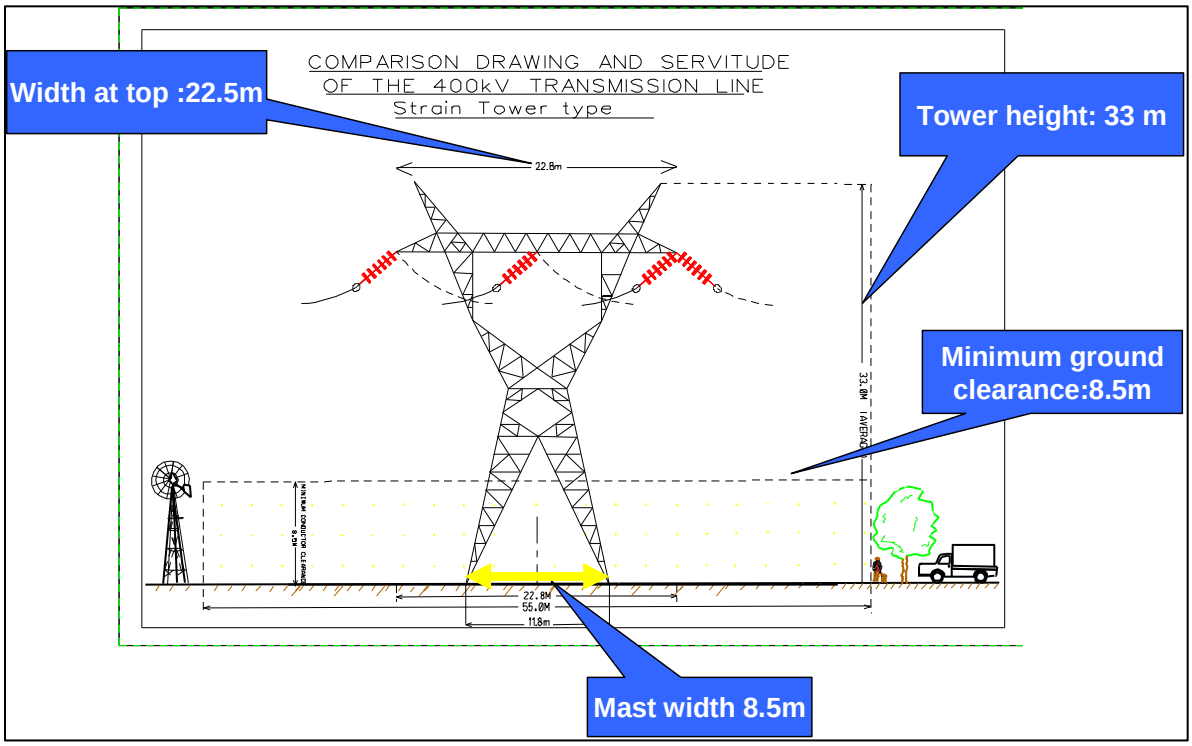


Figure 6.9: Self-supporting Strain Structure (illustrative only, subject to detailed design)

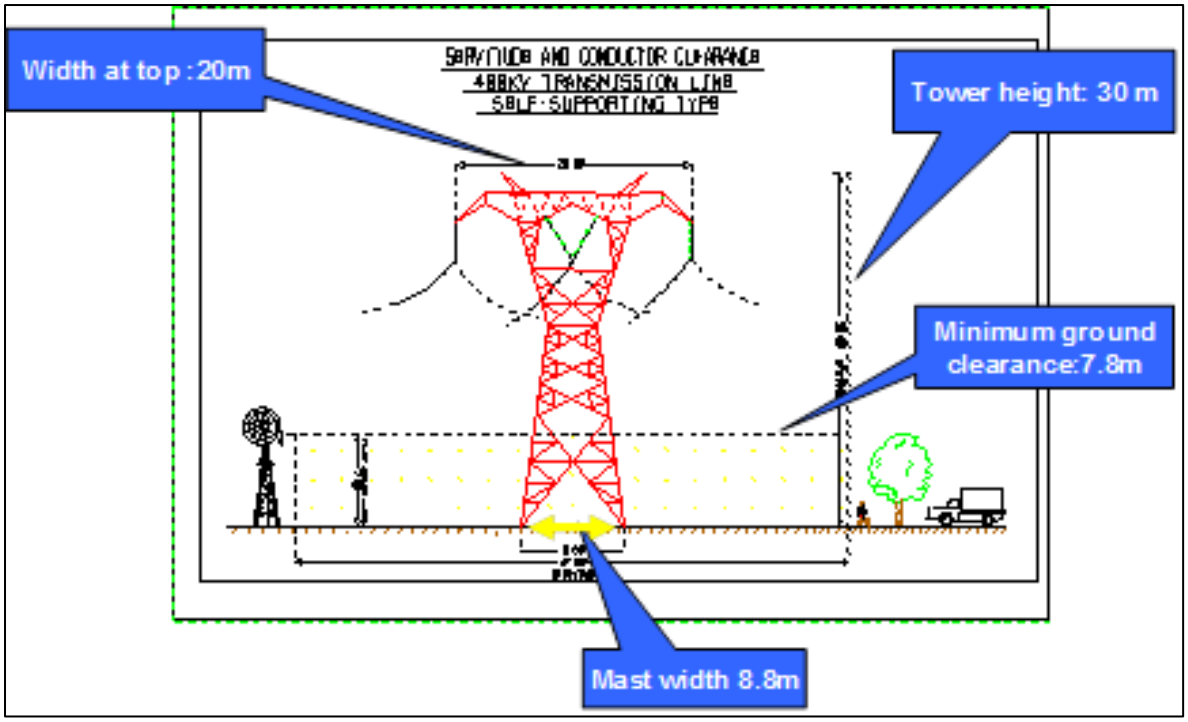


Figure 6.10: Self-supporting Single Circuit Structure (illustrative only, subject to detailed design)

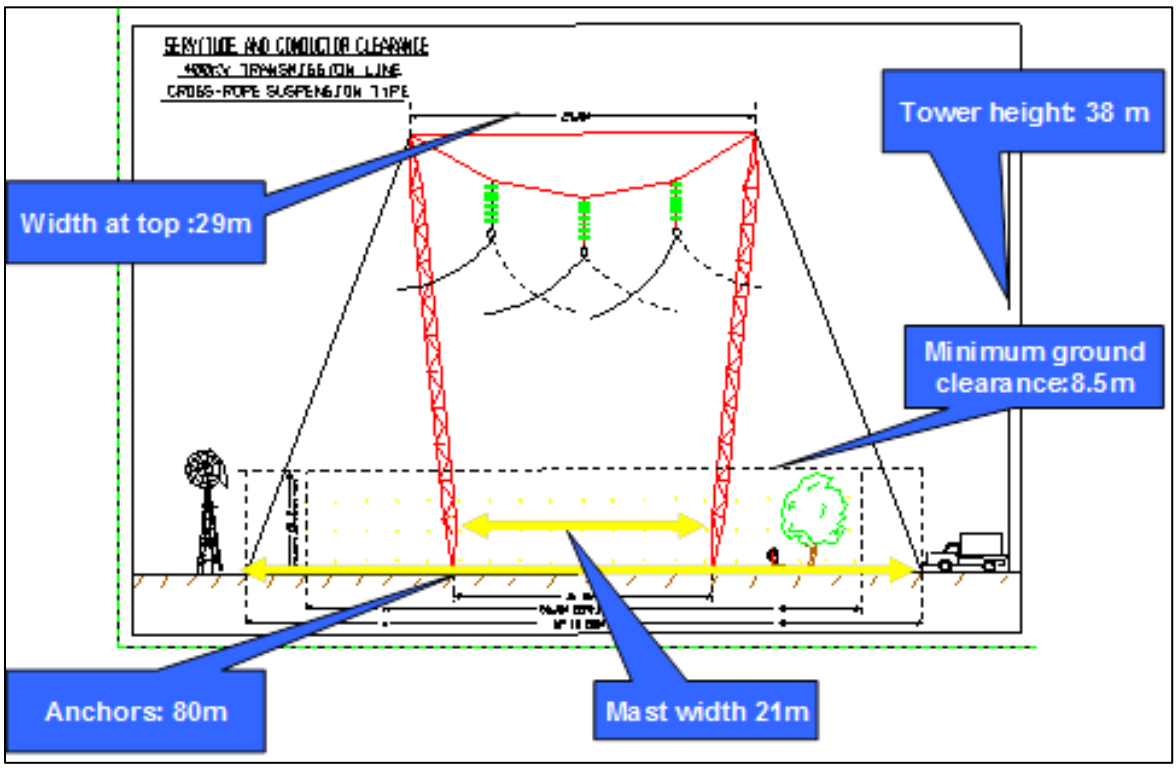


Figure 6.11: Cross Rope Suspension Structure (illustrative only, subject to detailed design)

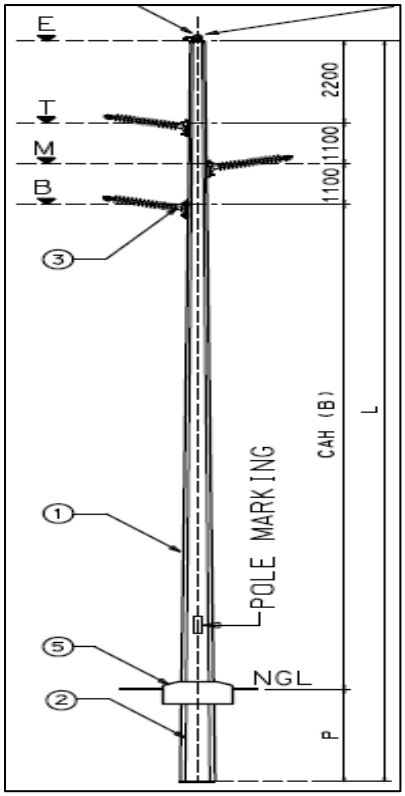


Figure 6.12: Intermediate self-supporting monopole (single circuit) (illustrative only, subject to detailed design)

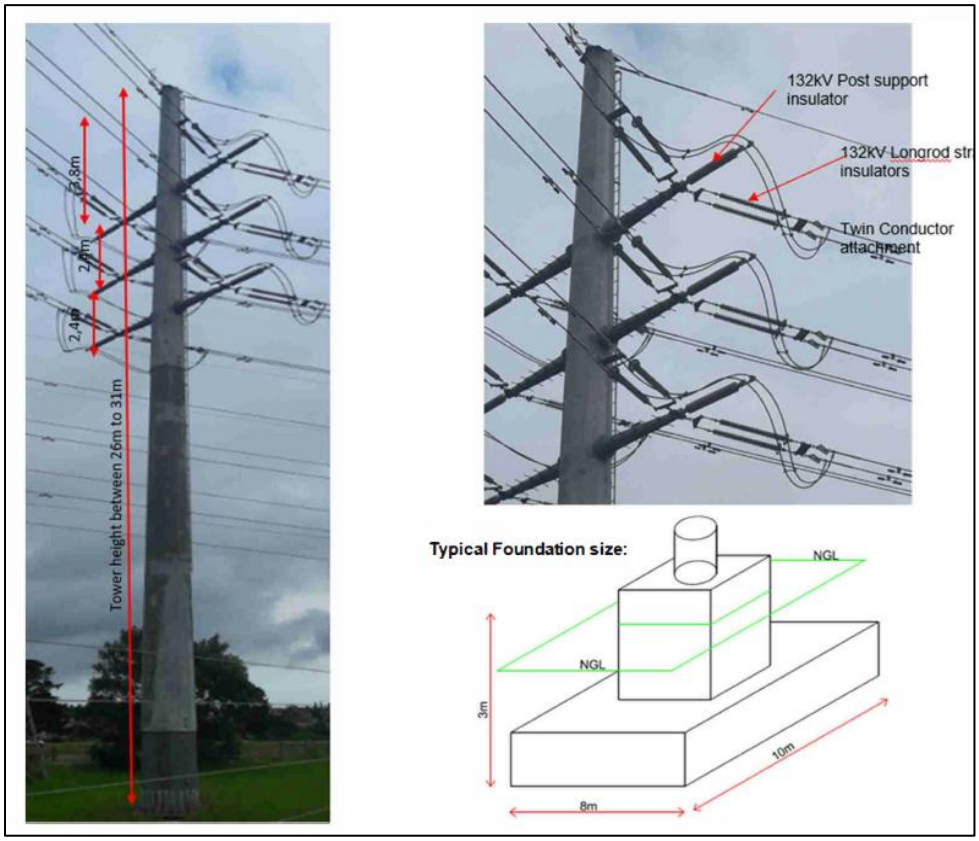


Figure 6.13: Inline or angle-strain self-supporting monopole (double circuit) (illustrative only, subject to detailed design)

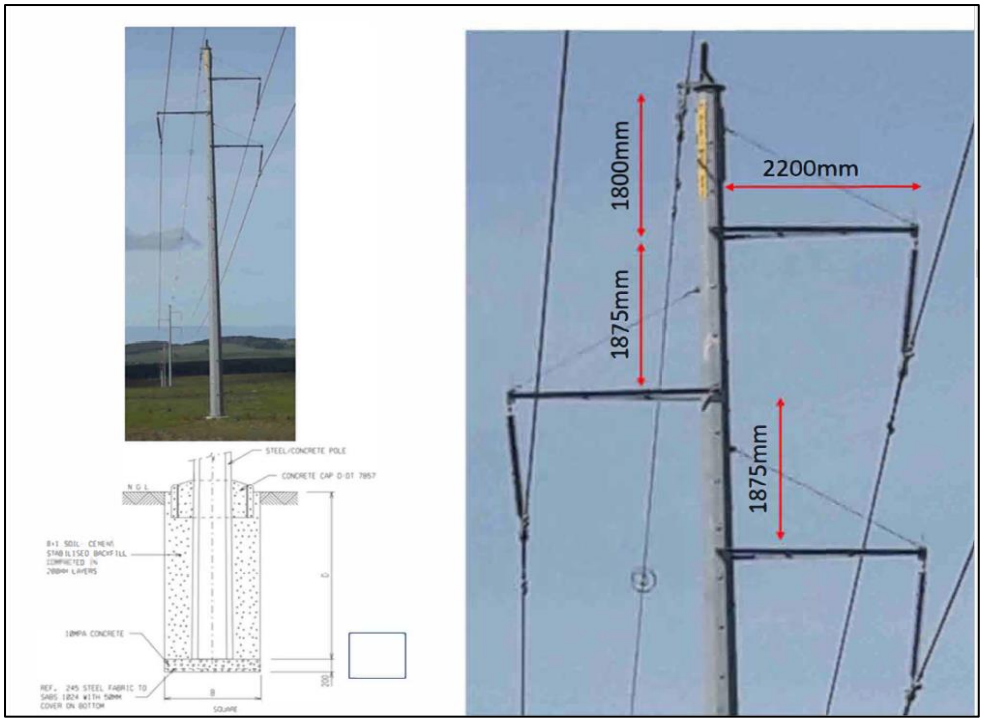


Figure 6.14: Suspension self-supporting monopole (single circuit) (illustrative only, subject to detailed design)

Figure 6.15: Steel lattice structure (double circuit) (illustrative only, subject to detailed design)

6.5.5 'NO PROJECT' ALTERNATIVE

It is noted that the scope of this application includes the establishment of an up to 400kV transmission line, associated collector substation and Camden MTS upgrade/expansion as needed, for the integration of the power generated at the proposed Camden Renewable Energy Complex to the National Grid. The proposed transmission line is essential supporting infrastructure to the Camden Renewable Energy Complex, which, once developed, will generate power from renewable energy resources.

South Africa currently relies almost completely on fossil fuels as a primary energy source (approximately 90%) with coal providing 75% of the fossil fuel-based energy supply. Coal combustion in South Africa is the main contributor to carbon dioxide emissions, which is the main greenhouse gas that has been linked to climate change.

An emphasis has therefore been placed on securing South Africa's future power supply through the diversification of power generation sources. Furthermore, South Africa would have to invest in a power generation mix, and not solely rely on coal-fired power generation, to honour its commitment made under the Copenhagen Accord and to mitigate climate change challenges.

With an increasing demand in energy predicted and growing environmental concerns about fossil fuel-based energy systems, the development of large-scale renewable energy supply schemes is strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports in the country.

Without the implementation of this project, the use of renewable options for power supply will be compromised in the future. This has potentially significant negative impacts on environmental and social well-being.

The no-go option is a feasible option; however, this would prevent the proponent from contributing to the significant environmental, social and economic benefits associated with the development of the renewables sector (see need and justification of the proposed project in **Section 5**). Conversely, negative environmental impacts of the project (as outlined in **Section 8** associated with the development of the Camden Renewable Energy Complex and the OHPL would be avoided.

7 DESCRIPTION OF THE BASELINE ENVIRONMENT

7.1 PHYSICAL ENVIRONMENT

7.1.1 CLIMATE AND METEOROLOGY

LOCAL METEOROLOGY OVERVIEW

According to the Köppen-Geiger Classification, the Camden area is defined as having a temperate climate with warm summers and dry winters27. Meteorological variables for the region were sourced from the South African Weather Service's (SAWS) Ermelo station, located ~20 km to the northwest, as well as Eskom's ambient air quality monitoring station (AQMS)28 located ~6 km to the northeast (**Figure 7.1**). The datasets were analysed for the period January 2018 - December 2020 (i.e. three calendar years as required by the Modelling Regulations). Station details and data recovery for both stations are presented in **Table 7.1**. Although the Ermelo station is at distance from the study site, the local topography is not complex and thus the meteorological data is considered representative of regional weather conditions that would prevail at the proposed development sites.

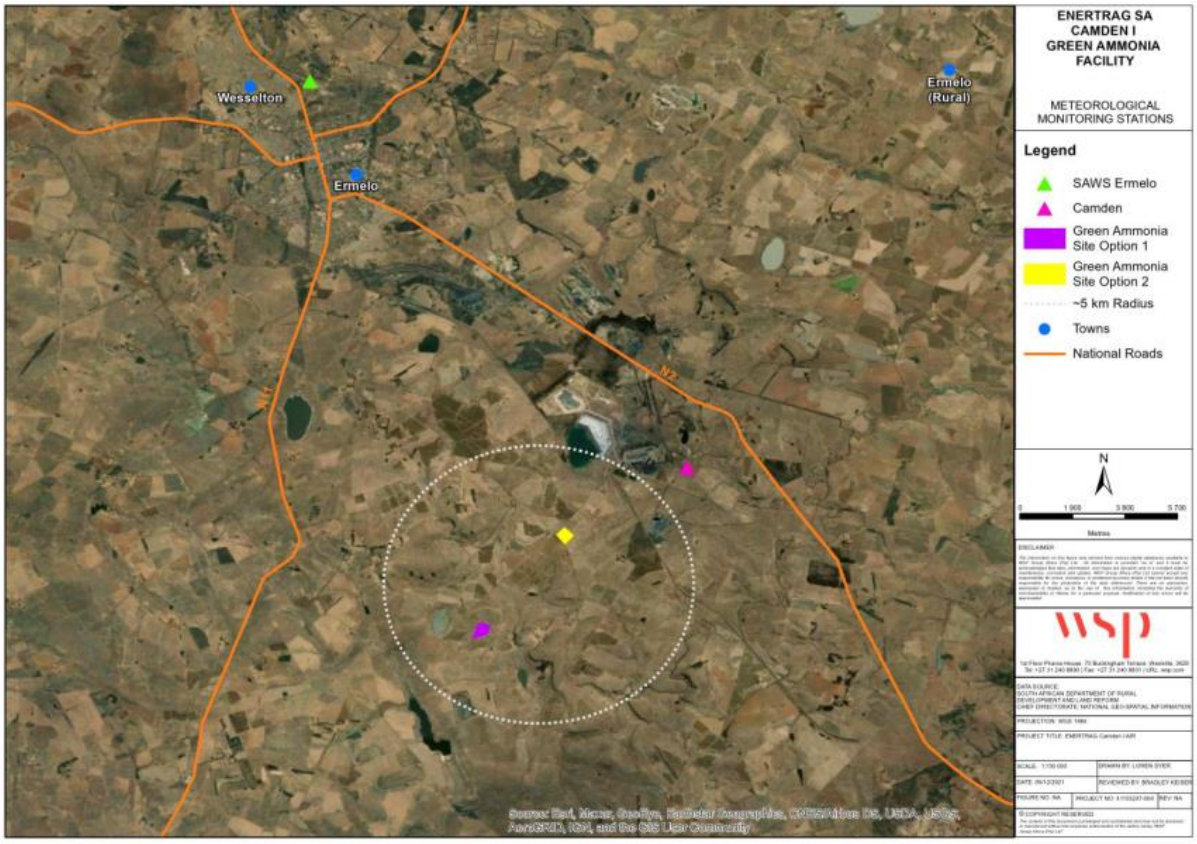


Figure 7.1: Meteorological station proximity to the study site

Table 7.1: Meteorological station details and data recovery

STATION NAME	LATITUDE (^{O}S)	LONGITUDE (^{O}E)	ALTITUDE (M)	DATA RECOVERY		
				Temperature	Rainfall	Wind
Ermelo	-26.497000°	29.983000°	1752	97%	98%	98%
Camden	-26.622600°	30.106000°	1646	97%	97%	96%

TEMPERATURE HUMIDITY AND RAINFALL

Ambient air temperature influences plume buoyancy as the higher the plume temperature is above the ambient air temperature, the higher the plume will rise. Further, the rate of change of atmospheric temperature with height influences vertical stability (i.e. formation of mixing or inversion layers). Rainfall is an effective removal mechanism of atmospheric pollutants and thus also relevant in the assessment of pollution potential.

Figure 7.2 (Ermelo) and **Figure 7.3** (Camden) presents the average monthly temperature range, humidity and rainfall for the assessed stations. Seasonal averages for each station are provided in **Table 7.2.**

Both stations exhibit seasonal trends typical for the eastern portion of South Africa (i.e. higher rainfall occurs during the warmer summer months, with drier conditions during the cooler winter months).

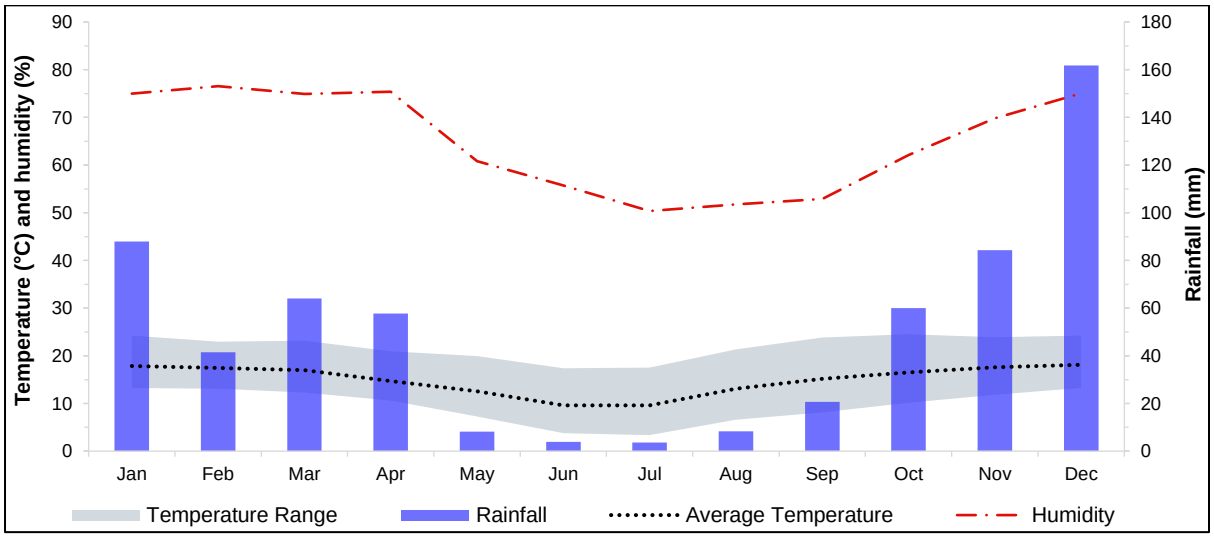


Figure 7.2: Meteorological summary for Ermelo (January 2018 - December 2020)

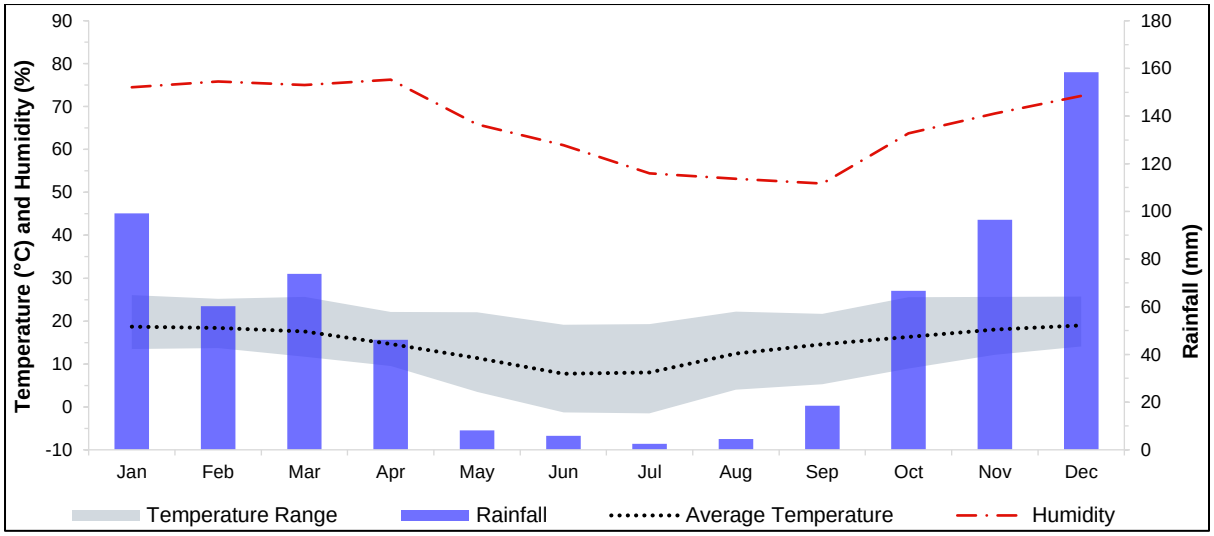


Figure 7.3: Meteorological summary for Camden (January 2018 - December 2020)

Table 7.2: Seasonal average meteorology

	SUMMER AVERAGE (DECEMBER, JANUARY AND FEBRUARY)		WINDER AVERAGE (JUNE, JULY AND AUGUST)		ANNUAL AVERAGE RAINFALL
STATION NAME	Temperature	Humidity	Temperature	Humidity	
Ermelo	17.8 ºC	76%	10.8 ºC	53%	602 mm
Camden	18.7 ºC	74%	9.4 ºC	56%	641 mm

WIND

Wind rose summarize wind speed and directional frequency at a location. Each directional branch on a wind rose represents wind originating from that direction. Each directional branch is divided into segments of colour, representative of different wind speeds. Calm conditions are defined by the Beaufort Wind Force Scale29 as wind speeds less than 0.5 m/s. However, calm conditions for this study are defined as wind speeds less than 1 m/s in line with the anemometer sensitivity for SAWS stations.

Wind roses for Ermelo are presented in **Figure 7.4.** Wind roses for Camden are presented in **Figure 7.5**

Typical wind fields were analysed using Lakes Environmental WRPlot Freeware (Version 7.0.0) for the full period (January 2018 – December 2020); diurnally for early morning (00h00 – 06h00), morning (06h00 – 12h00), afternoon (12h00 – 18h00) and night (18h00 – 00h00); and seasonally for summer (December, January and February), autumn (March, April and May), winter (June, July and August) and spring (September, October and November) and summarised as follows:

ERMELO

- Calm conditions (wind speeds <1.0 m/s) occurred 1.40% of the time.
- Gentle to strong breezes from the east prevailed in the region.
- Peak wind speeds occurred from the north-northwest (14.4 m/s) and highest average wind speeds occurred from the east-southeast (5.0 m/s).
- Easterly winds prevail throughout the day and night with northerly components noted during the early morning (00h00-06h00) and morning (06h00-12h00) hours as well as westerly components noted during the morning (06h00-12h00) and afternoon (12h00-18h00) hours.
- Diurnal peak (12.4 m/s) and highest average (4.8 m/s) wind speeds occurred during the afternoon.

- Winds from the east prevailed during the summer and autumn months.
- Winds from the west and north prevailed during winter.
- Winds from the east and north prevailed during spring.
- Seasonal peak (12.9 m/s) wind speeds occur during winter and highest average (4.9 m/s) wind speeds occur during spring.

CAMDEN

- Calm conditions (wind speeds <1 m/s) occurred 14.13% of the time.
- Gentle to strong breezes from the east prevailed in the region.
- Peak (13.8 m/s) and highest average (5.5 m/s) wind speeds occurred from the west.
- Easterly winds prevail throughout the day and night with north-westerly components noted during the early morning (00h00-06h00), morning (06h00-12h00) and night-time (18h00-00h00) hours, as well as westerly components noted during the afternoon (12h00-18h00).
- Diurnal peak (13.3 m/s) and highest average (5.0 m/s) wind speeds occurred during the afternoon.
- Winds from the east prevailed during the spring and autumn months.
- Winds from the northwest, west-northwest, west and east prevailed during winter.
- Winds from the east and northwest prevailed during spring.
- Seasonal peak (13.3 m/s) wind speeds occur during winter and highest average (4.0 m/s) wind speeds occur during spring.

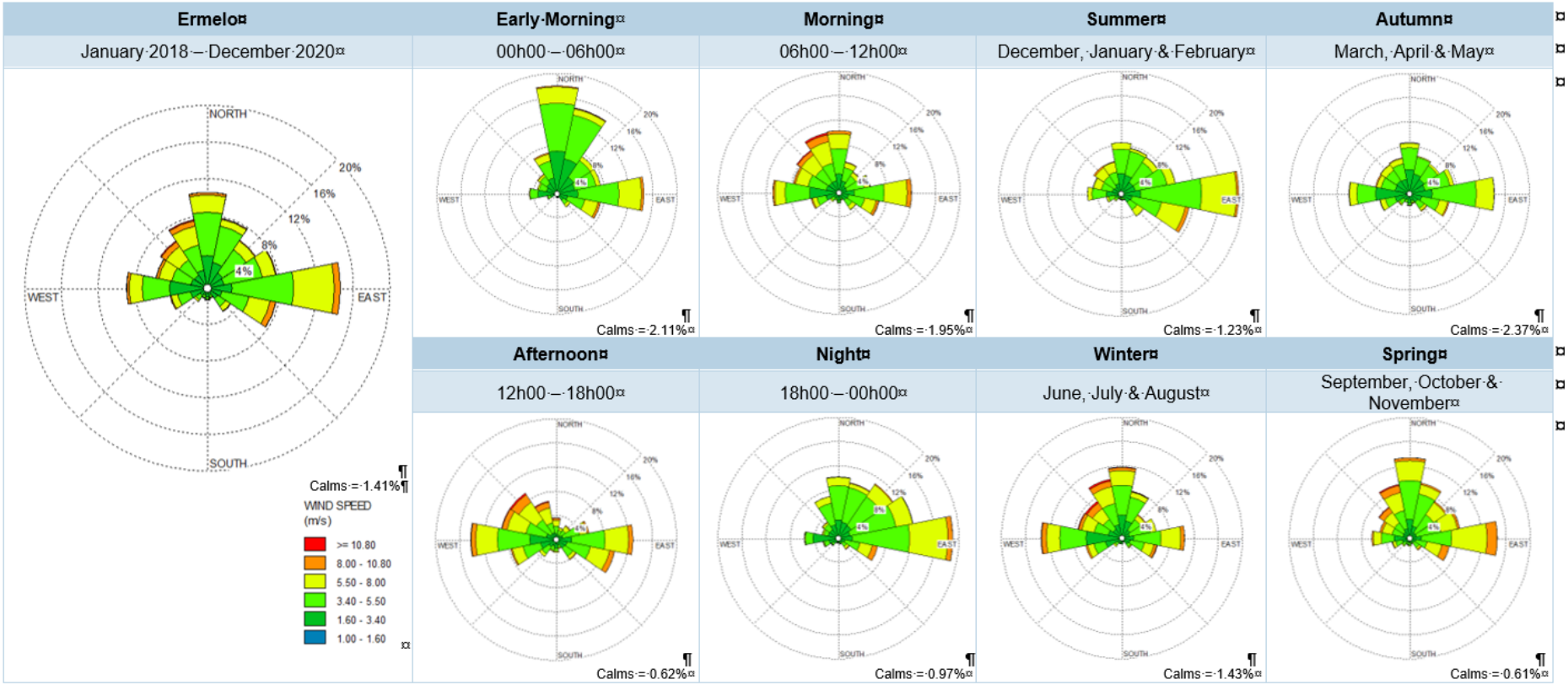


Figure 7.4: Local Wind Conditions at Ermelo

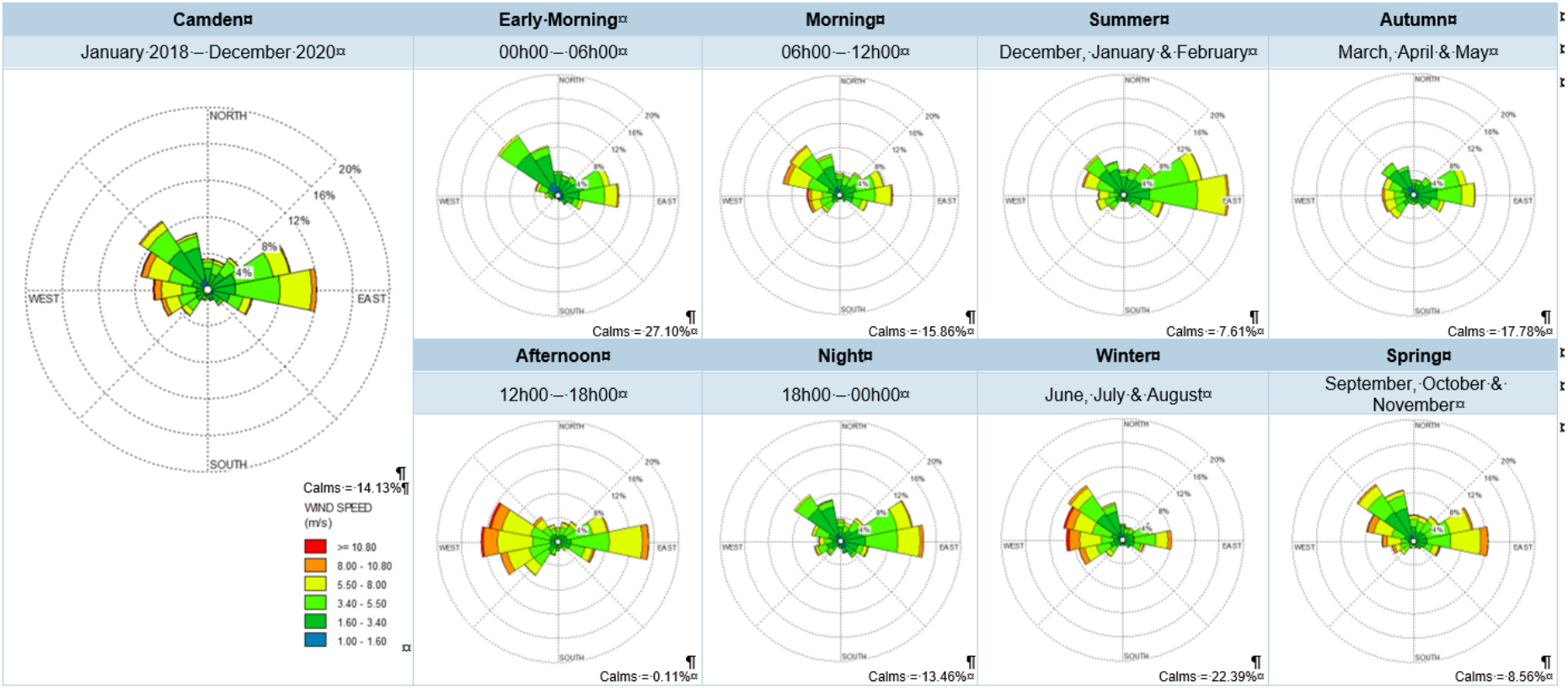


Figure 7.5: Local Wind Conditions at Camden

7.1.2 TOPOGRAPHY

The Project area is largely characterised by a mix of undulating plains and greater relief in the form of higher lying plateaus intersected by river valleys. Slopes across the study area are relatively gentle to moderate, with steeper slopes being largely associated with the more incised river valleys. The main water course in the broader study area is the Vaal River in the south-eastern portion of the study area. Gently undulating terrain prevails across much of the Project development site.

The study area undulates over a wide elevation range from a minimum of around 1 620m above mean sea level (amsl) within the west to a maximum of approximately 1 735m amsl in the north, with an overall topographic fall from north to south. The eastern portion of the area lies on a ridge that largely topographically separates the site from Camden Power Station to the northeast.

The topography and slopes within and in the immediate vicinity of the project area are indicated in **Figure 7.6** and **Figure 7.7** respectively.

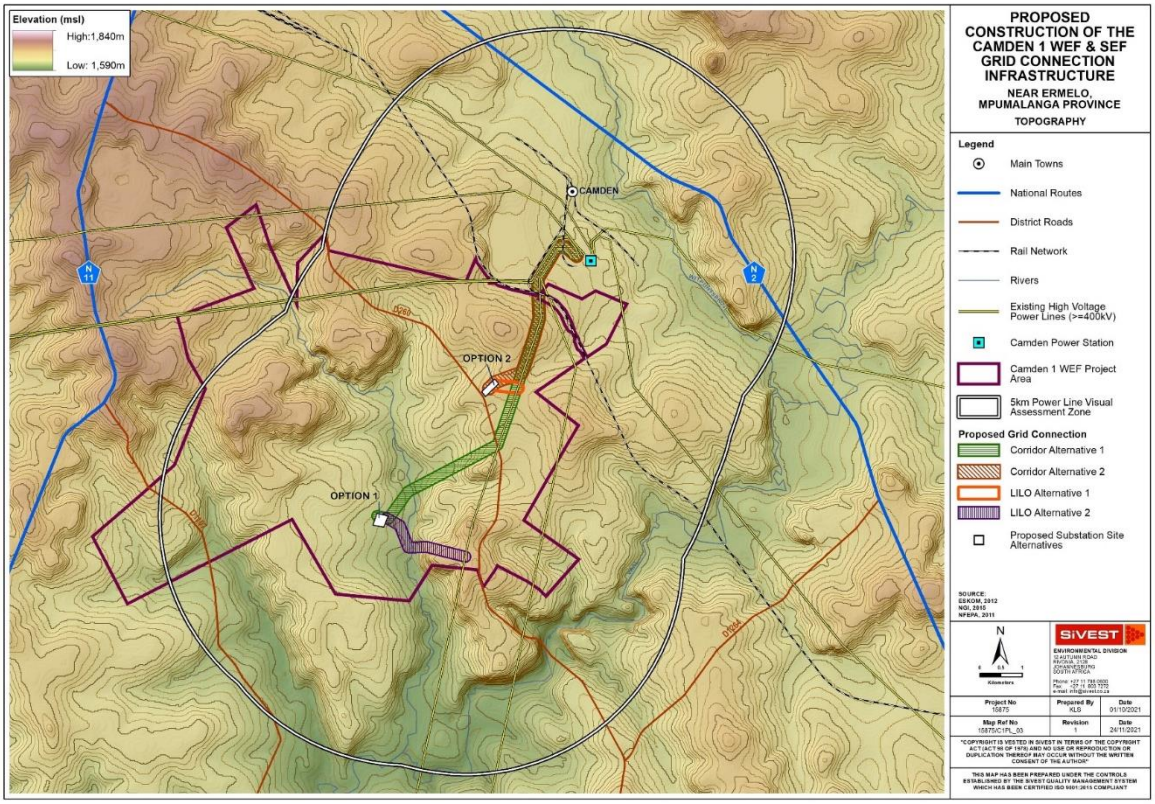


Figure 7.6: Topographical Map of Project Area (SiVest, 2021)

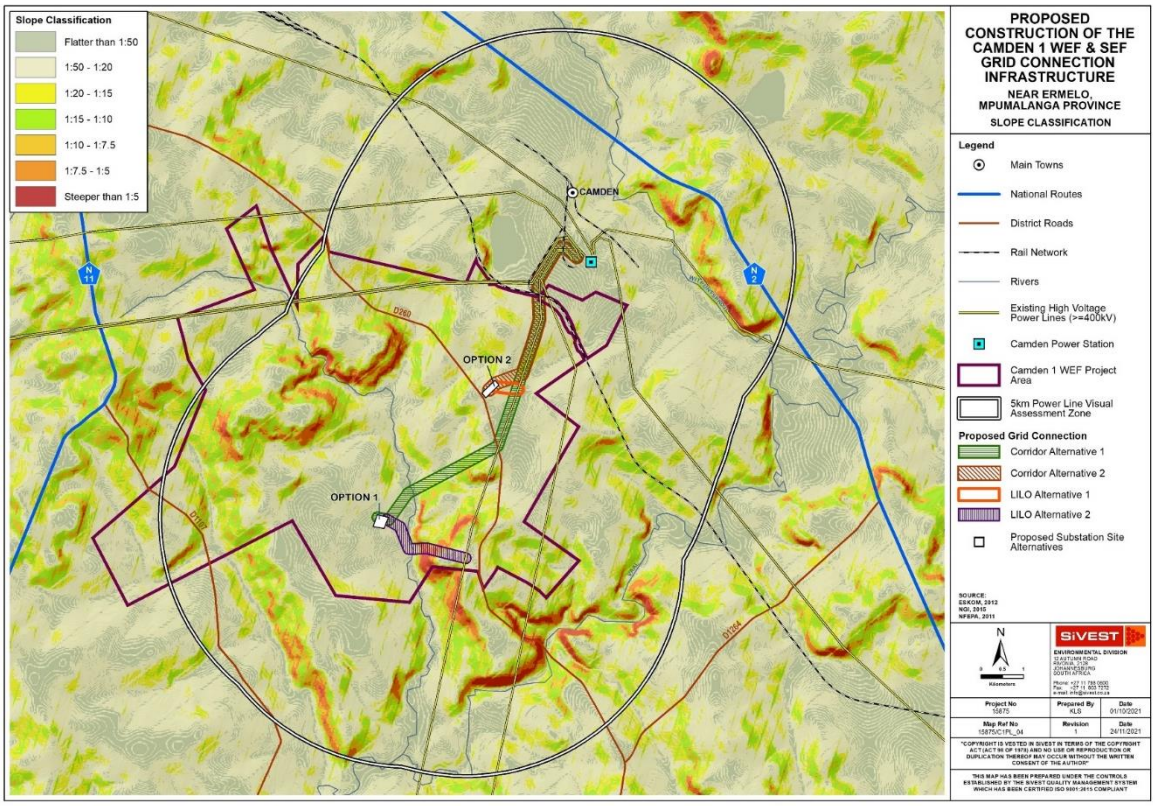


Figure 7.7: Slope classification of Project Area (SiVest, 2021)

7.1.3 GEOLOGY

A desktop review of the geology indicates the site is underlain predominantly by the Vryheid Formation of the Ecca Group (1:250 000, 2630). The Vryheid Formation consists of sandstone, shale, siltstone and coal seam that underlie the project area. The Vryheid Formation is intruded by late Triassic to Middle Jurassic Karoo dolerite dykes and sills which influence the regional hydrogeology.

The abovementioned rock types may be closely intercalated, resulting in highly variable geotechnical conditions, both vertically and horizontally. It is not unusual for a weak lens of mudrock to occur within a competent layer of sandstone, or for a band of rock to disappear horizontally over a short distance. The occurrence of weaker strata within or below competent rock strata may be problematic for the founding of heavy structures. The assumption that the founding conditions will improve with depth does not necessarily apply in the case of the Vryheid Formation.

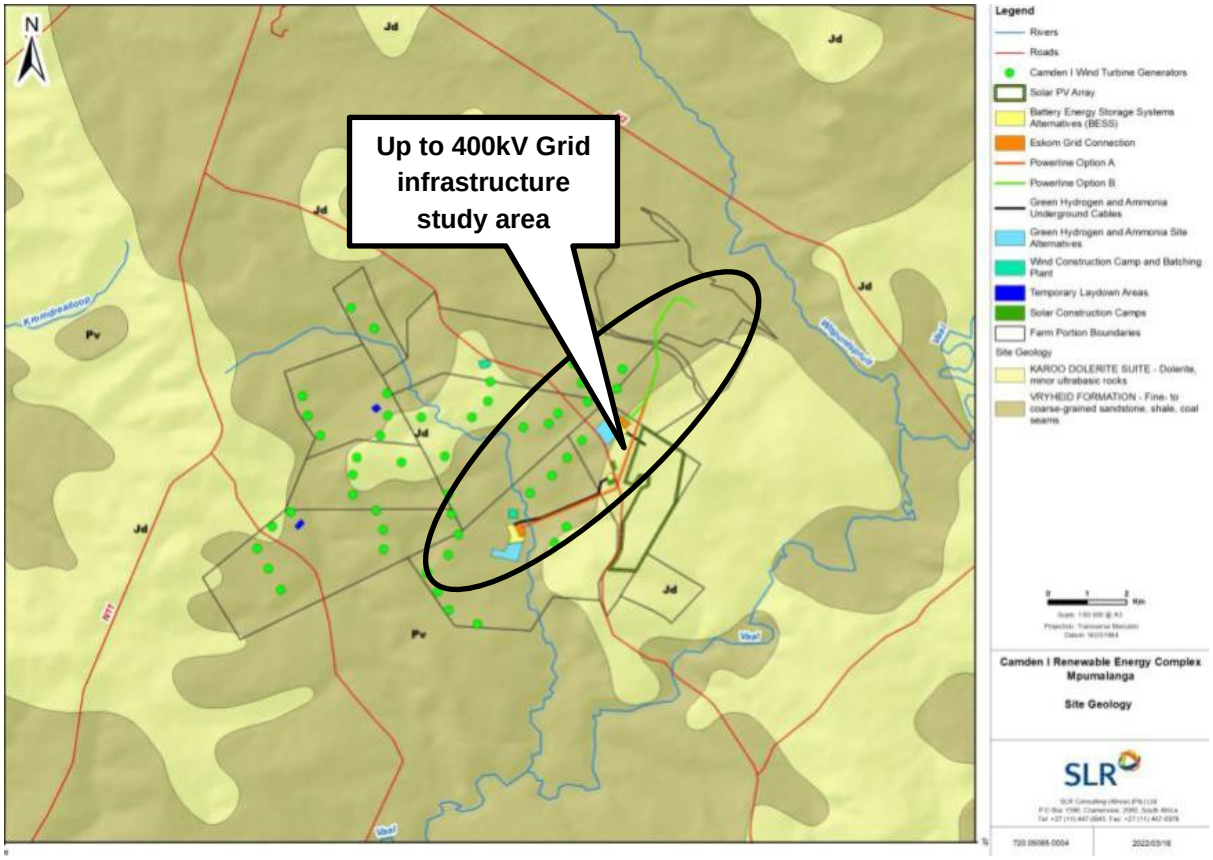


Figure 7.8: Geological Map of the Proposed Development Area

In respect of sourcing construction materials for roads and laydown areas consideration could be given to natural gravely or crushed sandstone bedrock. Selective usage must be exercised to avoid using sandstone containing excessive pyrite and muscovite, which can cause distress when used as basecourse (Brink, 1983). In addition, where chemical stabilization is required the clay matrix of sandstones make them suitable for stabilization with lime (Brink, 1983). The occurrence, nature, material quality and quantity of sandstone and other potential construction materials will have to be assessed during the detailed geotechnical investigation. It is recommended that provision be made to procure aggregates for use in upper pavement layer works construction and the manufacture of concrete from commercial sources.

Sandstones comprise a larger portion of the Karoo sediments and are generally closely intercalated with mudrocks, resulting in alternating bands of arenaceous and argillaceous sediments. The Vryheid Formation sandstones may typically occur as arkosic to greywacke, ranging from a generally coarse grained, poorly sorted material to a fine grained, well sorted material, with an abrupt upward transition.

The dolerite observed on the site, based on previous geotechnical investigations undertaken, was found to be weathered to moderate depths and the rock was overlain by residual soils, typically with a moderate to high clay content.

Of significant economic importance is the presence of coal seams located stratigraphically between the sandstone and mudrock bedding partings, at the base of the Vryheid Formation. The lower coal seams attain thicknesses of approximately 18 m which progressively diminishes upwards through the formation, due to various depositional and post-depositional factors (Brink, 1983).

7.1.4 SOILS AND AGRICULTURAL POTENTIAL

An agricultural impact is a temporary or permanent change to the future production potential of land. The significance of the agricultural impact is directly proportional to the extent of the change in production potential. If a development will not change the future production potential of the land, then there is no agricultural impact.

The only aspect of the agro-ecosystem that is relevant to the power line impact is the agricultural land use. Part of the site is used for dryland crops and the rest is used for cattle grazing. Crops in the area include mainly maize and soya beans. All of these land uses are unaffected by overhead power lines.

The proposed electrical grid infrastructure has insignificant agricultural impact because there is no loss of future agricultural production potential under transmission lines because all agricultural activities that are viable in this environment, can continue completely unhindered underneath transmission lines. The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture is insignificantly small.

The only sources of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and fairly easily mitigated through generic mitigation measures included in the EMPr. However, farmers frequently complain that these impacts occur because the EMPr is not adequately implemented.

There is likely to be some nuisance disturbance to agricultural activities during construction. A common complaint from farmers is that gates are left open by contractors. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact.

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. However, the insignificant impact of the power line means that its route will make no difference to agricultural impact. The only difference that can have an impact is if pylons are located within field crops. Therefore, wherever possible, pylons should be located outside of or on the edges of all field crops.

7.1.5 AQUATIC

The study area is dominated by a variety of aquatic features associated with catchments and rivers, and were characterised as follows as per their respective Hydrogeomorphic classes:

- Mainstem Rivers
- Floodplain dominated systems with oxbow wetlands (**Figure 7.10**). A few reaches did contain very narrow riparian zones, consisting mostly of a single row of willow trees associated with the unknown tributary of the Vaal River
- Valley Bottom Wetlands (Channelled and Unchannelled) (**Figure 7.11**)
- Endorheic pans (**Figure 7.12**)
- Seep wetlands (**Figure 7.13**)
- One minor watercourses (**Figure 7.14**), that was previously part of a wetland systems, but now contains severe head cut and has eroded into a channel / watercourse.

Notably, most of the aquatic features and unknown tributary of the Vaal River within the study area and are located within the riverine valleys and upper catchment areas (pans) within the C11B Quinary Catchment (Vaal River) of the Highveld Ecoregion in the Vaal Water Management Area (**Figure 7.9**).

The Department of Environment Fisheries and Forestry identified the aquatic environment for the study area as having a Very High Sensitivity, based on the fact the following criteria are present within the site or the associated catchment, namely:

- Presence of Wetlands
- Aquatic Critical Biodiversity Areas (CBA)
- Freshwater Ecosystem Priority Area quinary catchments (NFEPA)
- Wetland clusters
- Eastern Highveld Grassland a listed Threatened Ecosystem under NEMA.

The presence of these Very High Sensitivity features, although to a finer mapping scale were confirmed during this assessment. The study area is however not located within an International Bird Area (IBA) or a Strategic Water Resource Area.

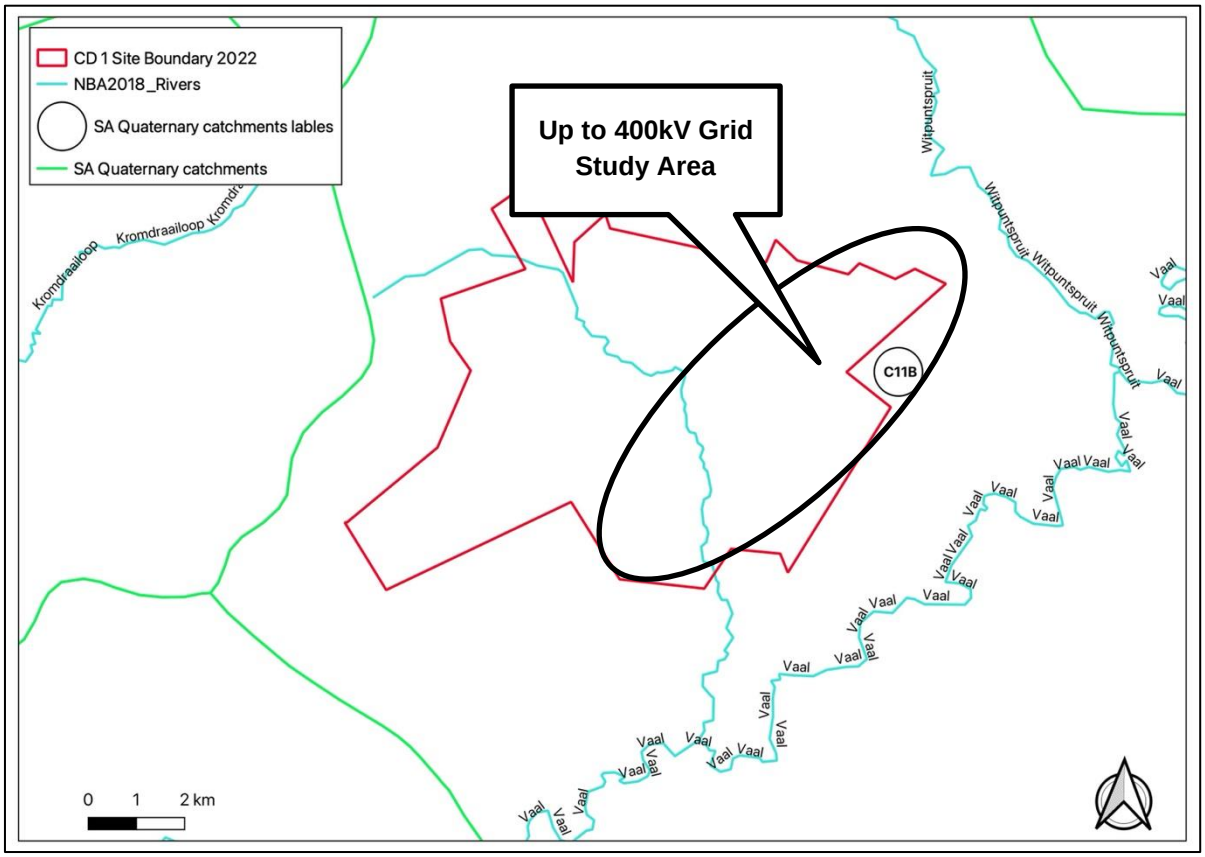


Figure 7.9: Project locality map indicating the various quaternary catchments and mainstem rivers (Source DWS and NGI) within the broader Camden I study area boundary

Figure 7.10: Wetlands associated with the unknown tributary that bisects the broader study area

Figure 7.11: Channelled Valley Bottom wetland

Figure 7.12: Endorheic Pan, one of three such large systems within the study area

Figure 7.13: A medium sized seep wetland within the central portion of the site

Figure 7.14: A view of a minor water course, with a view of an earth wall farm dam upstream

The ground-truthed delineations were then compared to current wetland inventories (**Figure 7.15**) (van Deventer et al., 2020), 1: 50 000 topocadastral surveys mapping data and the site observations. These inventories include wetland spatial data based on landcover 2007 data, previous assessments and wetland information retained by the Provincial authorities, combined into one database that formed part of the updated National Spatial Biodiversity Assessment, 2018.

A baseline map was then developed and refined using the August 2020 and March 2021 survey data, noting that due to the complex nature of the topography and geology, the features were digitised at a scale of 1:4000 (**Figure 7.16**).

Coupled to the aquatic delineations, information was collected on potential species that could occur within the wetlands and water courses, especially any areas that would contain open water for long periods and or conservation worthy species (Listed or Protected). For the most part those that were observed are terrestrial in nature and thus listed in the ecological report.

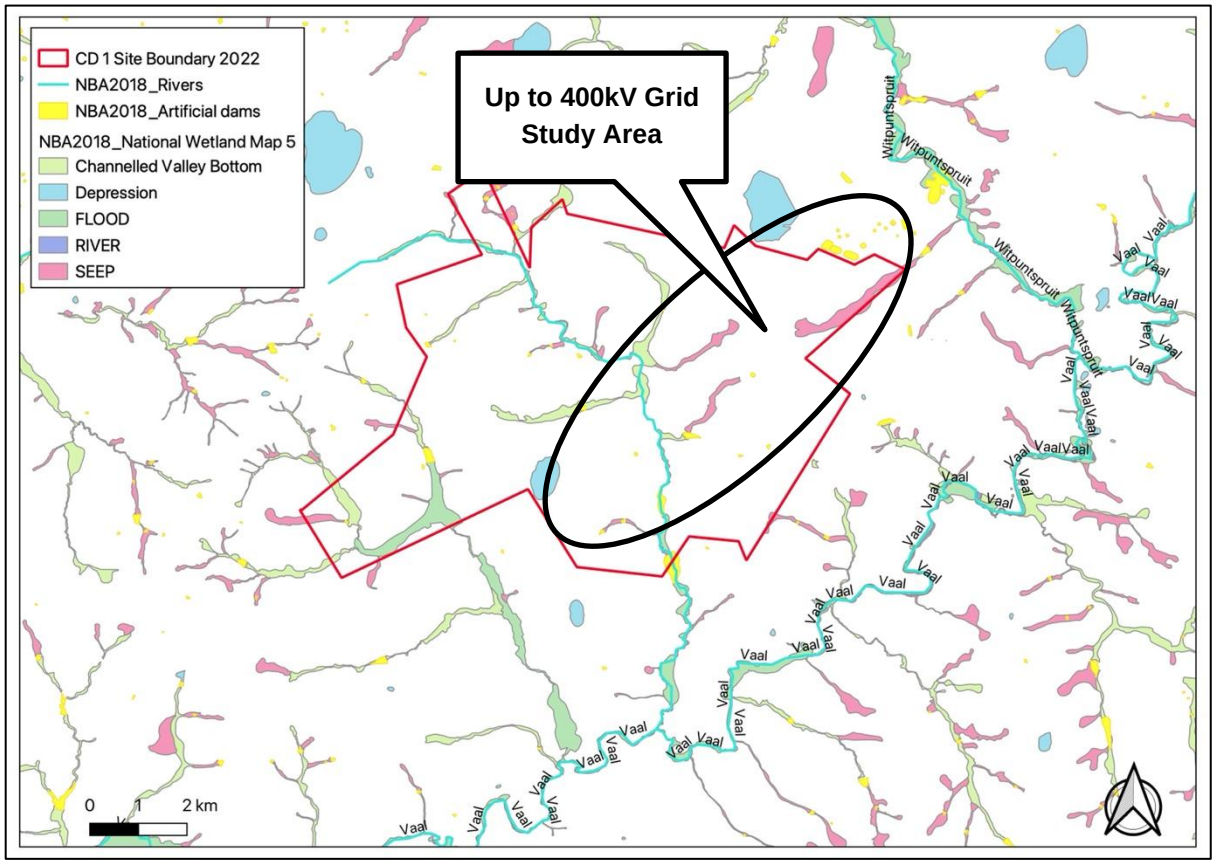


Figure 7.15: National Wetland Inventory wetlands and waterbodies (van Deventer et al., 2020)

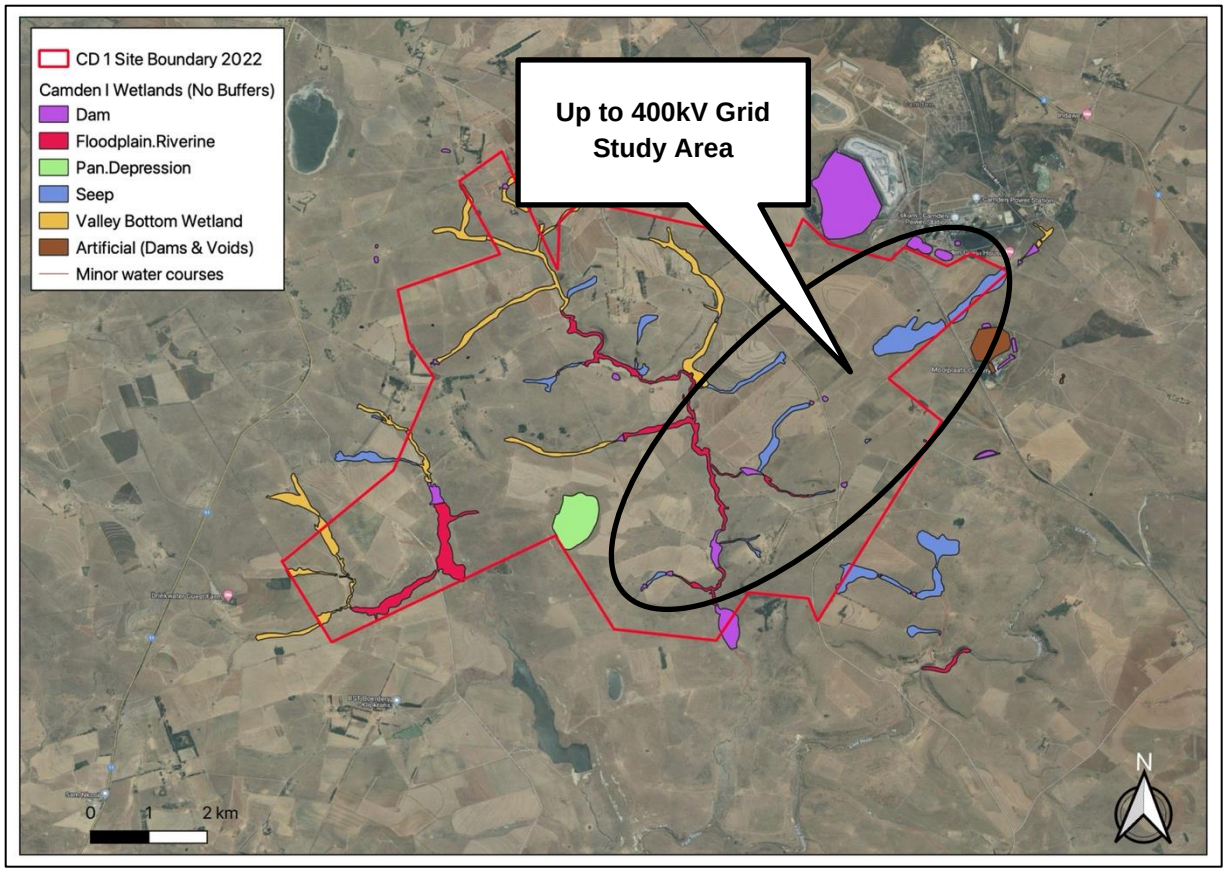


Figure 7.16: Wetlands delineated based on ground truthing information collected

PRESENT ECOLOGICAL STATE AND CONSERVATION IMPORTANCE

The Present Ecological State (PES) of a river, watercourse or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES scores have been revised for the country and based on the new models, aspects of functional importance as well as direct and indirect impacts have been included (DWS, 2014). The new PES system incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centred on rating rivers using broad fish, invertebrate, riparian vegetation and water quality indicators. The Recommended Ecological Category (REC) is still contained within the new models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

All of the systems assessed by DWS (2014) on a Sub quaternary level within the study area were rated as PES = C or Moderately Modified and PES = D or Largely Modified. While these were also rated as High in terms of Ecological Sensitivity and Ecological Importance respectively.

Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine / wetland systems. The natural wetlands were however rated independently and achieved PES scores of C and D, while the EIS was rated as HIGH. The High EIS rating for both natural water courses and wetlands, is further substantiated by the fact that the affected catchments are included in both the National Freshwater Priority Atlas and the provincial Biodiversity Spatial Plan Critical Biodiversity Area spatial layers (**Figure 7.17** and **Figure 7.18**). These areas are also highlighted as important ecological support areas along the Vaal River.

Overall, these catchment areas and subsequent rivers / watercourses are largely functional with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with road crossings;
- Impeded water flow due to several in channel farm dams; and
- Sedimentation and scour of channels due to undersized culverts within present day road crossings.

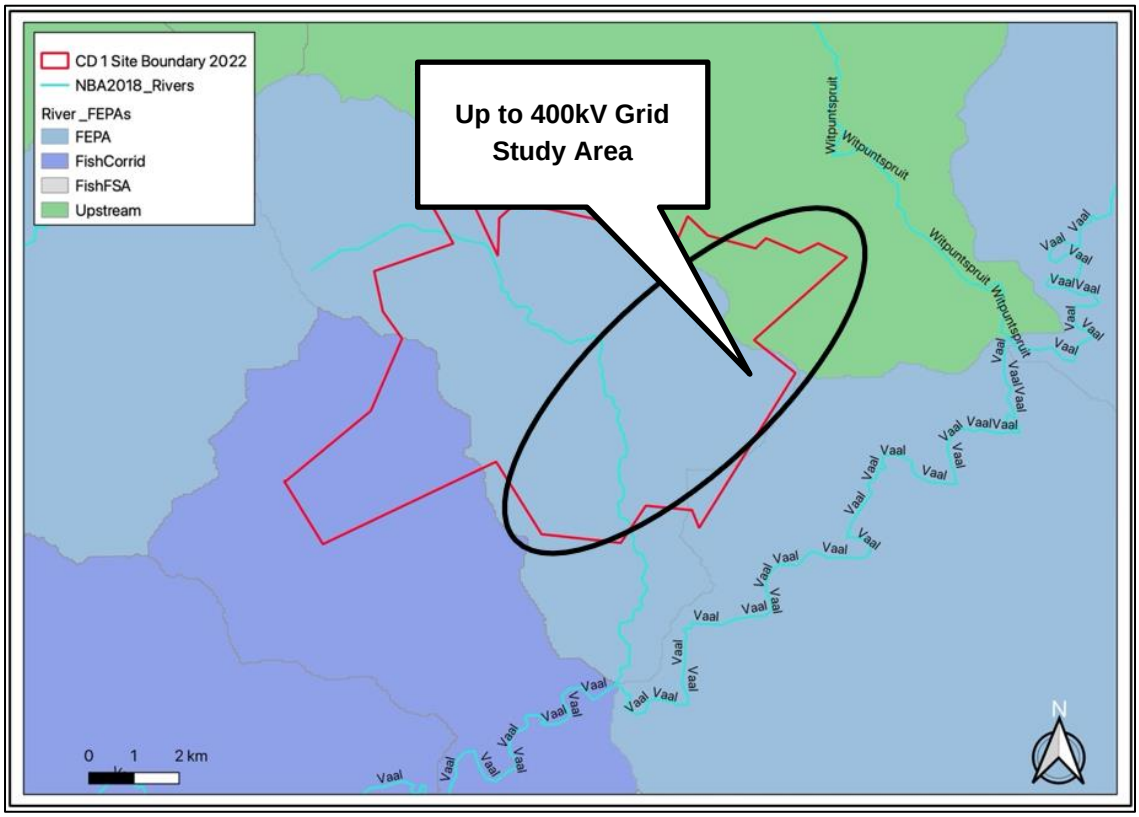


Figure 7.17: The Freshwater Ecosystem Priority Areas for the study site (Nel et al, 2011)

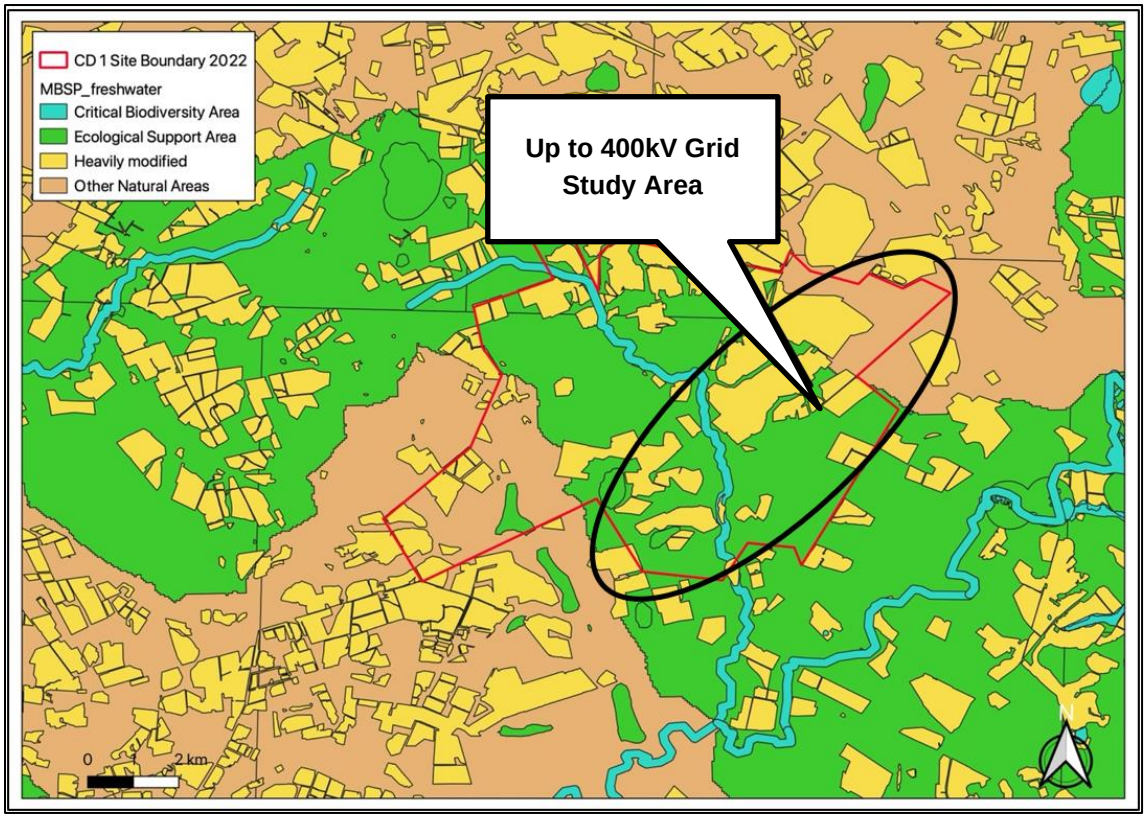


Figure 7.18: The Critical Biodiversity Areas as per the Mpumalanga Biodiversity Spatial Plan (Nel et al, 2011) issued 2014

SITE SENSITIVITY

The sensitivity ratings of No go, Medium and Low were determined through an assessment of the aquatic habitat sensitivity and related constraints. The criteria for defining sensitivity areas are shown on table below:

Using the baseline description and field data while considering the current disturbances and site characteristics, the following features were identified, then categorised into one of a number pre-determined sensitivity categories to provide protection and/or guide the layout planning and design processes of the Facility and respective grid assessment corridors. The full extent of the grid and water pipeline corridors were assessed to allow for micrositing therein. Aquatic sensitivity mapping categorises feature or areas (with their buffers) into the following categories that were used by all specialists on the project to ensure consistency:

Table 7.3: Sensitivity Categories

No Go	Legislated "no go" areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile Therefore areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations
Medium	Buffer areas and or areas that are deemed to be of medium sensitivity but should still be avoided where possible as this would minimise impacts and or the need for additional Water Use Authorisation
Low	Areas of low sensitivity or constraints, such as artificial systems
Neutral	Unconstrained areas (left blank in mapping)

Table 7.4 below provides an overview of the sensitivity of various aquatic features (with buffers distances included) as it relates to the main project component types for the project. The features are shown spatially in **Figure 7.19** below. The sensitivity ratings of No go, Medium and Low were determined through an assessment of the aquatic habitat sensitivity and related constraints. However, these No-Go areas (with buffers) relate in general terms to the project and there are areas where encroachment on these areas would occur (i.e. existing road crossings within wetlands, grid spans or water pipeline infrastructure) but this is considered acceptable since these areas have already been impacted.

These proposed constraints / buffers do not include bird and or bat specialist buffers / constraints as theirs buffers along aquatic features are at times far larger around aquatic features, than those required for the known aquatic species within this region.

Table 7.4 below shows the results of sensitivity rating.

Table 7.4: Results of the sensitivity rating / constraints assessment

DEVELOPMENT COMPONENT	WATERBODY TYPE	SENSITIVITY RATING OF THE RESPECTIVE WATERBODY TYPE AGAINST THE DEVELOPMENT TYPE AND THE REQUIRED BUFFER	SENSITIVITY RATING OVERRIDE, IF AN IMPACT SUCH AS A ROAD ALREADY OCCURS WITHIN THE PROPOSED FOOTPRINT
Solar Panels	Riverine Floodplains with Riparian Vegetation or wetland areas	No-Go with 95m buffer	
	Seepage Wetlands	No-Go with 62m buffer	
	Artificial dams or mine works		
Buildings / Substations & BESS	Riverine Floodplains with Riparian Vegetation or wetland areas	No-Go with 95m buffer	
	Seepage Wetlands	No-Go with 62m buffer	
	Artificial dams or mine works		
Roads & Hardstands	Riverine Floodplains with Riparian Vegetation or wetland areas	No-Go with 95m buffer	Moderate if an existing crossing / road or impact is already present, that must then be included in the potential road network. However if the road network can't be aligned with existing impacted areas, then any such crossings must be evaluated prior to construction on a case by case basis, by the aquatic specialist, preferably with the engineers and a site visit
	Seepage Wetlands	No-Go with 62m buffer	
	Artificial dams or mine works		
Overhead Lines	Riverine Floodplains with Riparian Vegetation or wetland areas	Assumption is that the overhead lines could span these areas, but the towers/pylons should adhere to the buffer distances as indicated as far as possible where areas are too large to span (buffers) then these tower positions must be evaluated on a case by case basis prior to construction.	
	Seepage Wetlands		
	Artificial dams or mine works		

With regard the proposed 400kV grid connection, collector substation and the expansion of the HV substation (**Figure 7.19**), the overall layout has avoided the delineated systems inclusive of the calculated buffers and the recommended 100m buffer. No preference is given to the grid routes or substations as these have all the potential to avoid the aquatic environments encountered. This is however based on the assumption that the grid connection towers are also placed outside of any of the delineated aquatic zones including buffers, no access tracks are located in these areas and the overhead cables span these.

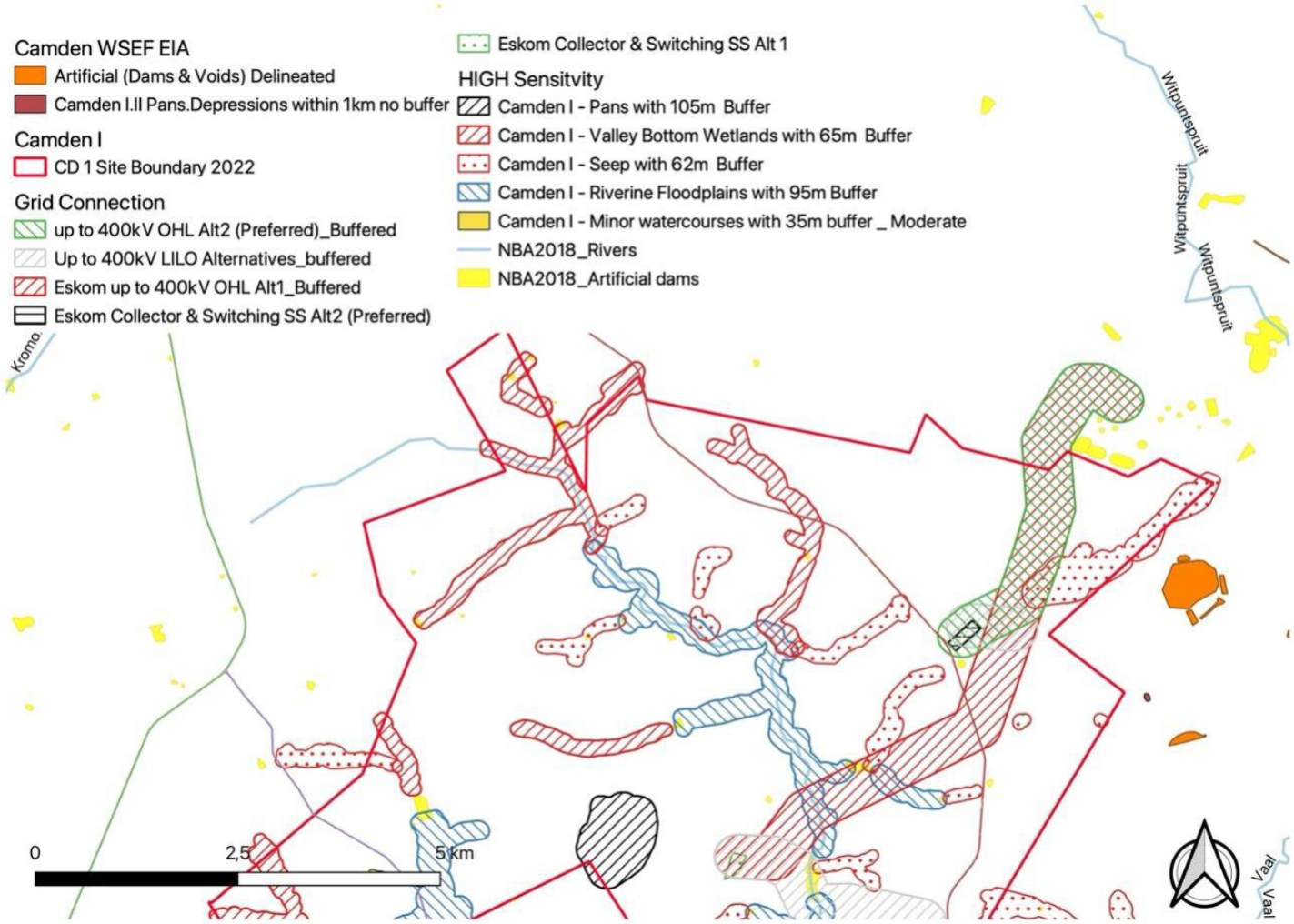


Figure 7.19: Camden 1 up to 400kV grid connection, collector substation and the expansion of the HV substation in relation to buffered aquatic systems delineated

7.2 BIOLOGICAL ENVIRONMENT

7.2.1 REGIONAL VEGETATION

Based on the preliminary desktop and site specific field study Plant Ecology Species Assessment Report (David Hoare Consulting, 2021) (Appendix I), there is one regional vegetation type occurring in the study area, namely Eastern Highveld Grassland (**Figure 7.20**). The vegetation type description below is from Mucina & Rutherford (2006), extracted from the SANBI BGIS website (http://bgis.sanbi.org/vegmap).

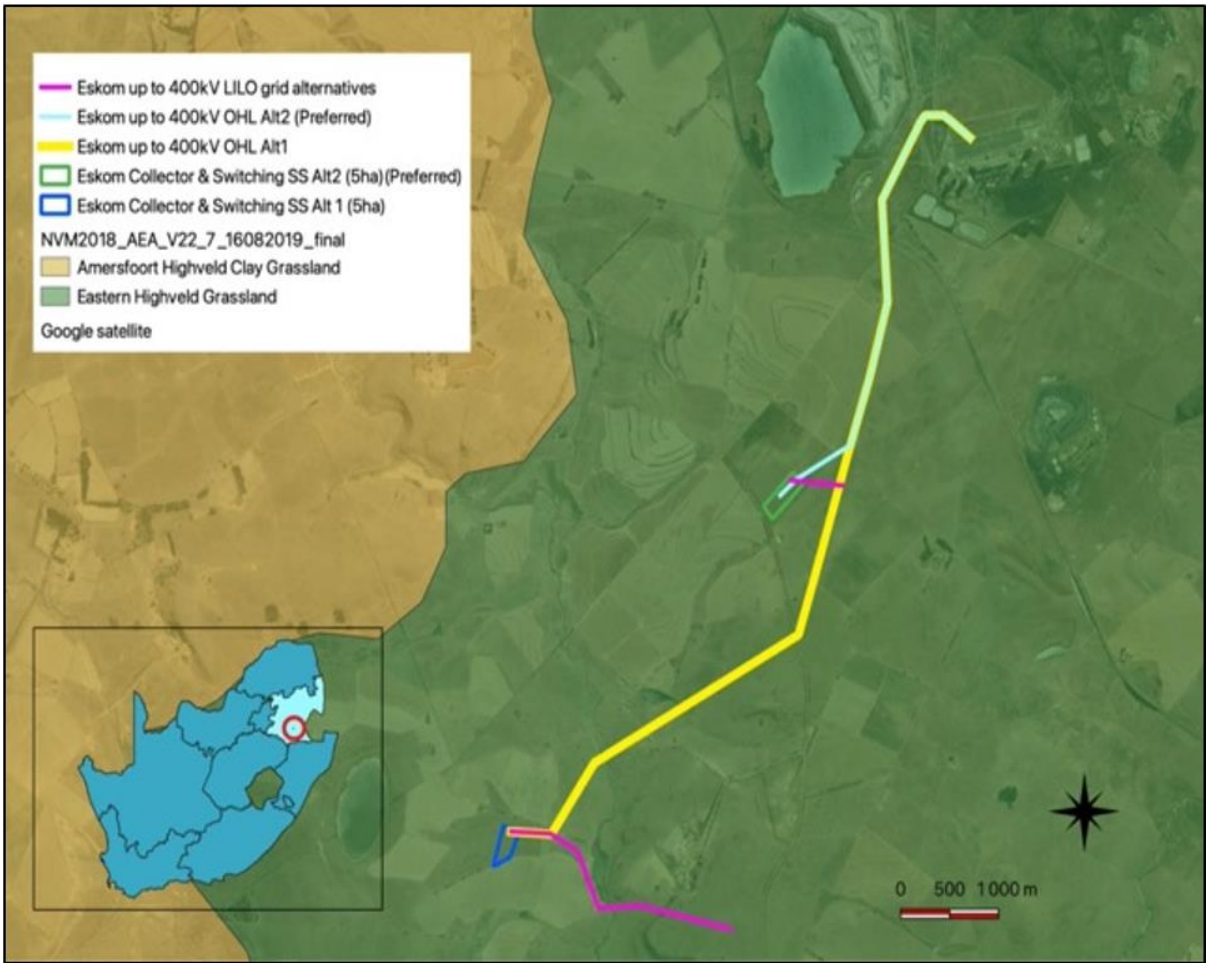


Figure 7.20: Regional Vegetation Types of the Study Area

EASTERN HIGHVELD GRASSLAND

DISTRIBUTION

Found in Mpumalanga and Gauteng Provinces, on the plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief. The vegetation type occurs at an altitude of between 1 520–1 780 m.

VEGETATION & LANDSCAPE FEATURES

The vegetation occurs on slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya*, etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Searsia magalismontanum*).

GEOLOGY & SOILS

Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup). Land types Bb (65%) and Ba (30%).

CLIMATE

Strongly seasonal summer rainfall, with very dry winters. MAP 650–900 mm (overall average: 726 mm), MAP relatively uniform across most of this unit, but increases significantly in the extreme southeast. The coefficient of variation in MAP is 25% across most of the unit, but drops to 21% in the east and southeast. Incidence of frost from 13–42 days, but higher at higher elevations.

IMPORTANT TAXA

Low Shrubs	*Anthospermum rigidum* subsp. *pumilum*, *Stoebe plumosa*..
Herbs	*Berkheya setifera* (d), *Haplocarpha scaposa* (d), *Justicia anagalloides* (d), *Pelargonium luridum* (d), *Acalypha angustata*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Euryops gilfillanii, E. transvaalensis* subsp. *setilobus, Helichrysum aureonitens*, *H. caespititium*, *H. callicomum*, *H. oreophilum*, *H. rugulosum*, *Ipomoea crassipes*, *Pentanisia prunelloides* subsp. *latifolia*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala*, *Wahlenbergia undulata*.
Geophytic Herbs	*Gladiolus crassifolius*, *Haemanthus humilis* subsp. *hirsutus*, *Hypoxis rigidula* var. *pilosissima*, *Ledebouria ovatifolia*.
Succulent Herbs	*Aloe ecklonis*
Graminoids	*Aristida aequiglumis* (d), *A. congesta* (d), *A. junciformis* subsp. *galpinii* (d), *Brachiaria serrata* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *E. racemosa* (d), *E. sclerantha* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Microchloa caffra* (d), *Monocymbium ceresiiforme* (d), *Setaria sphacelata* (d), *Sporobolus africanus* (d), *S. pectinatus* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *T. rehmannii* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon appendiculatus*, *A. schirensis*, *Bewsia biflora*, *Ctenium concinnum*, *Diheteropogon amplectens*, *Eragrostis capensis*, *E. gummiflua*, *E. patentissima*, *Harpochloa falx*, *Panicum natalense*, *Rendlia altera*, *Schizachyrium sanguineum*, *Setaria nigrirostris*, *Urelytrum agropyroides*.

CONSERVATION STATUS OF THE REGIONAL VEGETATION TYPES

On the basis of a scientific approach used at national level by SANBI (Driver *et al*., 2005), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The original extent of a vegetation type is as presented in the most recent national vegetation map (Mucina, Rutherford & Powrie 2005) and is the extent of the vegetation type in the absence of any historical human impact. On a national scale the thresholds are as depicted in **Figure 7.21**, as determined by best available scientific approaches (Driver *et al*., 2005). The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% (Driver *et al*., 2005).

According to scientific literature (Driver *et al*., 2005; Mucina *et al*., 2006), as shown in **Table 7.5**, Eastern Highveld Grassland is listed as Endangered.

Determining ecosystem status (Driver *et al.*, 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)			
80–100	least threatened	LT
60–80	vulnerable	VU
*BT–60	endangered	EN
0–*BT	critically endangered	CR

Figure 7.21: Ecosystem Status (Driver et al. 2005)

Table 7.5: Conservation status of different vegetation types occurring in the study area

VEGETATION TYPE	TARGET (%)	CONSERVED (%)	TRANSFORMED (%)	CONSERVATION STATUS	
				DRIVER *ET AL.* 2005; MUCINA *ET AL.*, 2006	NATIONAL ECOSYSTEM LIST (NEM:BA)
Eastern Highveld Grassland	24	0.3	44	Endangered	Vulnerable

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types, and other ecosystems defined in the Act, that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature. Eastern Highveld Grassland is listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). Eastern Highveld Grassland covers the entire site (**Figure 7.20**).

There is an additional listed ecosystem defined under the National Ecosystem List, called Chrissiesmeer Panveld, which is listed as Endangered. This covers the entire site (**Figure 7.22**). It spatially co-incides partially with Eastern Highveld Grassland, but is defined on different criteria.

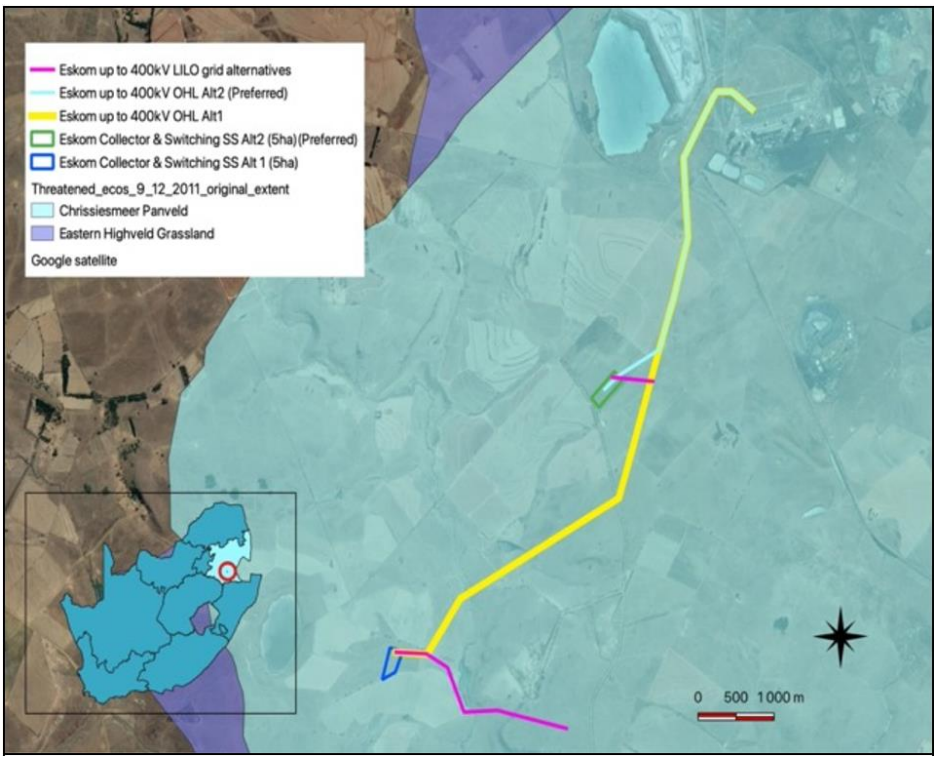


Figure 7.22: Distribution of listed ecosystems

7.2.2 BIODIVERSITY

The Mpumalanga Biodiversity Sector Plan (MBSP) (Mpumalanga Parks and Tourism Agency 2014) classifies the natural vegetation of the Province according to the following categories:

- Protected Areas (sub-divided into three categories);
- Critical Biodiversity Areas (sub-divided into “Irreplaceable” and “Optimal”);
- Other natural areas;
- Ecological Support Area (sub-divided into four categories); and
- Modified (sub-divided into Heavily or Moderately modified

Figure 7.23 shows the features in the study area within five of the classes listed above:

- Protected Areas: (National Parks and Nature Reserves): The entire site is shown as a protected area. This is, however, in the process of change (see discussion below).
- Critical Biodiversity Areas (CBA): Irreplaceable: two small patches – note that the on-site habitat assessment (see Figure 8 on page 31) has determined that these areas (where the alignment crosses the CBA) are no longer in a natural state – the small area crossed near to SS Alt2 is degraded, the finger that sticks out north of that is a combination of old land and degraded, and the small area near Camden PS is degraded.
- Critical Biodiversity Areas (CBA): Optimal: a small nearby patch – areas crossed by the alignment are degraded, as indicated for CBA (Irreplaceable).

According to the National Parks Area Expansion Strategy (NPAES), there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore **outside the NPAES focus area**.

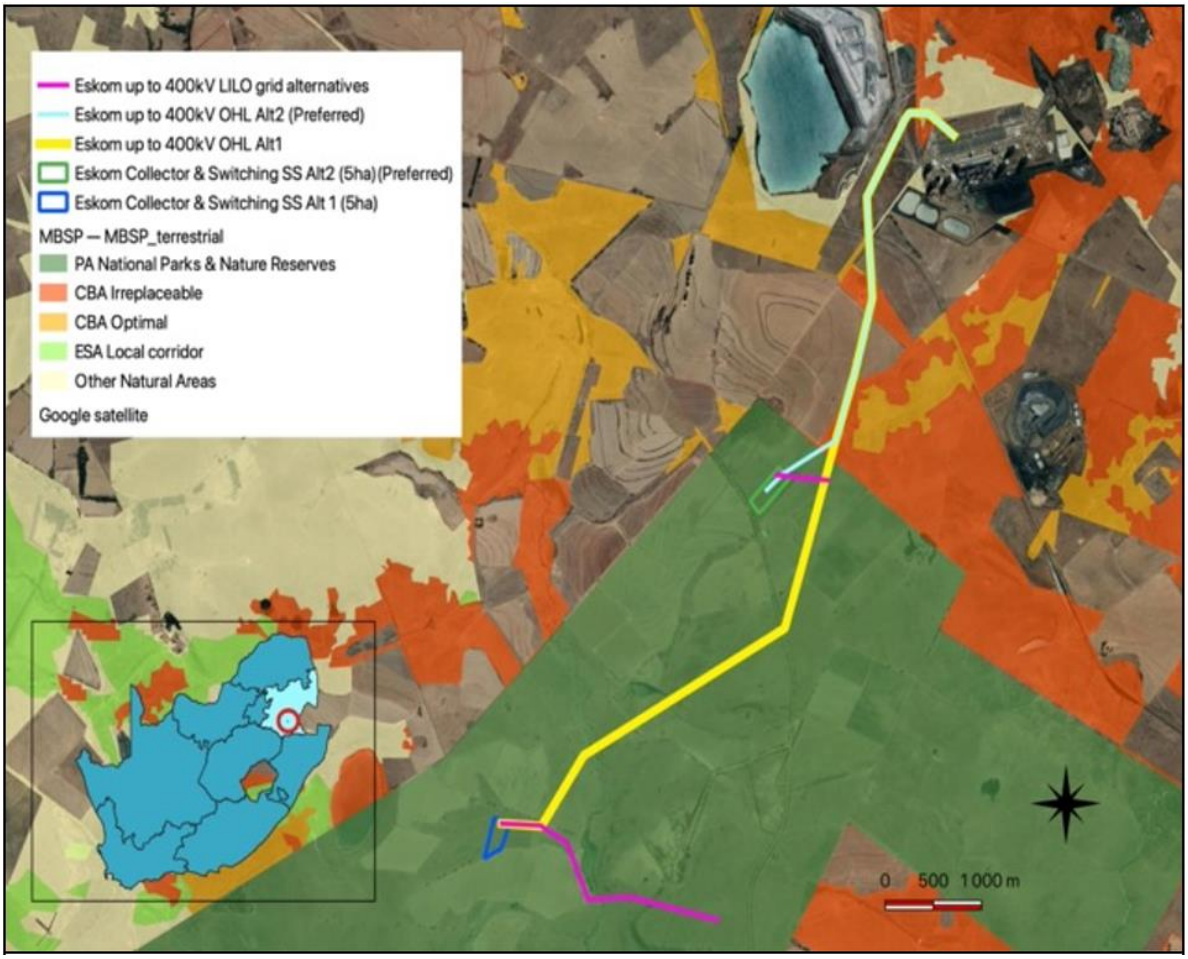


Figure 7.23: Mpumalanga CBA map for the study area (as per MBSP, 2014)

As per the Species Environmental Assessment Guidelines (SANBI 2020), Site Ecological Importance (SEI) is calculated as a function of the Biodiversity Importance (BI) of the receptor and its resilience to impacts (SEI = BI + RR). The Biodiversity Importance (BI) in turn is a function of Conservation Importance (CI) and Functional Integrity (FI), i.e. BI = CI + FI. The site ecological importance is outlined in the **Table 7.6** below for each habitat

Table 7.6: Site ecological importance for habitats found on site

HABITAT	CONSERVATION IMPORTANCE	FUNCTIONAL INTEGRITY	RECEPTOR RESILIENCE	SITE ECOLOGICAL IMPORTANCE (BI)
Natural grassland	High Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type.	Medium Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. (Chrissiesmeer Panveld is listed as EN) BUT Mostly minor current negative ecological impacts with some	Very low Habitat that is unable to recover from major impacts	High (BI = Medium)

HABITAT	CONSERVATION IMPORTANCE	FUNCTIONAL INTEGRITY	RECEPTOR RESILIENCE	SITE ECOLOGICAL IMPORTANCE (BI)
		major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.		
Wetlands	High Any area of natural habitat of threatened ecosystem type with status of VU.	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types	Low Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore less than 50% of the original species composition and functionality	High (BI = Medium)
Old lands	Low No confirmed or highly likely populations of SCC or range-restricted species.	Very low Several major current negative ecological impacts.	High Habitat that can recover relatively quickly (5-10 years) to restore >75% to restore the original species composition and functionality	Very low (BI = Very low)
Current cultivation	Very low No confirmed or highly likely populations of SCC or range-restricted species. No natural habitat remaining.	Very low Several major current negative ecological impacts.	Very high Habitat that can recover rapidly	Very low (BI = Very low)
Exotic trees	Very low No confirmed or highly likely populations of SCC or range-restricted species. No natural habitat remaining.	Very low Several major current negative ecological impacts.	Very high Habitat that can recover rapidly	Very low (BI = Very low)
Degraded	Very low No confirmed or highly likely populations of SCC or range-restricted species. No natural habitat remaining.	Very low Several major current negative ecological impacts.	Very high Habitat that can recover rapidly	Very low (BI = Very low)
Transformed	Very low No confirmed or highly likely populations of SCC or range-restricted	Very low	Very high Habitat that can recover rapidly	Very low (BI = Very low)

HABITAT	CONSERVATION IMPORTANCE	FUNCTIONAL INTEGRITY	RECEPTOR RESILIENCE	SITE ECOLOGICAL IMPORTANCE (BI)
	species. No natural habitat remaining.	Several major current negative ecological impacts.		

The calculation of Site Ecological Importance matches the sensitivity classification given in the previous section of this report, but includes an explicit recognition of the ability of each ecosystem to tolerate and recover from disturbance. Guidelines for development activities within different importance levels are given in the **Table 7.7** below.

Table 7.7: Guidelines for interpreting SEI in the context of the proposed development activities

SITE ECOLOGICAL IMPORTANCE	INTERPRETATION IN RELATION TO PROPOSED DEVELOPMENT ACTIVITIES
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/ not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities
Very low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

7.2.3 PLANT SPECIES

For all infrastructure components located within natural habitat there is the possibility that individuals or populations of plant species of conservation concern may be lost due to construction impacts. Based on known information, and data collected on site, the probability of encountering species of conservation concern at any particular location is dependent on local habitat conditions.

The appropriate mitigation to address uncertainty issues related to SCC is to do a walk-through survey of all final infrastructure positions to check for SCC, and to collect the necessary data for any flora permits that may be required.

According to the DFFE online environmental screening tool, seven plant species have been flagged as of concern for the area the current project is in. A description of each species is provided.

Khadia carolinensis- Vulnerable

Occurs at Carolina and Belfast in Eastern Highveld Grassland, Lydenburg Montane Grassland, and Rand Highveld Grassland. It is found in well-drained, sandy loam soils among rocky outcrops, or at the edges of sandstone sheets, at around 1700 m elevation. It has been recently recorded just to the south of the site in grasslands close to the Vaal River. Based on the known distribution and habitat requirements, as well as known nearby populations, there is a HIGH chance of it occurring in the general area where the project is located.

Sensitive species 1201

Occurs on dolerite outcrops in grasslands at about 2000m altitude, from Dullstroom in the north to Vryheid in the south. This geophyte is fairly restricted and threatened by alien invasive plants, and is therefore listed as Vulnerable on the national Red List. This species is conspicuous when flowering, with attractive pale white flowers in summer. The closest locality at which this species has been observed is Hartebeespruit due south of Camden. It therefore has a MODERATE chance of occurring on the site.

Aspidoglossum xanthosphaerum- Vulnerable

Occurs in Mpumalanga, around Groenvlei and Ermelo. Closest known record is from Breyten and just to the west of Ermelo. It is found in montane grassland, marshy sites, at around 1800 m elevation. Based on the known distribution and habitat requirements, as well as known nearby populations, there is a HIGH chance of it occurring in the general area where the project is located.

Sensitive species 41

A common and widespread geophyte that is very similar to Gladiolus crassifolius, also a widespread and common species with a similar distribution. The main distribution area is Witbank to Lydenburg, and southwards to Piet Retief and Wakkerstroom. It occurs in wetlands or marshes in high altitude grassland that remain wet throughout the year or dry out for only a short period. This species is listed on the South African Red List with a national assessment of Vulnerable, but is currently not recognized by the IUCN as it is regarded as a synonym of G. crassifolius. Whereas this species is confined more to wetland habitats, G. crassofolius has larger leaves, longer spikes and smaller flowers, and is found in drier, more stony habitats. It flowers from October to January and has a high probability of occurring in wetland areas on the study site. Without flowers, the plant can be recognized as a Gladiolus. The closest historical record is approximately 30km from the study site. This species has a MODERATE chance of occurring on the site.

Sensitive species 691

A widespread geophyte distributed in Free State, North West, Gauteng, and in Mpumalanga from Belfast and Ermelo to Wolmaransstad. It is found in wetlands in undulating grasslands. The species is currently listed as Vulnerable. It flowers from January to March but its peak flowering month is February. It could feasibly be found in wet areas on the site but is quite conspicuous in February when if flowers. The closest historical record is approximately 40km from the site. It has a MODERATE chance of occurring on the site.

Pachycarpus suaveolens-Vulnerable

Occurs in Gauteng and Mpumalanga to Eswatini, where it is found in Lydenburg Montane Grassland, Eastern Highveld Grassland, and Soweto Highveld Grassland in short or annually burnt grasslands, at elevations of 1400-2000 m. Based on the known distribution and habitat requirements, as well as known nearby populations, there is a HIGH chance of it occurring in the general area where the project is located.

Sensitive species 851

A small succulent perennial herb with white flowers, growing in marshy areas or shallow vleis. This species is listed as Vulnerable but the confidence in this assessment is low (according to the Red List). Its distribution is uncertain because of its taxonomic confusion with the very similar Crassula inanis, but it appears to be restricted to the area between Ermelo and Maseru. The closest known record to the site of the Project is in the Bethal area. It has a MODERATE chance of occurring on the site.

Additional listed plant species for the study area

A database search identified a number of additional plant species of conservation concern that could also occur on site that are not flagged in the Screening Tool output. These included in the following **Table 7.8** below:

Table 7.8: Additional plant species of concern

TAXON	RED LIST STATUS	HABITAT AND DISTRIBUTION	FLOWERING TIME	PROBABILITY OF OCCURRANCE
Alepidea cordifolia APIACEAE	Endangered (SA)	Widespread and extremely common across the eastern highveld of Mpumalanga, the eastern Free State, and north-western KwaZulu-Natal. It occurs along the north and north-eastern borders of Lesotho and is also found in Eswatini, on the Eastern Highlands of Zimbabwe and the Chimanimani Mountains of Mozambique. Forest margins, west and south facing mountain slopes and near drainage lines or islands within wetlands. Open grassland or on forest margins, often amongst rocks and/or along streams.	Summer, mostly February to March	**MODERATE** (within known overall distribution)
Alepidea longeciliata APIACEAE	Endangered	Between Breyten, Lothair, Middelburg and Stoffberg. Recorded from 2 neighbouring grids. Eastern Highveld Grassland. Grassland, Karoo Sandstone, above 1600 m. Possibly associated with edges of pans.	Summer	**MODERATE** (within known overall distribution)
Bowiea volubilis subsp. volubilis HYACINTHACEAE	Vulnerable (national)	Eastern Cape to Limpopo Province. Widespread elsewhere in southern and eastern Africa. Low and medium altitudes, usually along mountain ranges and in thickly vegetated river valleys, often under bush clumps and in boulder screes, sometimes found scrambling at the margins of karroid, succulent bush in the Eastern Cape. Occurs in bushy kloofs at the coast and inland in KwaZulu-Natal. In Gauteng, Mpumalanga and North West Province it is often found in open woodland or on steep rocky hills usually in well-shaded situations. Tolerates wet and dry conditions, growing predominantly in summer rainfall areas with an annual rainfall of 200-800 mm.		**LOW** (site within gap in distribution, habitat not suitable)
Brachystelma gerrardii APOCYNACEAE	Endangered	KwaZulu-Natal, Waterberg, Wolkberg and Eswatini. Open grassland, 400-1800 m. Site is within overall distribution range, but plant absent from Mpumalanga highveld.		**LOW**
Eucomis pallidiflora subsp. polevansii HYACINTHACEAE	Near Threatened	Pilgrim's Rest and Lydenburg to Eswatini to southern Mpumalanga. Wetlands in grassland, often in standing water up to 300 mm deep. Recorded at Ermelo in similar habitat as that found on site.		**HIGH** (wetlands)

Gladiolus robertsoniae IRIDACEAE	Near Threatened	South-eastern Gauteng, northern Free State and south-western Mpumalanga. Moist highveld grasslands, found in wet, rocky sites, mostly dolerite outcrops, wedged in rock crevices.		**HIGH**
Habenaria barbertonii ORCHIDACEAE	Near Threatened	Gauteng and Mpumalanga. Rocky hillsides, in bushveld in association with acacias, 1000-1500 m.	February to March	**MODERATE** (habitat may not be suitable)
Kniphofia typhoides ASPHODELACEAE	Near Threatened	Gauteng, Limpopo, Mpumalanga, North West, Parys to Lydenburg to Paulpietersburg to Newcastle. Low lying wetlands and seasonally wet areas in climax Themeda triandra grasslands on heavy black clay soils, tends to disappear from degraded grasslands.		**MODERATE** (habitat may not be suitable)
Merwilla plumbea HYACINTHACEAE	Near Threatened	Widespread in eastern half of South Africa. Also in Eswatini and Lesotho. Montane mistbelt and Ngongoni grassland, rocky areas on steep, well drained slopes. 300-2500 m.		**HIGH**
Miraglossum davyi APOCYNACEAE	Vulnerable	Dullstroom, Middelburg and Standerton. Grassland (Lydenburg Montane Grassland, Soweto Highveld Grassland, Eastern Highveld Grassland).		**HIGH**
Riocreuxia aberrans APOCYNACEAE	Near Threatened	Dullstroom to Ermelo. Grassland. Wedged in cracks among rocks on exposed quartzite ridges.		**LOW** (habitat not suitable)
Alepidea cordifolia APIACEAE	Endangered (SA)	Widespread and extremely common across the eastern highveld of Mpumalanga, the eastern Free State, and north-western KwaZulu-Natal. It occurs along the north and north-eastern borders of Lesotho and is also found in Eswatini, on the Eastern Highlands of Zimbabwe and the Chimanimani Mountains of Mozambique. Forest margins, west and south facing mountain slopes and near drainage lines or islands within wetlands. Open grassland or on forest margins, often amongst rocks and/or along streams.	Summer, mostly February to March	**MODERATE** (within known overall distribution)

None of the tree species protected under the National Forests Act (**Appendix 1** of David Hoare Consulting (Pty) Ltd, 2022) have been previously recorded in the area in which the site is located. A full list of plants that could occur on site, as well as those actually recorded, is given in **Appendix 2** of the Plant Species Assessment Report (David Hoare Consulting (Pty) Ltd, 2022).

There are a number of species recorded on site that are protected under the Mpumalanga Nature Conservation Act No. 10 of 1998, **Appendix 3** of Plant Species Assessment Report (David Hoare Consulting (Pty) Ltd, 2022). It is a legal requirement to obtain a permit from the provincial authorities for the destruction of any of these species. A comprehensive walk-through survey of the final footprint is required to compile a complete list of these protected species.

Alien Species

Low existing populations of alien plants were observed on site, but areas of farm infrastructure were not investigated in detail during the field survey. There is a high possibility that alien plants could be introduced to areas within the footprint of the proposed activities from surrounding areas in the absence of control measures. The potential consequences may be of moderate seriousness for affected natural habitats. Control measures could prevent the impact from occurring. These control measures are relatively standard and well-known. Known alien invasive species recorded in the general geographical area that includes the site are as follows (in order of frequency observed):

- Campuloclinium macrocephalum
- Acacia mearnsii
- Verbena bonariensis
- Solanum mauritianum
- Datura stramonium
- Cirsium vulgare
- Rumex acetosella
- Acacia dealbata
- Solanum sisymbriifolium
- Cortaderia selloana
- Arundo donax
- Sesbania punicea
- Ipomoea purpurea
- Melia azedarach
- Nicotiana glauca
- Eucalyptus camaldulensis
- Solanum elaeagnifolium
- Phytolacca octandra
- Robinia pseudoacacia
- Ailanthus altissima
- Xanthium spinosum
- Myriophyllum aquaticum
- Araujia sericifera
- Nasturtium officinale
- Verbena rigida
- Acacia melanoxylon
- Xanthium strumarium
- Azolla filiculoides
- Pinus taeda
- Alisma plantago-aquatica
- Rubus niveus
- Agave americana
- Acacia podalyriifolia
- Carduus nutans
- Ligustrum lucidum

- Ageratum houstonianum
- Spathodea campanulata
- Verbena brasiliensis
- Salvia tiliifolia
- Solanum pseudocapsicum
- Argemone ochroleuca
- Pinus patula
- Paspalum quadrifarium
- Austrocylindropuntia subulate
- Rumex usambarensis

7.2.4 FAUNA SPECIES

Vertebrate species (mammals, reptiles, amphibians) with a geographical distribution that includes the study area are listed in Appendix 3 of the Animal Species Ecological Report (**Appendix I**). All threatened (Critically Endangered, Endangered or Vulnerable) or near threatened vertebrate animals that could occur in the study area and have habitat preference that includes habitats available in the study area, are discussed further below.

MAMMALS

There are 81 mammal species that have a geographical distribution that includes the study area, of which fourteen are listed in a conservation category of some level (see Appendix 2 of the Animal Species Ecological Report - **Appendix I**). This is a relatively moderate diversity of mammals compared to other parts of South Africa. Based on the natural state of the study area and surrounding areas, it is considered likely that some of these species could occur on site.

Of the species currently listed as threatened or protected (see Appendix 2 of the Animal Species Ecological Report - **Appendix I** for list of protected species), eight of those listed in **Table 7.9** are considered to have a medium to high probability of occurring on site and being potentially negatively affected by proposed activities associated with the proposed projects.

Table 7.9: Mammal species of conservation concern with a likelihood of occurring on site

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Ourebia ourebi	Oribi	Endangered	Low
Pelea capreolus	Grey Rhebok	Near Threatened, protected	Medium
Felis nigripes	Black-footed Cat	Vulnerable, protected	High
Panthera pardus	Leopard	Vulnerable, protected	Low
Aonyx capensis	Cape Clawless Otter	Near Threatened, protected	Medium
Hydrictus maculicollis	Spotted-necked Otter	Vulnerable, protected	Medium
Poecilogale albinucha	African Striped Weasel	Near Threatened	Medium
Parahyaena brunnea	Brown hyaena	Near Threatened	Low
Atelerix frontalis	South African Hedgehog	Near Threatened, protected	High

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Crocidura maquassiensis	Maquassie Musk Shrew	Vulnerable	Low
Crocidura mariquensis	Swamp Musk Shrew	Near Threatened	High
Amblysomus septentrionalis	Highveld Golden Mole	Near Threatened	Medium
Mystromys albicaudatus	White-tailed Rat	Vulnerable	Low
Otomys auratus	Vlei Rat	Near Threatened	High

REPTILES

A total of 60 reptile species have a geographical distribution that includes the study area in which the project site is found (Alexander & Marais 2007, Bates *et al*. 2014, Branch 1988, Marais 2004, Tolley & Burger 2007). This is a moderate diversity compared to average diversity in other parts of the country. Of the reptile species that could potentially occur in the study area, four have been listed in a threat category (**Table 7.10**). There are three reptile species of conservation concern that could potentially occur in the study area and that may therefore be affected by the proposed projects.

Table 7.10: Reptile species of conservation concern with a likelihood of occurring on site.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Chamaesaura aenea	Coppery grass lizard	Near Threatened	Medium to High
Chamaesaura macrolepis	Large-scaled Grass Lizard	Near Threatened	Low
Tetradactylus breyeri	Breyer's Long-tailed Seps	Vulnerable	Low
Homoroselaps dorsalis	Striped Harlequin Snake	Near Threatened	Medium to High

AMPHIBIANS

A total of 24 frog species have a geographical distribution that includes the general study area in which the project site is found (Du Preez & Carruthers 2009). Some of these species are only marginally present in the study area due to the fact that their distribution range ends close to the study area. Of the frog species that could potentially occur in the study area, none are listed in a threat category, but one species is listed as protected, according to National legislation, the Giant Bullfrog.

It is concluded that the site contains habitat that is suitable for various frog species, although only one species of conservation concern is likely to occur in the study area. One frog species of concern is therefore potentially likely to be affected by development in the study area, as shown in **Table 7.11.**

Table 7.11: Amphibian species of conservation concern with a likelihood of occurring on site.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Pyxicephalus adspersus	Giant Bullfrog	Protected	Medium

PROTECTED ANIMALS

There are a number of animal species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (see Appendix 3 of the Animal Species Assessment Report - **Appendix I**). According to this Act, "*a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7*". Such activities include any that are "*of a nature that may negatively impact on the survival of a listed threatened or protected species*". This implies that any negative impacts on habitats in which populations of protected species occur or are dependent upon would be restricted according to this Act.

Those species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) that have a geographical distribution that includes the site are listed in Appendix 3 of the Animal Species Assessment Report (**Appendix I)**, marked with the letter "N". This includes the following species:

- Black Wildebeest (doesn't occur on site),
- Oribi (unlikely to occur on site),
- White Rhinoceros (doesn't occur on site),
- Black-footed Cat,
- Serval,
- Leopard (probably does not occur on site),
- Cape Clawless Otter,
- Spotted-necked Otter,
- Cape Fox,
- Honey Badger,
- South African Hedgehog,
- Brown Hyena
- Giant Bullfrog.

There are additional species protected under the Mpumalanga Nature Conservation Act (Act No. 10 of 1998) (see Appendix 2 of the Animal Species Assessment Report - **Appendix I**). These include the following that have a geographical distribution that includes the site:

- Giant Bullfrog,
- South African Hedgehog,
- Honey Badger,
- Aardwolf,
- Brown Hyaena,
- Mountain Reedbuck,
- Black Wildebeest,
- Klipspringer,
- Orbi,
- Steenbok,
- Eland,
- Cape Clawless Otter
- Spotted-necked Otter,
- All species of reptiles, except the water leguaan, rock leguaan and all species of snakes, of which the following have a geographical distribution that includes the site:
  - Marsh terrapin
  - Leopard tortoise
  - Common dwarf gecko
  - Spotted dwarf gecko
  - Van Son's gecko
  - Delalande's sandveld lizard

- Burchell's sand lizard
- (Spotted sand lizard)
- Coppery grass lizard
- Cape grass lizard
- Large-scaled grass lizard
- Common girdled lizard
- Common crag lizard
- Yellow-throated plated lizard
- Breyer's long-tailed seps
- Short-headed legless skink
- Thin-tailed legless skink
- Wahlberg's snake-eyed skink
- Cape skink
- Red-sided skink
- Speckled rock skink
- Variable skink
- Montane dwarf burrowing skink
- Common flap-necked chameleon
- Eastern ground agama
- Southern rock agama.

7.2.5 AVIFAUNA

IMPORTANT BIRD AREAS

The project site is not located in an Important Bird Area (IBA), but it is located between three IBAs. The closest IBA to the project site is the Grasslands IBA SA020, which is located 6-7km to the east of the site. The Chrissies Pans IBA SA019 is located 16-17km to the north-east of the site, and the Amersfoort-Bethal-Carolina IBA SA018 is located about 7-8km to the west. Due to the close proximity of the site to the IBAs, it is possible that some highly mobile powerline sensitive species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be impacted by the project when they leave to forage or breed beyond the borders of the IBA. Species that were recorded in the broader area and fall within this category are the following:

- Secretary bird
- Pied Avocet
- Denham's Bustard
- Blue Crane
- Grey Crowned Crane
- Wattled Crane
- White-backed Duck
- Yellow-billed Duck
- Martial Eagle
- Lanner Falcon
- Greater Flamingo
- Lesser Flamingo
- Black-necked Grebe
- Little Grebe
- African Marsh Harrier

- Black Harrier
- Southern Bald Ibis
- African Grass Owl
- Southern Pochard
- Cape Shoveler
- White-winged Tern

BIRD HABITAT

Whilst much of the distribution and abundance of the bird species in the study area can be explained by the dominant biomes and vegetation types, it is also important to examine the modifications which have changed the natural landscape, and which may have an effect on the distribution of avifauna. These are sometimes evident at a much smaller spatial scale than the biome or vegetation types, and are determined by a host of factors such as topography, land use and man-made infrastructure.

The following bird habitat classes were identified in the project site:

GRASSLAND

The majority of the habitat in the project site comprises natural grassland. The grassland varies from dense stands of relatively high grass to areas of heavily grazed short grass. The powerline sensitive species which could potentially use the natural grassland in the project site on a regular basis are the following:

- Secretary bird
- White-bellied Bustard
- Common Buzzard
- Jackal Buzzard
- Buff-streaked Chat
- Blue Crane
- Grey Crowned Crane
- Black-chested Snake Eagle
- Long-crested Eagle
- Spotted Eagle-Owl
- Amur Falcon
- Lanner Falcon
- Grey-winged Francolin
- African Harrier-Hawk
- Southern Bald Ibis
- Black-winged Kite
- Blue Korhaan
- Black-winged Lapwing
- African Grass Owl
- Marsh Owl
- Black Sparrowhawk
- White Stork

The powerline sensitive species which could occasionally use the natural grassland in the project site are the following:

- Denham's Bustard
- Martial Eagle
- Black Harrier
- Cape Vulture
- Black-bellied Bustard

- Brown Snake Eagle
- Peregrine Falcon
- Montagu's Harrier
- Yellow-billed Kite
- Northern Black Korhaan

DRAINAGE LINES AND WETLANDS

There are a number of wetlands in the project site, most of which are associated with drainage lines. The powerline sensitive species which could potentially use the wetlands in the project site on a regular basis are the following:

- African Grass Owl
- Blue Crane
- Grey Crowned Crane
- Hamerkop
- African Black Duck
- Great Egret
- Intermediate Egret
- Little Egret
- Glossy Ibis
- Hadada Ibis
- Marsh Owl

The powerline sensitive species which could occasionally use the wetlands in the project site are the following:

- African Marsh Harrier
- Wattled Crane

AGRICULTURAL LANDS

The project site contains a patchwork of agricultural fields, where maize, soya beans and pastures are cultivated. Some fields are lying fallow or are in the process of being re-vegetated by grass. The powerline sensitive species which could potentially use the agricultural fields in the project site on a regular basis are the following:

- Amur Falcon
- Blue Crane
- Egyptian Goose
- Grey Crowned Crane
- Helmeted Guineafowl
- Lanner Falcon
- Southern Bald Ibis
- Spur-winged Goose

The powerline sensitive species which could occasionally use the agricultural lands in the project site are the following:

- Black-bellied Bustard
- Brown Snake Eagle
- Cape Vulture
- Denham's Bustard
- Martial Eagle
- Montagu's Harrier
- Northern Black Korhaan
- Peregrine Falcon
- Wattled Crane

- Yellow-billed Kite

ALIEN TREES

The project site contains few trees. Most trees are alien species, particularly Eucalyptus, Australian Acacia (Wattle), and Salix (Willow) species. Trees are often planted as wind breaks next to agricultural lands and around homesteads. Some of the drainage lines also have trees growing in them. The powerline sensitive species which could potentially use the alien trees in the project site on a regular basis are the following:

- Secretary bird
- Common Buzzard
- Jackal Buzzard
- Reed Cormorant
- White-breasted Cormorant
- Cape Crow
- Pied Crow
- African Darter
- African Fish Eagle
- Black-chested Snake Eagle
- Long-crested Eagle
- Spotted Eagle-Owl
- Western Cattle Egret
- Amur Falcon
- Lanner Falcon
- Helmeted Guineafowl
- African Harrier-Hawk
- African Sacred Ibis
- Hadada Ibis
- Southern Bald Ibis
- Rock Kestrel
- Black-winged Kite
- Western Barn Owl
- Black Sparrowhawk

The powerline sensitive species which could occasionally use the alien trees in the project site are the following:

- Peregrine Falcon
- Brown Snake Eagle
- Martial Eagle
- Cape Vulture
- Grey Crowned Crane
- Western Osprey

DAMS

There are numerous ground dams at the project site, located in drainage lines. The powerline sensitive species which could potentially use the dams in the project site on a regular basis are the following:

- African Darter
- African Sacred Ibis
- African Swamphen
- Common Moorhen
- Egyptian Goose
- Great Egret

- Grey Heron
- Hamerkop
- Intermediate Egret
- Little Egret
- Little Grebe
- Purple Heron
- Red-billed Teal
- Red-knobbed Coot
- Reed Cormorant
- South African Shelduck
- Southern Pochard
- Spur-winged Goose
- White Stork
- White-breasted Cormorant

The powerline sensitive species which could occasionally use the dams in the project site are the following:

- Black heron
- Black-crowned night heron
- Black-necked grebe
- Blue-billed teal
- Cape teal
- Goliath heron
- Mallard
- Squacco heron
- Western osprey

PANS

The project site contains one large pan, and another large pan is located approximately one kilometre south of the site. These pans are a potential drawcard for many priority species. Lesser and Greater Flamingos could use these pans for foraging and roosting. Large raptors and vultures could use the pans for bathing and drinking, and Blue Cranes could roost there on occasion. The powerline sensitive species which could potentially use the pans in the project site on a regular basis are the following:

- Black-chested Snake Eagle
- Blue Crane
- Egyptian Goose
- Greater Flamingo
- Grey Crowned Crane
- Hamerkop
- Lanner Falcon
- Lesser Flamingo
- Red-knobbed Coot
- Secretary bird
- South African Shelduck

The powerline sensitive species which could occasionally use the pans in the study area are the following:

- Mallard
- Brown Snake Eagle
- Martial Eagle
- Peregrine Falcon

- Yellow-billed Kite
- Cape Teal
- Cape Vulture

HIGH VOLTAGE LINES

Eskom power line pylons/towers are regularly used as roosting, hunting and/or nesting habitat by certain species, especially raptors and crows. Southern Bald Ibis is also known to roost on transmission towers in large numbers. The priority species which could potentially use the high voltage lines in the study area on a regular basis are the following:

- Common Buzzard
- Jackal Buzzard
- Cape Crow
- Pied Crow
- Black-chested Snake Eagle
- Long-crested Eagle
- Amur Falcon
- Lanner Falcon
- Southern Bald Ibis
- Rock Kestrel
- Black-winged Kite

The priority species which could occasionally use the high voltage lines in the study area are the following:

- Brown Snake Eagle
- Martial Eagle
- Peregrine Falcon
- Western Osprey
- Cape Vulture

Mortality of powerline sensitive avifauna due to electrocutions

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (Van Rooyen 2004). The electrocution risk is largely determined by the pole/tower design. In the case of the proposed up to 400kV grid connection, the electrocution risk is envisaged to be negligible because the proposed design of the up to 400kV line because of the clearance distances between the live and earthed components. The up to 400kV grid connection power line should not pose an electrocution threat to the priority species which are likely to occur in the study area and immediate surrounding environment.

Electrocutions within the proposed substation yards are possible but should not affect the more sensitive Red List bird species, as these species are unlikely to use the infrastructure within the substation yard for perching or roosting. Species that are more vulnerable to this impact are corvids, owls, and certain species of waterbirds.

The powerline sensitive species which are potentially vulnerable to electrocution impact are listed below:

- Common Buzzard
- Jackal Buzzard
- Cape Crow
- Pied Crow
- African Fish Eagle
- Black-chested Snake Eagle
- Brown Snake Eagle
- Long-crested Eagle

- Martial Eagle
- Spotted Eagle-Owl
- Amur Falcon
- Lanner Falcon
- Peregrine Falcon
- Helmeted Guineafowl
- Black-headed Heron
- Hadada Ibis
- Southern Bald Ibis
- Black-winged Kite
- Yellow-billed Kite
- Western Osprey
- African Grass Owl
- Marsh Owl
- Western Barn Owl
- Black Sparrowhawk
- Cape Vulture

Mortality of powerline sensitive avifauna due to collisions

Collisions are the biggest threat posed by transmission lines to birds in southern Africa (Van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds, and to a lesser extent, vultures. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with transmission lines (Van Rooyen 2004, Anderson 2001). In a PhD study, Shaw (2013) provides a concise summary of the phenomenon of avian collisions with transmission lines:

"The collision risk posed by power lines is complex and problems are often localised. While any bird flying near a power line is at risk of collision, this risk varies greatly between different groups of birds, and depends on the interplay of a wide range of factors (APLIC 1994). Bevanger (1994) described these factors in four main groups – biological, topographical, meteorological, and technical. Birds at highest risk are those that are both susceptible to collisions and frequently exposed to power lines, with waterbirds, gamebirds, rails, cranes and bustards usually the most numerous reported victims (Bevanger 1998, Rubolini et al. 2005, Jenkins et al. 2010).

The proliferation of man-made structures in the landscape is relatively recent, and birds are not evolved to avoid them. Body size and morphology are key predictive factors of collision risk, with large-bodied birds with high wing loadings (the ratio of body weight to wing area) most at risk (Bevanger 1998, Janss 2000). These birds must fly fast to remain airborne, and do not have sufficient manoeuvrability to avoid unexpected obstacles. Vision is another key biological factor, with many collision-prone birds principally using lateral vision to navigate in flight, when it is the lower-resolution, and often restricted, forward vision that is useful to detect obstacles (Martin & Shaw 2010, Martin 2011, Martin et al. 2012). Behaviour is important, with birds flying in flocks, at low levels and in crepuscular or nocturnal conditions at higher risk of collision (Bevanger 1994). Experience affects risk, with migratory and nomadic species that spend much of their time in unfamiliar locations also expected to collide more often (Anderson 1978, Anderson 2002). Juvenile birds have often been reported as being more collision-prone than adults (e.g. Brown et al. 1987, Henderson et al. 1996).

Topography and weather conditions affect how birds use the landscape. Power lines in sensitive bird areas (e.g. those that separate feeding and roosting areas, or cross flyways) can be very dangerous (APLIC 1994, Bevanger 1994). Lines crossing the prevailing wind conditions can pose a problem for large birds that use the wind to aid take-off and landing (Bevanger 1994). Inclement weather can disorient birds and reduce their flight altitude, and strong winds can result in birds colliding with power lines that they can see but do not have enough flight control to avoid (Brown et al. 1987, APLIC 2012).

The technical aspects of power line design and siting also play a big part in collision risk. Grouping similar power lines on a common servitude or locating them along other features such as tree lines, are both approaches thought to reduce risk (Bevanger 1994). In general, low lines with short span lengths (i.e. the

distance between two adjacent pylons) and flat conductor configurations are thought to be the least dangerous (Bevanger 1994, Jenkins et al. 2010). On many higher voltage lines, there is a thin earth (or ground) wire above the conductors, protecting the system from lightning strikes. Earth wires are widely accepted to cause most collisions on power lines with this configuration because they are difficult to see, and birds flaring to avoid hitting the conductors often put themselves directly in the path of these wires (Brown et al. 1987, Faanes 1987, Alonso et al. 1994a, Bevanger 1994)."

Power line collisions are generally accepted as a key threat to bustards (Raab *et al*. 2009; Raab *et al*. 2010; Jenkins & Smallie 2009; Barrientos *et al*. 2012, Shaw 2013). In a recent study, carcass surveys were performed under high voltage transmission lines in the Karoo for two years, and low voltage distribution lines for one year (Shaw 2013). Ludwig's Bustard was the most common collision victim (69% of carcasses), with bustards generally comprising 87% of mortalities recovered. Total annual mortality was estimated at 41% of the Ludwig's Bustard population, with Kori Bustards also dying in large numbers (at least 14% of the South African population killed in the Karoo alone). Karoo Korhaan was also recorded, but to a much lesser extent than Ludwig's Bustard. The reasons for the relatively low collision risk of this species probably include their smaller size (and hence greater agility in flight) as well as their more sedentary lifestyles, as local birds are familiar with their territory and are less likely to collide with power lines (Shaw 2013).

From national incidental record keeping by the Endangered Wildlife Trust, it is possible to give a measure of what species are generally susceptible to power line collisions in South Africa as shown in **Figure 7.24** below.

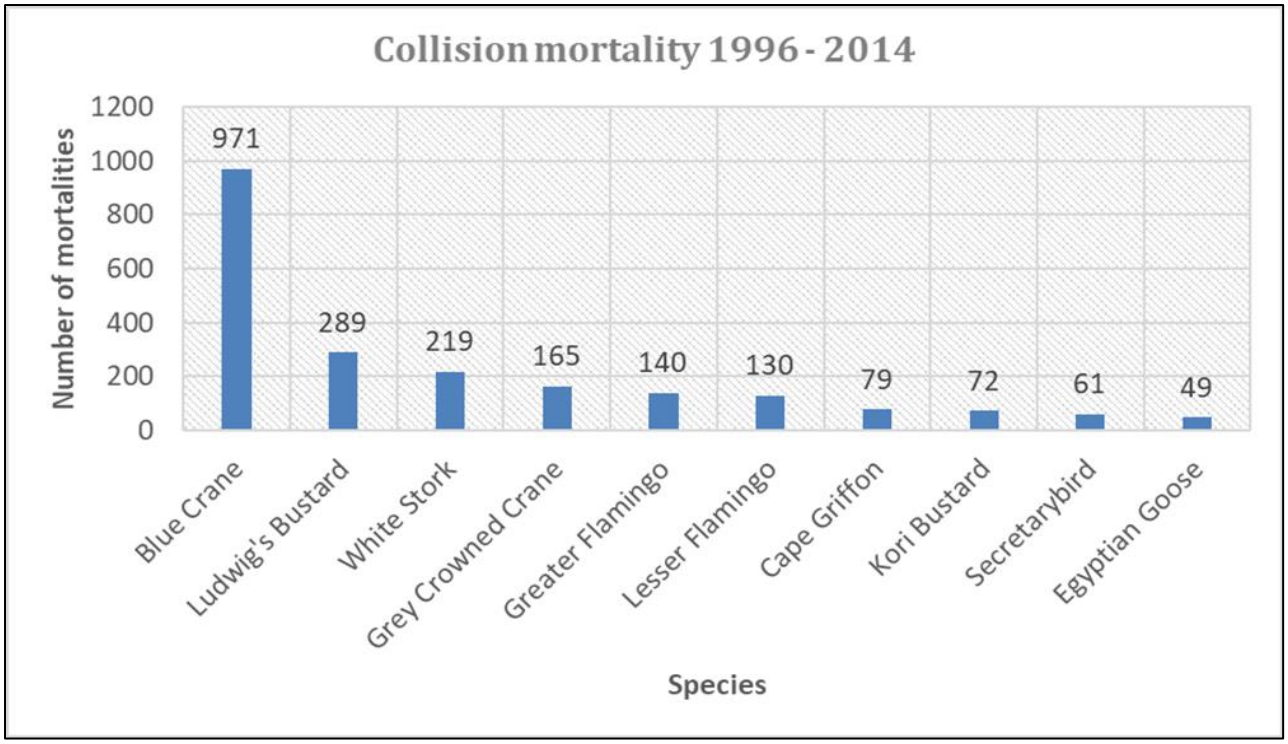


Figure 7.24: The top 10 collision prone bird species in South Africa, in terms of reported incidents contained in the Eskom/Endangered Wildlife Trust Strategic Partnership central incident register 1996 - 2014 (EWT unpublished data).

Several factors are thought to influence avian collisions, including the manoeuvrability of the bird, topography, weather conditions and power line configuration. An important additional factor that previously has received little attention is the visual capacity of birds, i.e., whether they are able to see obstacles such as power lines, and whether they are looking ahead to see obstacles with enough time to avoid a collision. In addition to helping explain the susceptibility of some species to collision, this factor is key to planning effective mitigation measures. Recent research provides the first evidence that birds can render themselves blind in the direction of travel during flight through voluntary head movements (Martin & Shaw 2010). Visual fields were determined in three bird species representatives of families known to be subject to high levels of mortality associated with power lines i.e. Kori Bustards *Ardeotis kori*, Blue Cranes and White Storks. In all species the frontal visual fields showed narrow and vertically long binocular fields typical of birds that take food items directly in the bill

under visual guidance. However, these species differed markedly in the vertical extent of their binocular fields and in the extent of the blind areas which project above and below the binocular fields in the forward-facing hemisphere. The importance of these blind areas is that when in flight, head movements in the vertical plane (pitching the head to look downwards) will render the bird blind in the direction of travel. Such movements may frequently occur when birds are scanning below them (for foraging or roost sites, or for conspecifics). In bustards and cranes pitch movements of only 25° and 35°, respectively, are sufficient to render the birds blind in the direction of travel; in storks, head movements of 55° are necessary. That flying birds can render themselves blind in the direction of travel has not been previously recognised and has important implications for the effective mitigation of collisions with human artefacts including wind turbines and power lines. These findings have applicability to species outside of these families especially raptors (A*ccipitridae*) which are known to have small binocular fields and large blind areas similar to those of bustards and cranes and are also known to be vulnerable to power line collisions.

Despite doubts about the efficacy of line marking to reduce the collision risk for bustards (Jenkins *et al*. 2010; Martin *et al.* 2010), there are numerous studies which prove that marking a line with PVC spiral type Bird Flight Diverters (BFDs) generally reduce mortality rates (e.g. Bernardino *et al.* 2018; Sporer *et al.* 2013, Barrientos *et al*. 2011; Jenkins *et al*. 2010; Alonso & Alonso 1999; Koops & De Jong 1982), including to some extent for bustards (Barrientos *et al*. 2012; Hoogstad 2015 pers.comm). Beaulaurier (1981) summarised the results of 17 studies that involved the marking of earth wires and found an average reduction in mortality of 45%. Barrientos *et al.* (2011) reviewed the results of 15 wire marking experiments in which transmission or distribution wires were marked to examine the effectiveness of flight diverters in reducing bird mortality. The presence of flight diverters was associated with a decrease of 55–94% in bird mortalities. Koops and De Jong (1982) found that the spacing of the BFDs was critical in reducing the mortality rates - mortality rates are reduced up to 86% with a spacing of 5m, whereas using the same devices at 10m intervals only reduces the mortality by 57%. Barrientos *et al*. (2012) found that larger BFDs were more effective in reducing Great Bustard collisions than smaller ones. Line markers should be as large as possible, and highly contrasting with the background. Colour is probably less important as during the day the background will be brighter than the obstacle with the reverse true at lower light levels (e.g. at twilight, or during overcast conditions). Black and white interspersed patterns are likely to maximise the probability of detection (Martin *et al*. 2010).

Using a controlled experiment spanning a period of nearly eight years (2008 to 2016), the Endangered Wildlife Trust (EWT) and Eskom tested the effectiveness of two types of line markers in reducing power line collision mortalities of large birds on three up to 400kV transmission lines near Hydra substation in the Karoo. Marking was highly effective for Blue Cranes, with a 92% reduction in mortality, and large birds in general with a 56% reduction in mortality, but not for bustards, including the endangered Ludwig's Bustard. The two different marking devices were approximately equally effective, namely spirals and bird flappers, they found no evidence supporting the preferential use of one type of marker over the other (Shaw *et al*. 2017).

The powerline sensitive species which are potentially vulnerable to this impact are listed below:

- Hamerkop
- Mallard
- Secretary bird
- Black-bellied Bustard
- Denham's Bustard
- White-bellied Bustard
- Red-knobbed Coot
- Reed Cormorant
- White-breasted Cormorant
- Blue Crane
- Grey Crowned Crane
- Wattled Crane
- African Darter
- African Black Duck
- Fulvous Whistling Duck
- White-backed Duck

- White-faced Whistling Duck
- Yellow-billed Duck
- Spotted Eagle-Owl
- Great Egret
- Intermediate Egret
- Little Egret
- Western Cattle Egret
- Greater Flamingo
- Lesser Flamingo
- Egyptian Goose
- Spur-winged Goose
- Black-necked Grebe
- Little Grebe
- Black Heron
- Black-crowned Night Heron
- Black-headed Heron
- Goliath Heron
- Grey Heron
- Purple Heron
- Squacco Heron
- African Sacred Ibis
- Glossy Ibis
- Hadada Ibis
- Southern Bald Ibis
- Blue Korhaan
- Northern Black Korhaan
- African Grass Owl
- Marsh Owl
- Western Barn Owl
- Southern Pochard
- South African Shelduck
- Cape Shoveler
- African Spoonbill
- White Stork
- Blue-billed Teal
- Cape Teal
- Red-billed Teal
- Cape Vulture

Displacement due to habitat transformation

During the construction of powerlines, service roads (jeep tracks), substations and other associated infrastructure, habitat destruction/transformation inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed OHL grid connection through the transformation of habitat. The construction activities will constitute the following:

- Site clearance and preparation;
- Excavations for infrastructure;
- Construction of the substation and grid connection infrastructure; and

- Transportation of personnel, construction material and equipment to the site, and personnel away from the site.

Relevant to this development, very little mitigation can be applied to reduce the significance of this impact as the total permanent transformation of the natural habitat within the construction footprint of the on-site substation is unavoidable. In the case of the powerline, the direct habitat transformation is limited to the on-site substation and pole/tower footprints and the narrow access road/track under the proposed powerline. The loss of habitat in the substation footprint (6 ha) will be a relatively insignificant percentage of the habitat that regularly supports powerline sensitive species and the resultant impact is likely to be fairly minimal.

Powerline sensitive species which are potentially vulnerable to displacement due to habitat transformation are mostly ground nesting species:

- African Grass Owl
- Black-bellied Bustard
- Blue Crane
- Blue Korhaan
- Denham's Bustard
- Grey Crowned Crane
- Helmeted Guineafowl
- Marsh Owl
- Northern Black Korhaan
- Secretary bird
- Spotted Eagle-Owl
- White-bellied Bustard

Displacement due to disturbance

Apart from direct habitat destruction, the above-mentioned activities also impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle, although this is often impractical to implement due to tight construction schedules.

Powerline sensitive species which are potentially vulnerable to displacement due to habitat transformation are mostly ground nesting species:

- African Grass Owl
- Black-bellied Bustard
- Blue Crane
- Blue Korhaan
- Denham's Bustard
- Grey Crowned Crane
- Helmeted Guineafowl
- Marsh Owl
- Northern Black Korhaan
- Secretary bird
- Spotted Eagle-Owl
- White-bellied Bustard

PRIORITY SPECIES

The South African Bird Atlas Project 2 (SABAP2) data indicates that a total of 234 bird species could potentially occur within the broader area. Appendix 1 of the Avifauna Impact Assessment Report (**Appendix J**)

provides a comprehensive list of all the species. Of these, 78 species are classified as priority species and 15 of these are South African Red List species. Of the priority species, 55 are likely to occur regularly in the development area.

Table 7.12 lists all the priority species that are likely to occur regularly and the possible impact on the respective species by the proposed wind farm. The following abbreviations and acronyms are used:

- NT = Near threatened
- VU = Vulnerable
- EN = Endangered

Table 7.12: Priority species potentially occurring at the development area (Red List species are shaded)

SPECIES NAME	SCIENTIFIC NAME	SABAP2 FULL PROTOCOL REPORTING RATE	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	POWERLINE PRIORITY	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	POWERLINE - COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION	ELECTROCUTIONS: SUBSTATION
Hamerkop	*Scopus umbretta*	12	0	-	-	x	x	H		x	x	x				x			
Mallard	*Anas platyrhynchos*	0.6	0.4	-	-	x		L			x	x				x			
Secretary bird	*Sagittarius serpentarius*	13	0	EN	VU	x	x	H	x			x	x			x	x	x	
Black-bellied Bustard	*Lissotis melanogaster*	0.6	0	-	-	x		L	x							x	x	x	
Denham's Bustard	*Neotis denhami*	1.8	0	NT	VU	x		L	x							x	x	x	
White-bellied Bustard	*Eupodotis senegalensis*	7.9	0	-	VU	x	x	M	x							x	x	x	
Common Buzzard	*Buteo buteo*	28	9.3	-	-	x	x	H	x				x	x					x
Jackal Buzzard	*Buteo rufofuscus*	19	2.2	-	-	x	x	H	x				x	x					x
Red-knobbed Coot	*Fulica cristata*	58	4.8	-	-	x	x	H			x	x				x			
Reed Cormorant	*Microcarbo africanus*	64	4.8	-	-	x	x	H			x		x			x			

SPECIES NAME	SCIENTIFIC NAME	SABAP2 FULL PROTOCOL REPORTING RATE	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	POWERLINE PRIORITY	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	POWERLINE - COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION	ELECTROCUTIONS: SUBSTATION
White-breasted Cormorant	*Phalacrocorax lucidus*	12	0.9	-	-	x	x	H			x		x			x			
Blue Crane	*Grus paradisea*	12	0.4	VU	NT	x	x	H	x	x		x			x	x	x	x	
Grey Crowned Crane	*Balearica regulorum*	5.5	0	EN	EN	x	x	M	x	x		x	x		x	x	x	x	
Wattled Crane	*Grus carunculata*	0.6	0	VU	CR	x		L		x						x			
Cape Crow	*Corvus capensis*	18	0.4	-	-	x	x	H	x				x	x					x
Pied Crow	*Corvus albus*	12	3.5	-	-	x	x	H	x				x	x					x
African Darter	*Anhinga rufa*	16	2.2	-	-	x	x	H			x		x			x			
African Black Duck	*Anas sparsa*	11	0	-	-	x	x	H		x						x			
Fulvous Whistling Duck	*Dendrocygna bicolor*	0	0.4	-	-	x		L								x			
White-backed Duck	*Thalassornis leuconotus*	6.7	0	-	-	x	x	M								x			
White-faced Whistling Duck	*Dendrocygna viduata*	0.6	0	-	-	x		L								x			

SPECIES NAME	SCIENTIFIC NAME	SABAP2 FULL PROTOCOL REPORTING RATE	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	POWERLINE PRIORITY	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	POWERLINE - COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION	ELECTROCUTIONS: SUBSTATION
Yellow-billed Duck	*Anas undulata*	62	4.4	-	-	x	x	H								x			
African Fish Eagle	*Haliaeetus vocifer*	12	0.9	-	-	x	x	H					x						x
Black-chested Snake Eagle	*Circaetus pectoralis*	3	0.4	-	-	x	x	M	x			x	x	x					x
Brown Snake Eagle	*Circaetus cinereus*	1.8	0	-	-	x		L	x			x	x	x					x
Long-crested Eagle	*Lophaetus occipitalis*	6.7	9.3	-	-	x	x	M	x				x	x					x
Martial Eagle	*Polemaetus bellicosus*	2.4	0	EN	EN	x	x	L	x			x	x	x					x
Spotted Eagle-Owl	*Bubo africanus*	9.1	0.9	-	-	x	x	M	x				x			x	x	x	x
Great Egret	*Ardea alba*	7.9	1.3	-	-	x		M		x	x					x			
Intermediate Egret	*Ardea intermedia*	14	1.8	-	-	x	x	H		x	x					x			
Little Egret	*Egretta garzetta*	4.2	1.3	-	-	x		H		x	x					x			
Western Cattle Egret	*Bubulcus ibis*	45	12	-	-	x	x	H	x				x			x			

SPECIES NAME	SCIENTIFIC NAME	SABAP2 FULL PROTOCOL REPORTING RATE	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	POWERLINE PRIORITY	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	POWERLINE - COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION	ELECTROCUTIONS: SUBSTATION
Amur Falcon	*Falco amurensis*	29	6.6	-	-	x	x	H	x				x	x	x				x
Lanner Falcon	*Falco biarmicus*	7.3	0	-	VU	x	x	M	x			x	x	x	x				x
Peregrine Falcon	*Falco peregrinus*	1.2	0	-	-	x	x	L	x			x	x	x					x
Greater Flamingo	*Phoenicopterus roseus*	3.6	4.4	-	NT	x	x	M				x				x			
Lesser Flamingo	*Phoeniconaias minor*	3.6	1.3	NT	NT	x	x	M				x				x			
Egyptian Goose	*Alopochen aegyptiaca*	78	6.2	-	-	x	x	H			x	x			x	x			
Spur-winged Goose	*Plectropterus gambensis*	44	1.8	-	-	x	x	H			x				x	x			
Black-necked Grebe	*Podiceps nigricollis*	0.6	0.4	-	-	x		L			x					x			
Little Grebe	*Tachybaptus ruficollis*	39	3.1	-	-	x	x	H			x					x			
Helmeted Guineafowl	*Numida meleagris*	49	3.1	-	-	x	x	H	x				x		x		x	x	x
African Marsh Harrier	*Circus ranivorus*	0.6	0	-	EN	x		L		x									

SPECIES NAME	SCIENTIFIC NAME	SABAP2 FULL PROTOCOL REPORTING RATE	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	POWERLINE PRIORITY	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	POWERLINE - COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION	ELECTROCUTIONS: SUBSTATION
Black Harrier	*Circus maurus*	0	0.9	EN	EN	x		L	x										
Montagu's Harrier	*Circus pygargus*	1.2	0	-	-	x		L	x										
African Harrier-Hawk	*Polyboroides typus*	12	1.8	-	-	x	x	M	x				x						
Black Heron	*Egretta ardesiaca*	0.6	0	-	-	x		L			x					x			
Black-crowned Night Heron	*Nycticorax nycticorax*	0.6	0	-	-	x		L			x					x			
Black-headed Heron	*Ardea melanocephala*	52	4	-	-	x	x	H	x							x			x
Goliath Heron	*Ardea goliath*	2.4	0	-	-	x		L			x					x			
Grey Heron	*Ardea cinerea*	25	3.5	-	-	x	x	H			x					x			
Purple Heron	*Ardea purpurea*	4.2	0	-	-	x		M			x					x			
Squacco Heron	*Ardeola ralloides*	1.2	0	-	-	x		L			x					x			
African Sacred Ibis	*Threskiornis aethiopicus*	48	6.2	-	-	x	x	H			x		x			x			

SPECIES NAME	SCIENTIFIC NAME	SABAP2 FULL PROTOCOL REPORTING RATE	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	POWERLINE PRIORITY	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	POWERLINE - COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION	ELECTROCUTIONS: SUBSTATION
Glossy Ibis	*Plegadis falcinellus*	4.2	1.8	-	-	x		M		x						x			
Hadada Ibis	*Bostrychia hagedash*	90	14	-	-	x	x	H	x	x			x			x			x
Southern Bald Ibis	*Geronticus calvus*	23	3.1	VU	VU	x	x	H	x				x	x	x	x			x
Rock Kestrel	*Falco rupicolus*	5.5	0.9	-	-	x	x	M					x	x					
Black-winged Kite	*Elanus caeruleus*	61	13	-	-	x	x	H	x				x	x					x
Yellow-billed Kite	*Milvus aegyptius*	2.4	0	-	-	x	x	L	x			x	x						x
Blue Korhaan	*Eupodotis caerulescens*	6.1	0	NT	LC	x	x	H	x							x	x	x	
Northern Black Korhaan	*Afrotis afraoides*	0.6	0	-	-	x		L	x							x	x	x	
Common Moorhen	*Gallinula chloropus*	33	1.8	-	-	x	x	H			x								
Western Osprey	*Pandion haliaetus*	0.6	0	-	-	x		L			x		x	x					x
African Grass Owl	*Tyto capensis*	2.4	0	-	VU	x	x	M	x	x						x	x	x	x

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Marsh Owl	*Asio capensis*	5.5	0.4	-	-	x	x	M	x	x						x	x	x	x
Western Barn Owl	*Tyto alba*	3	0.4	-	-	x		M	x				x			x			x
Southern Pochard	*Netta erythrophthalma*	9.1	0	-	-	x	x	M			x					x			
South African Shelduck	*Tadorna cana*	30	3.5	-	-	x	x	H			x	x				x			
Cape Shoveler	*Spatula smithii*	19	0	-	-	x	x	H								x			
Black Sparrowhawk	*Accipiter melanoleucus*	12	0.9	-	-	x	x	H					x						x
African Spoonbill	*Platalea alba*	16	2.2	-	-	x	x	H								x			
White Stork	*Ciconia ciconia*	7.3	1.3	-	-	x	x	M	x		x					x			
African Swamphen	*Porphyrio madagascariensis*	6.1	2.2	-	-	x	x	M			x								
Blue-billed Teal	*Spatula hottentota*	1.2	0	-	-	x		L			x					x			
Cape Teal	*Anas capensis*	3	0	-	-	x	x	L			x	x				x			

SPECIES NAME	SCIENTIFIC NAME	SABAP2 FULL PROTOCOL REPORTING RATE	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	POWERLINE PRIORITY	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	POWERLINE - COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION	ELECTROCUTIONS: SUBSTATION
Red-billed Teal	*Anas erythrorhyncha*	17	1.3	-	-	x	x	H			x					x			
Cape Vulture	*Gyps coprotheres*	0	0	EN	EN	x	x	L	x			x	x	x		x			x

7.2.6 HABITATS

The site is within an area of natural grassland. A general view over the site is given in **Figure 7.25.** The grassland contains variation due to changes in topography, slope inclination, surface rockiness and the influence of water-flow and water retention in the landscape. A classification of the natural habitat units on site, which also reflects relatively uniform plant species compositional units, is as follows:

Grassland

The general study area is characterised by an open grassland on the undulating hills and plains. It is generally a short to moderate height tussock grassland with closed canopy cover. The soil depth varies, as does the amount of surface rock cover, but tends to have shallow soil.

The general floristic character of this vegetation on site is fairly uniform across wide areas, often dominated by the same suite of species, including the grasses, *Alloteropsis semialata, Aristida diffusa, Aristida junciformis, Bewsia biflora, Brachiaria serrata, Diheteropogon amplectens, Elionurus muticus, Eragrostis capensis, Eragrostis chloromelas, Eragrostis plana, Eragrostis racemosa, Harpochloa falx, Heteropogon contortus, Microchloa caffra, Panicum natalense, Setaria sphacelata var. torta, Themeda triandra, and Tristachya leucothrix, and the forbs, Acalypha angustata, Anthospermum rigidum subsp. rigidum, Berkheya setifera, Chaetacanthus costatus, Commelina africana, Crabbea acaulis, Cucumis hirsutus, Cucumis zeyheri, Cyanotis speciosa, Gerbera viridifolia, Haplocarpha scaposa, Helichrysum rugulosum, Hemizygia pretoriae, Hermannia transvaalensis, Hibiscus aethiopicus, Hypoxis obtusa, Hypoxis rigidula, Indigofera comosa, Ipomoea ommaneyi, Justicia anagalloides, Kohautia amatymbica, Ledebouria ovatifolia, Monsonia attenuata, Nidorella hottentotta, Pentanisia angustifolia, Pollichia campestris, Scabiosa columbaria, Selago densiflora, Seriphium plumosum, Vernonia galpinii, Vernonia oligocephala, and Zornia milneana*. Overall diversity in this unit was high and included a full list of over 100 species. Local species richness was also high at 56 species per 400m^2 sampling area. This rivals the local richness of some of the most species-rich grasslands anywhere in the country.

Wetlands

Wetlands were mapped from Google Earth imagery dated 28/03/2019, a date which shows the wetness signal very well as darker green areas. This also corresponds well to black and white historical aerial photographs from 1955, where wetlands appear as darker areas.

There is one small wetland system on site that consists of patches of wetland linked by lower-lying areas through which water-flow probably occurs. These connected areas consist either of hygrophilous grassland, or temporary to seasonal weytlands, depending onlocal hydrologival conditions.

Valley bottom wetlands in this general area around Ermelo, such as this one, are generally dominated by a variety of grasses, sedges and herbaceous plants, including the graminoids, *Kyllinga erecta, Leersia hexandra, Agrostis lachnantha, Andropogon appendiculatus, Helictotrichon turgidulum, Scirpoides burkei, Cyperus teneristolon, Cyperus macranthus, Typha capensis, Agrostis erianthe, Hemarthria altissima, Panicum schinzii, Cyperus rigidifolius and Arundinella nepalensis, the herbs, Centella asiatica, Senecio polyodon, Senecio erubescens, Haplocarpha scaposa, Pelargonium luridum, Commelina africana, Lobelia flaccida, Monopsis decipiens, and Helichrysum aureonitens*. The species composition depends entirely on the hydrological characteristics of the site, with a greater number of obligate wetland species occurring in more permanently damp areas, whereas dryer areas more closely resembling terrestrial grassland in species composition.

Current cultivation

These are areas that, according to recent satellite imagery, are currently being cultivated, or were recently cultivated (within the last 5 years). If not under crops, they would be a ploughed land, or a fallow land with either weeds or a cover crop. From an ecological or biodiversity perspective, these areas have no natural habitat and have no plant or vegetation biodiversity value. The soil profile has been completely disturbed, removing all original vegetation, including geophytic and resprouting plant species. In the Grassland Biome of South Africa, a large proportion of the indigenous biodiversity consists of herbaceous and low shrubby species that re-sprout seasonally, after fire, or after defoliation from grazing animals, and can persist under these conditions. In cultivated areas, it is possible through natural succession, or through active rehabilitation, to restore a perennial cover of grasses, but the

original biodiversity is permanently lost. They also have little value for animal biodiversity, except for species that forage in cultivated areas.

Old lands

These are areas that were previously ploughed for cultivation but have been left for an extended period without ploughing. Through natural succession processes, they generally develop a perennial cover of grasses, but these secondary grasslands are species poor and the original diversity of resprouting species is usually entirely absent. Non-grass species diversity usually consists of re-seeding and weedy species, and sometimes animal- and/or bird-dispersed woody species.

On aerial photographs and satellite images with adequate resolution, these areas are often recognisable by the presence of residual plough lines and other structural features often present in cultivated fields.

Exotic trees

There are planted windrows on the roadsides in various parts of the site, as well as within homestead complex areas. These are mostly deliberately planted some decades ago and are not alien invasive species. There are, however, various places on site where alien invasive species have become established in previously disturbed areas. In both cases, the underlying natural grassland is lost.

Degraded areas

Any areas where the original vegetation is lost due to continuous degradation, such as trampling, severe overgrazing, or some other factor, it is mapped as degraded. These areas are unlikely to restore to natural grassland, even with removal of the drivers of the degradation.

Transformed areas

Areas where natural habitat no longer exists due to development of infrastructure, such as roads, buildings, and other hard surfaces. Current cultivation is also transformed, but has not been replaced by built infrastructure, therefore the soil surface can be colonized by plants, if cultivation is stopped.

A map of habitats within the study area and adjacent areas is provided in **Figure 7.25.**

Figure 7.25: Main habitats of the study area (David Hoare Consulting, 2021)

To determine ecological sensitivity in the study area, local and regional factors were taken into account. There are some habitats in the study area that have been described as sensitive in their own right, irrespective of regional assessments. This includes primarily the stream beds and associated riparian zones and adjacent floodplains.

At a regional level, the Critical Biodiversity Area (CBA) map for Mpumalanga indicates various parts of the study area as being important for conservation. There are some small patches crossed by the proposed alignment near to the railway and Camden power station, but the on-site habitat assessment has determined that these are no longer in a natural state. No intact areas of habitat within a CBA are therefore affected by the proposed project

In terms of other species of concern, including both plants and animals, the preferred habitat of each of these can be determined or has been described. They are, however, distributed amongst different habitats on site, which means that no single habitat is primarily important as habitat for species of concern.

A summary of sensitivities that occur on site and that may be vulnerable to damage from the proposed project are as follows:

Wetlands: These are described here only in terms of being a unique botanical habitat and not in the sense of a formal wetland delineation, which is normally assessed in a separate specialist study. The wetlands must be delineated according to "DWAF, 2003: A Practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". Restrictions in terms of infrastructure within these areas should be according to the National Water Act (Act 36 of 1998), except where the wetlands fall within a CBA "Irreplaceable" area, in which case they should be considered to be "No-Go" areas.

Listed ecosystems: Chrissiesmeer Panveld is listed as Endangered, and Eastern Highveld Grassland and Eastern Temperate Freshwater Wetlands are both listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

Grasslands: Grassland vegetation, in a general sense has been identified as threatened nationally as a habitat type. Indications are that loss of any grassland habitat is permanent in an ecological and biodiversity sense, and it is not possible to restore grassland to a natural state after they have been disturbed. They should therefore be treated as sensitive and all efforts made to minimize impacts on any area of grassland. If possible, the footprint of any proposed infrastructure should be kept to a minimum within any natural grasslands, especially those in a moderate to good condition.

Plant species of concern: There are a number of listed plant species that could potentially occur on site. The key habitats are grasslands and wetlands. There are also various protected species that could potentially occur on site

Based on this information, a map of habitat sensitivity on site is provided in **Figure 7.26** This shows main habitat sensitivity classes on site, as follows:

- LOW for all transformed areas.
- MEDIUM-LOW for secondary grasslands in previously cultivated areas.
- MEDIUM for cultivated wetlands.
- MEDIUM-HIGH for all remaining natural habitat on site.
- HIGH for remaining natural habitat within “CBA: Irreplaceable” and “CBA: Optimal” areas.
- VERY HIGH for intact natural wetlands

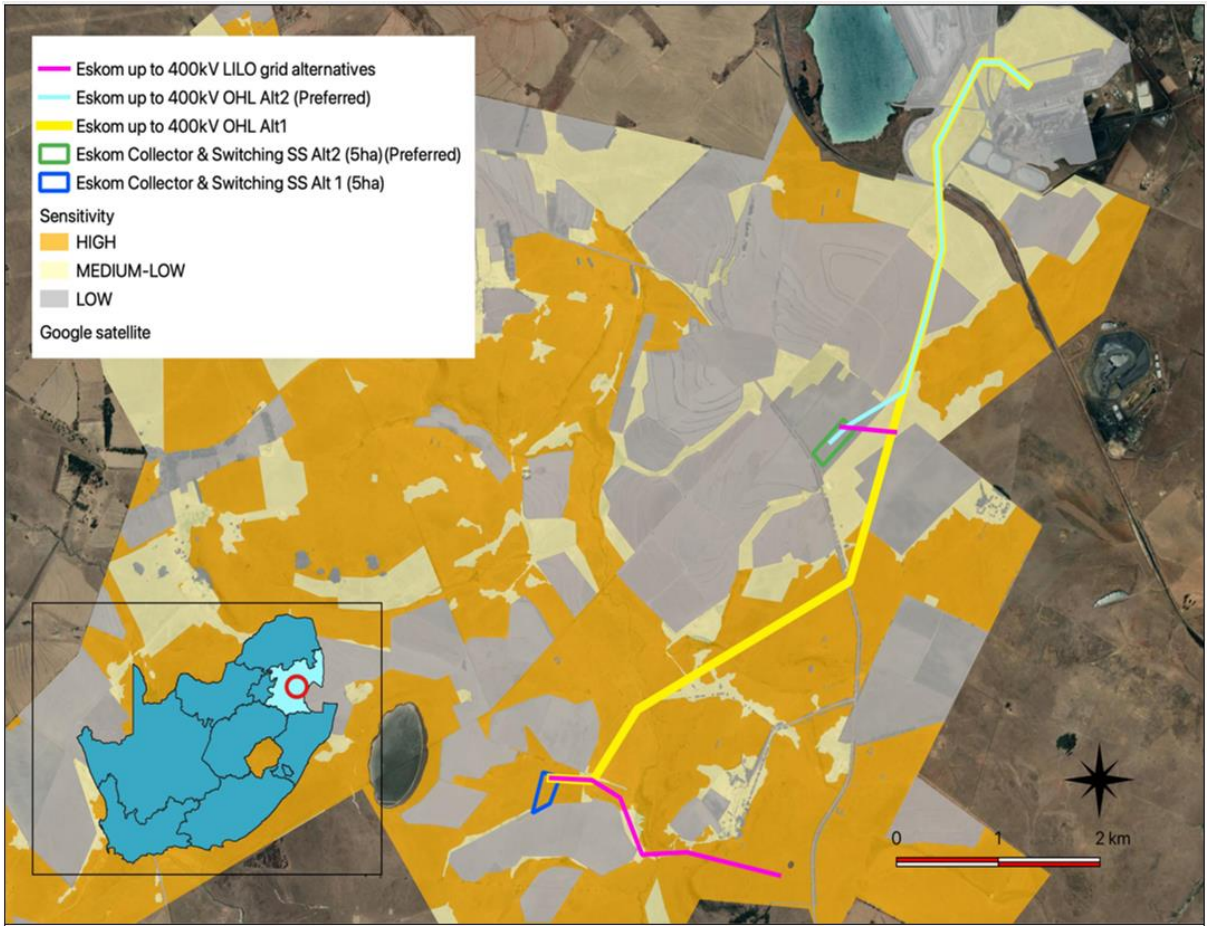

Figure 7.26: Location of proposed infrastructure relative to habitat sensitivity of the study area

There are two possible substation site options. The amount of habitat affected by each is provided in the **Table 7.13** and **Table 7.14** below.

Table 7.13: Amount of each type of habitat in the footprint of SS Alternative 2 (Preferred)

HABITAT	STATUS	AREA IN HECTARES	PROPORTION OF TOTAL AREA
Current cultivation	Transformed	5	100.0
TOTAL		5 ha	100.0%

Table 7.14: Amount of each type of habitat in the footprint of SS Alternative 1

HABITAT	STATUS	AREA IN HECTARES	PROPORTION OF TOTAL AREA
Grassland	Natural	1.89	37.8
Wetland	Natural	2.79	55.8
Current cultivation	Transformed	0.32	6.4
TOTAL		5.00 ha	100.0%

There are two direct-powerline alternatives, each of which crosses different proportions of land cover types, shown in the **Table 7.15** below. Typically, grid powerlines have pylon / tower structures anything from 10 m to 250 m apart, each of which has a small local footprint (possibly as high as ~400 m^2, but probably less than this). Assuming a tower every 200 m and a worst-case tower footprint, estimated impact areas are provided in the bottom row of the table. Although subject to modest variation, these are clearly negligible relative to the size of the study area associated with the overall cluster of projects. The alternative with the highest proportion of natural habitat is Alternative 1, for which an estimated total impact area of natural habitat is less than 2 ha. For the Loop-In-Loop-Out options, the distances required are considerably less and therefore far less than the estimates provided for the direct lines below. The impact will similarly therefore be less.

Table 7.15: Distance of each type of habitat in the footprint of the grid alternatives

HABITAT	STATUS	ALTERNATIVE 1	ALTERNATIVE 2 (PREFERRED)
Grassland	Natural	3986 m	196 m
Wetland	Natural	182 m	
Exotic trees	Degraded		
Degraded areas	Degraded	2684 m	2557 m
Old lands	Secondary	712 m	373 m

HABITAT	STATUS	ALTERNATIVE 1	ALTERNATIVE 2 (PREFERRED)
Current cultivation	Transformed	1554 m	1407 m
Road	Transformed	20 m	
TOTAL		9039 m	4533 m
Possible footprint		46 x 400 m^2 = 1.84 ha	24 x 400 m^2 = 0.96 ha

7.3 SOCIAL ENVIRONMENT

7.3.1 LAND USE

DEVELOPMENT SITE

The site is used for cultivation and for the grazing of both cattle and sheep. Cultivated crops include maize, soya beans and the fodder crop, weeping love grass, *Eragrostis curvula*.

In terms of the South African National Land Cover dataset, the site is classified as Grassland interspersed with cultivation areas, small sections of forested land and numerous wetlands/water bodies throughout the project site (**Figure 7.27**).

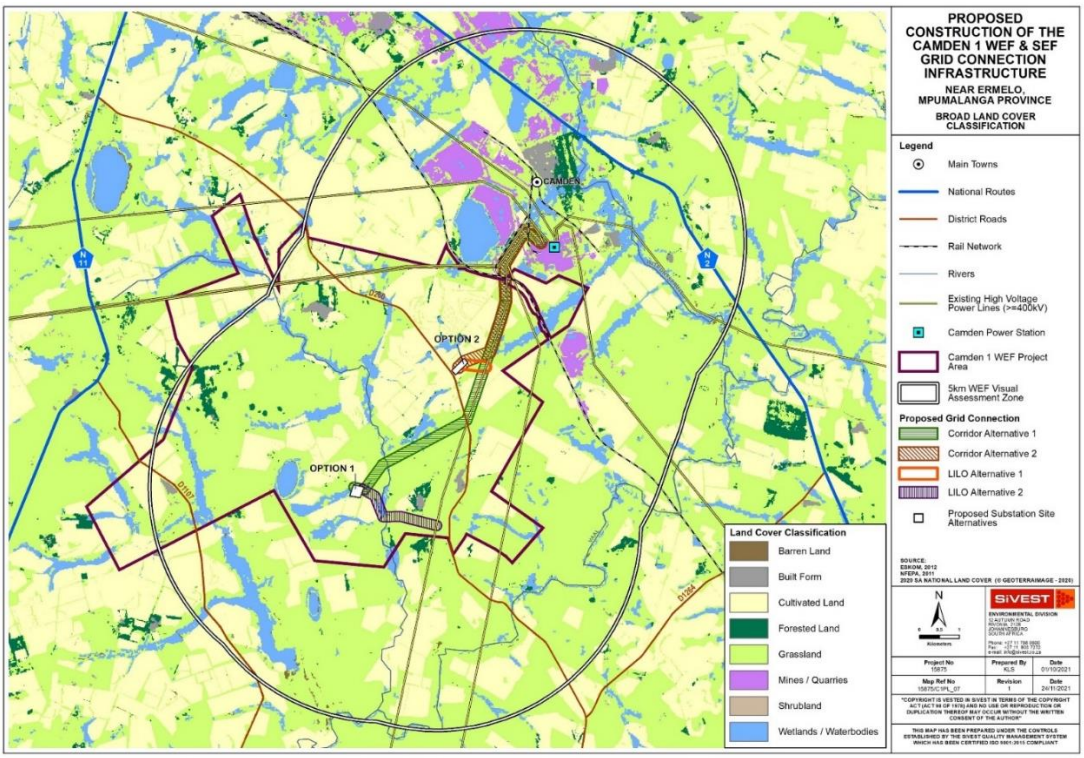

Figure 7.27: Broad land cover classification (SiVest 2021)

SURROUNDING AREAS

The study area is located approximately 10km southeast of the town of Ermelo. The only other settlement in the area is the rural settlement of Sheepmore located approximately 20 km to the east of the proposed project site.

Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation and livestock grazing. There are multiple farm portions in the study area, resulting in a relatively moderate density of rural settlement with many scattered farmsteads in evidence. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers' dwellings, gravel access roads, telephone lines, fences and windmills.

High levels of human influence are however visible in the northern / north-eastern sector of the study area. Much of the town of Ermelo encroaches into the study area and peri-urban areas stretching southwards from Ermelo along the N2 national route are dominated by mining activity and associated infrastructure, including Mooiplaats and Vunene Collieries. Also located in this area is the Camden Power Station with associated high voltage power lines, and the adjacent Camden residential area.

Other evidence of significant human influence includes a sizeable quarry (Rietspruit Crushers) located to the west of the N11 national route, as well as road, rail, telecommunications and high voltage electricity infrastructure.

7.3.2 HERITAGE AND CULTURAL RESOURCES

Heritage finds are limited to burial sites and the demolished remains of structures in the greater area (**Figure 7.28**). Only site CA 002, CA 010 and CA 012 are close enough to be affected by the Project. The sites are briefly described in **Table 7.16** and general site conditions are indicated in **Figure 7.29**–**Figure 8-36**.

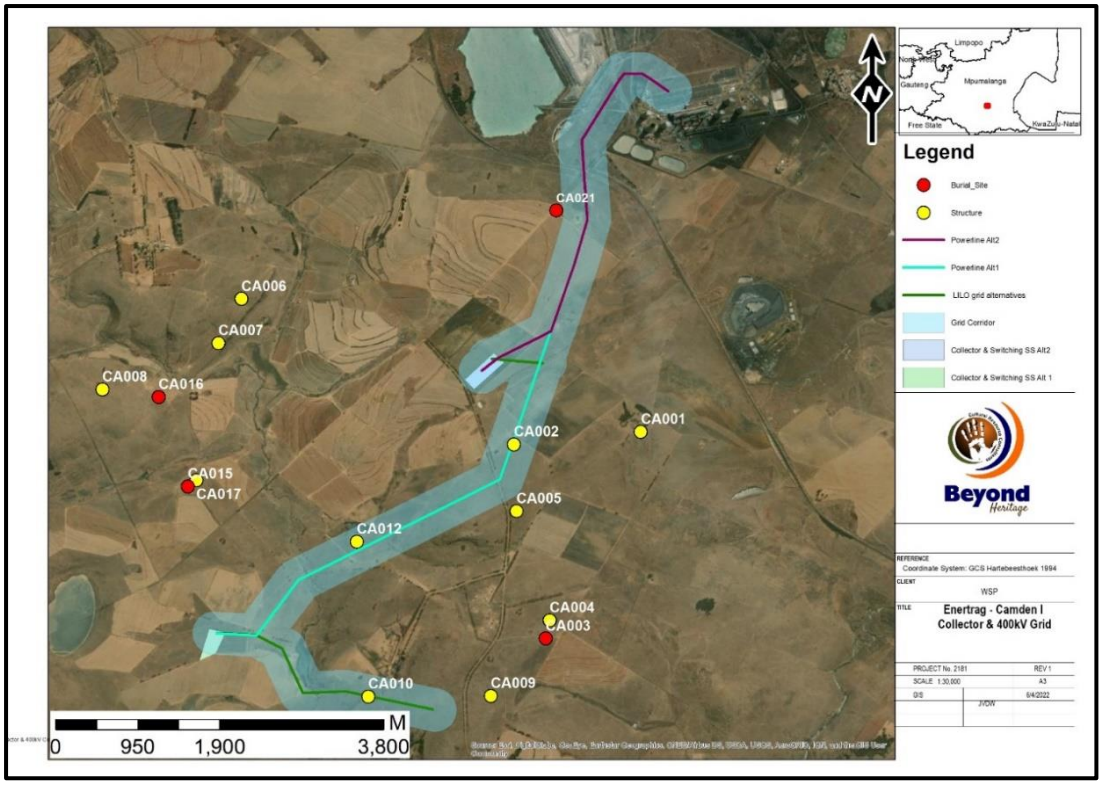

Figure 7.28: Observation points in relation the project area.

Table 7.16: Recorded observations in the study area.

LABEL	LONGITUDE	LATITUDE	DESCRIPTION	SIGNIFICANCE
CA002	30° 04' 17.9363" E	26° 39' 18.3757" S	Remnants of a square packed stone structure or kraal (5 x 3 m). The feature is situated right next to the existing powerline.	GP C - Low significance
CA010	30° 03' 23.2758" E	26° 40' 53.0306" S	Extensive packed stone wall extending about 1 km around an existing farmstead located on a small hill. The stone wall seems to form part of large grazing paddocks that were built around the farmstead. The feature is degraded and overgrown.	GP C Low Significance
CA012	30° 03' 19.0655" E	26° 39' 54.9277" S	The site consists of the remains of three stone structures. One is rectangular and is 20mx13m in size while the other is circular and 4m x4m in size The third is 12mx9m in size and the entire site extends over an 80mx50m area with a dam 50 m to the south.	GP C Low Significance

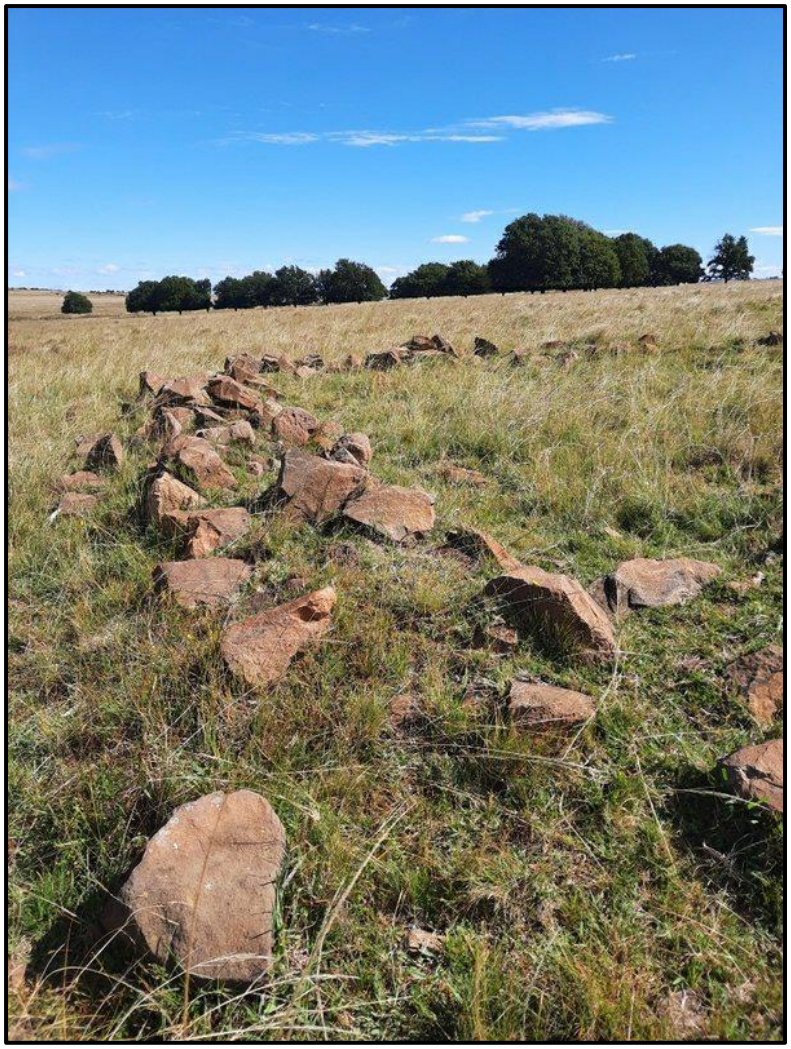

Figure 7.29: Ephemeral stone packed wall at CA002

Figure 7.30: Location of CA002 in relation to the powerline

Figure 7.31: General site conditions at CA010.

Figure 7.32: Extensive stone packed wall at CA010.

Figure 7.33: Series of stone packed structures at CA012.

Figure 7.34: Remnants of a stone packed feature at CA012.

CULTURAL LANDSCAPE

The study area is in a rural setting and characterised by cultivation and agricultural activities with a historical layering consisting of burial sites and the remnants of stone packed structures/ settlements. A more recent industrial element is introduced by the Camden Power Station that was commissioned in 1967.the cultural landscape is outlined below in **Figure 7.35.**

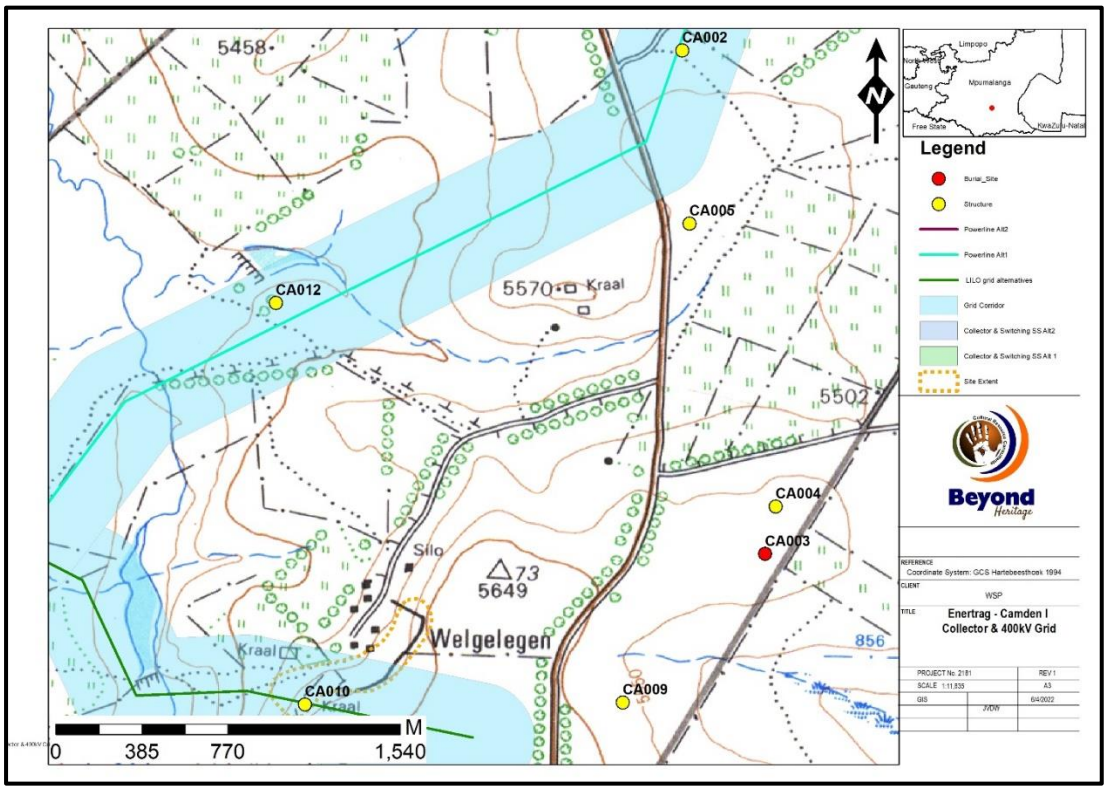

Figure 7.35: Topographic map of the study area indicating a kraal in the area where CA010 was recorded as well as a tree lane to the north. Some small tracks are indicated in the proposed corridors.

7.3.3 PALAEONTOLOGICAL

REGIONAL PALAEONTOLOGY

The palaeontological sensitivity of the area under consideration is presented in **Figure 7.36**. The site for development is in the Vryheid Formation (red; very highly sensitive) for Alternative 1, and the non-fossiliferous Jurassic dolerite (grey) for Alternative 2; but the power line grid connection routes are on both strata. The Jurassic dolerite is an intrusive igneous rock and do does not preserve fossils, in fact, dykes can destroy any fossils that were in the rocks through which they have intruded.

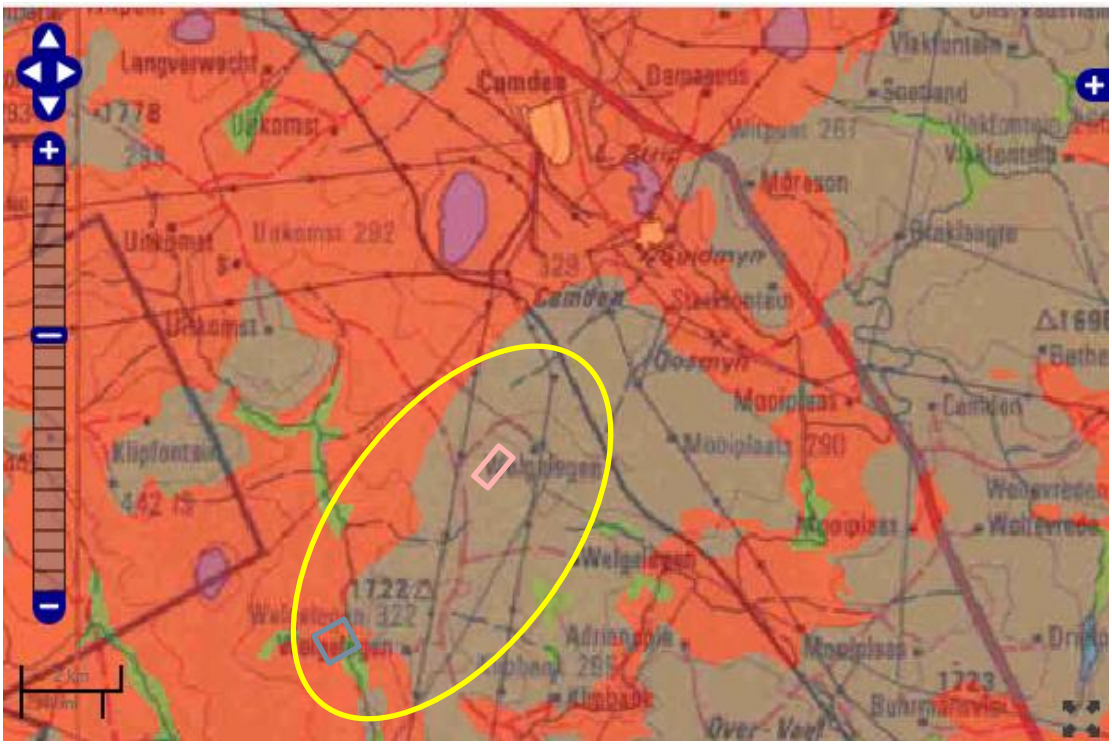

Figure 7.36: SAHRIS palaeosensitivity map for the site for the proposed Camden up to 400kV powerline and Collector Substation within the yellow oval. Lilac rectangle is the Collector Substation Alt 1, and light blue rectangle is the Alt 2. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

The Vryheid Formation is potentially very rich in fossils of the Glossopteris flora. This flora includes Glossopteris leaves, seeds, roots, stems and reproductive structures, as well as other plants such as lycopods, sphenophytes, ferns, cordaitaleans and early gymnosperms (Plumstead, 1969; Anderson an Anderson, 1985; Bamford, 2004). Coal seams were formed from peats comprising these plants that were altered by heat and pressure to make coal. The coal itself, however, does not preserve any recognisable plant structure, but the shales associated with the seams can preserve recognisable impressions of the ancient plants (Plumstead, 1969).

Site visit observations

The agricultural land is either cultivated now, has recently been cultivated or is used for grazing. Nonetheless, it is disturbed and covered with soils and medium height grasses. There are no rocky outcrops of shale, just some dolerite outcrops (no fossils expected). No fossils were seen in the Vryheid Formation either (**Figure 7.37**).

Figure 7.37: Site visit photographs for the Collector substation site alternatives and grid connections. A – Land being grazed so grass is short but still no outcrops or fossils were seen. B – View across the landscape showing dolerite ridges. C – Previously cultivated land with no rocky outcrops and no fossils.

7.3.4 VISUAL

VISUAL CHARACTER AND CULTURAL VALUE

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

The predominant land use in the area (maize cultivation) has significantly transformed the natural landscape across much of the study area. In addition, the landscape becomes progressively more transformed towards the north-eastern boundary of the study area where Camden Power Station with its associated power lines in conjunction with mining activities have resulted in a high degree of visual degradation. The more industrial character of the landscape is an important factor in this context, as the introduction of the proposed power line and substations would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

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

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

In light of this, it is important to assess whether the introduction of a new power line and substations into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that there are several existing high voltage power lines in the area. In addition, the visual character in much of the area has been significantly transformed and degraded as a result of mining and infrastructural development.

VISUAL CONTRAST

The visual contrast of a development refers to the degree to which the development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on receptors within a specific context. A development that is incongruent with the surrounding area could change the visual character of the landscape and have a significant visual impact on sensitive receptors.

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast:

High – undeveloped / natural / rural areas.

Moderate –

- areas within 500m of existing power lines (>=88kV);
- areas within 500m of N2 national route;
- areas within 500m of railway infrastructure;
- cultivated areas and smallholdings.

Low –

- areas within 500m of urban / built-up areas;
- areas within 500m of quarries / mines etc;
- areas within 500m of Camden Power Station;

These zones are depicted in **Figure 7.38** below.

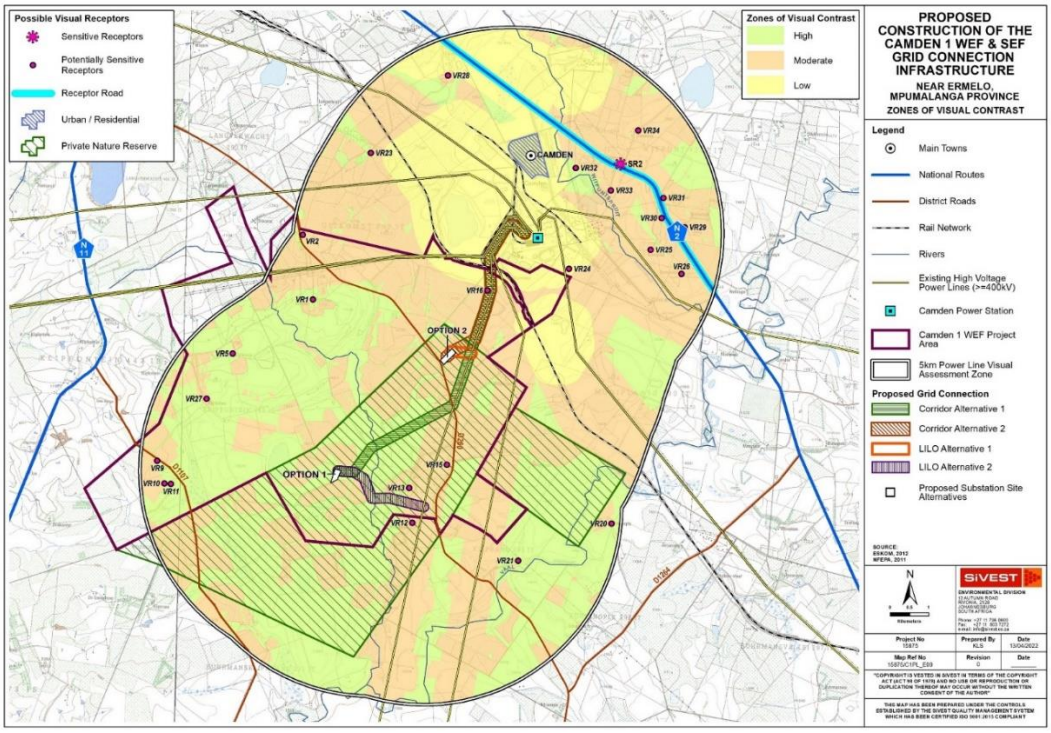

Figure 7.38: Zones of Visual Contrast

IDENTIFIED RECEPTORS

The visual impact assessment of the study area identified twenty-five (25) potentially sensitive visual receptor locations within a five (5) km radius of the power line / substation assessment corridors, most of which appear to be existing farmsteads. Although the findings of the desktop assessment were largely confirmed during the field investigation, it was not possible to confirm the presence of receptors at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development.

Only one (1) of the identified receptor locations, namely Indawo Game Ranch and Hotel (SR2) was found to be linked to leisure / tourism facilities and is thus considered to be a sensitive receptor.

The remaining receptor locations are all believed to be farmsteads that are regarded as potentially sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known. Six (6) of these farmsteads were found to be outside the preliminary viewshed for the proposed power line and substations.

In addition, ten (10) of these receptors are located within the Camden I WEF project area.

It was noted that the residential area of Camden is partially located within the grid infrastructure study area. Many of the residences appear to be derelict and disused and although the remaining residences could be seen as receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study is the N2 national route which links Piet Retief in the east with Ermelo to the north and Gauteng Province to the north-west. Another important route is the D260 district road which traverses the study area in a north-south direction.

The section of the N2 traversing the study area is not considered part of designated scenic route, although this route is an important link and is likely to be utilised, to some extent, by tourists exploring this part of Mpumalanga Province. As a result, the N2 is considered to be potentially sensitive receptor

road – i.e. a road that is used by motorists who may object to the potential visual intrusion of the proposed power line / substation development.

The D260 District Road and other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

One formal protected area (Langcarel Private Nature Reserve) was identified within the study area, although the area is entirely managed for commercial agriculture with no conservation activities present and no evidence of public access to the site. Any landscape value or visual appeal has therefore been reduced. The area is not typically valued for its tourism significance and relatively few leisure-based tourism facilities (lodges/accommodation facilities) were identified inside the study area. This factor in conjunction with the high levels of transformation in the north-east have reduced the overall visual sensitivity of the broader area.

The identified potentially sensitive visual receptor locations for the proposed power line and substation are indicated in **Figure 7.39.**

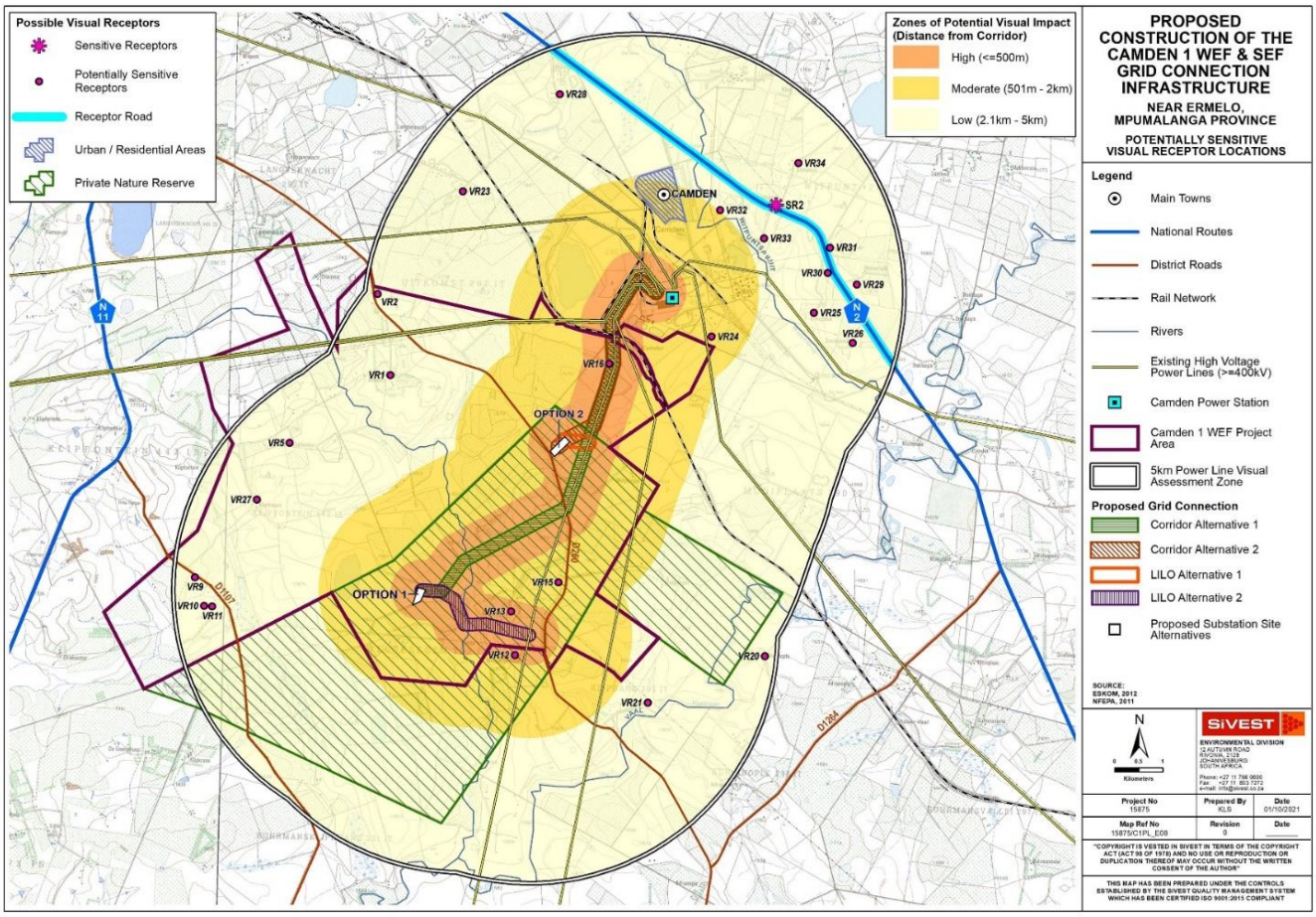

Figure 7.39: Potentially sensitive receptor locations within the study area

ASSESSMENT FINDINGS

Power line towers and substations are very large objects and thus highly visible. The maximum tower height envisaged for the proposed power line is 40m (approximately equivalent in height to a ten-storey building). Although a tower structure would be less visible than a building, the height of the structure means that the tower would still typically be visible from a considerable distance. Visibility would be increased by the fact that the power line comprises a series of towers typically spaced approximately 200m to 250m apart in a linear alignment.

The degree of visibility of an object informs the level and intensity of the visual impact, but other factors also influence the nature of the visual impact. The landscape and aesthetic context of the environment in which the object is placed, as well as the perception of the viewer are also important factors. In the context of a power line, the type of tower used as well as the degree to which the towers would impinge upon or obscure a view is also a factor that will influence the experience of the visual impacts.

As described above, a power line or substation could be perceived to be highly incongruous in the context of a largely natural or pastoral landscape. The height and linear nature of the power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing any taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the power line. In a largely natural, bushier setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the power line more visible and drawing the viewer's attention to the power line servitude.

Sensitivity to visual impacts is typically most pronounced in areas set aside for conservation of the natural environment (such as protected natural areas or conservancies), or in areas in where the natural character or

scenic beauty of the area attracts visitors (tourists). In this instance however, the area is not typically valued for its tourism significance and no recognised tourism routes traverse the study area.

Conversely, the presence of other anthropogenic objects associated with the built environment may "degrade" the visual environment and thus the introduction of a new power line and substation into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible. In this context therefore, the presence of the Camden Power Station and its associated power line infrastructure as well as mining activity in the area is expected to lessen the visual contrast associated with the introduction of a new power line and substation.

Other factors, as listed below, can also affect the nature and intensity of a potential visual impact associated with a power line and substation:

- The location of the development in the landform setting – i.e. in a valley bottom or on a ridge top. In the latter example the development would be much more visible and would "break" the horizon;
- The presence of macro- or micro-topographical features, built form or vegetation that would screen views of the development from a receptor location;
- The presence of existing, similar features in the area and their alignment in relation to the proposed new development; and
- Temporary factors such as weather conditions (presence of haze, rainfall or heavy mist) which would affect visibility.

In this instance, the proposed power line and substation are intended to serve the proposed Camden I WEF and Camden I SEF and as such, the power line and substations will only be built if these facilities are developed. The proposed power line and substations are therefore likely to be perceived to be part of the greater renewable energy complex development and the visual impact will be relatively minor when compared to the visual impact associated with the Renewable Energy Complex as a whole.

7.3.5 SOCIO-ECONOMIC

OVERVIEW OF STUDY AREA

The study area is located ~ 10 km to the south-east of the town of Ermelo, which is the administrative centre of the MM. Ermelo is the administrative seat of both the Msukaligwa Local Municipality (MLM) and the Gert Sibande District Municipality (GSDM) and is also known as the garden city of Mpumalanga and the gateway to the province. The small settlement of Camden associated with Camden Power station (located 2.3 km north of the project site), is the only other urban area located in significant proximity.

Three national highways, namely the N2, N11 and the N17 intersect at Ermelo. The N2 freeway connects Ermelo with Richards Bay on the KwaZulu Natal coastline. The N11 South connects the town to Newcastle to the south and then onto the Ladysmith before linking up with the N3 to Durban. The N11 north connects to Middelburg and the N4 freeway west to Pretoria. The N17 West connects the town to the southern suburbs of Johannesburg and N17 East to eSwatini.

Ermelo is also a major railway junction between Mpumalanga and KwaZulu-Natal. The rail junction connects to Machadodorp which is on the Pretoria and Maputo railway line. The town also lies on the Richards Bay railway line that connects the Mpumalanga coalfields with the export Port of Richards Bay on the Indian Ocean.

The study area is flanked by the N2 to the north and north-east of the site, and the N11 to the west and south west of the site. The Richards Bay railway line traverse the area to the south of the Camden Power station site. The Eskom Camden Coal Power station is located immediately to the north and north east of the site (Photograph 3.1). Construction of the 1600 MW power station commenced in November/December 1962 and the first turbo-generator was commissioned in April 1967. The last of the eight units was commissioned in 1969. The Camden Power station became the starting point of the national power grid, consisting of a series of 400 kV lines which today interconnect the entire country. The power station has six 111.86 m high cooling towers and four 154 chimney (smoke stacks) that served 8 boilers.

Between 1990 and 2006 the station was mothballed, but South Africa's energy crisis in the early 21st century prompted Eskom to recommission the station, starting with unit 6 in July 2005 and completing with unit 1 in July 2008. The development of the Camden Power station also involved the construction of the village of Camden, located ~ 1.3km to the north of the power station. The village, which consists of 356 was established to

accommodate administration, operating and maintenance personnel. Community facilities including a community hall, sports facilities, included four tennis courts, a bowling green, swimming bath, shooting range, rugby, hockey, soccer, and cricket fields and jukskei, and the associated clubhouses and changerooms were also established. Several parks, situated throughout the residential property, provided playgrounds for some 500 children at Camden. Schooling was provided in Ermelo for these children, with a regular bus service operating between Camden and Ermelo . The settlement currently accommodates a SANDF military base (Camden).

Figure 7.40: Camden Power Station

The proposed Camden 1 Collector substation and 400 kV line project is located just to the south of the Camden power station, approximately 11 km south-east of the town of Ermelo in the south-central part of Mpumalanga Province (**Figure 7.41**). The small Camden settlement associated with Camden power station (located 1.3 km north of the project site), is the only other urban area located in significant proximity.

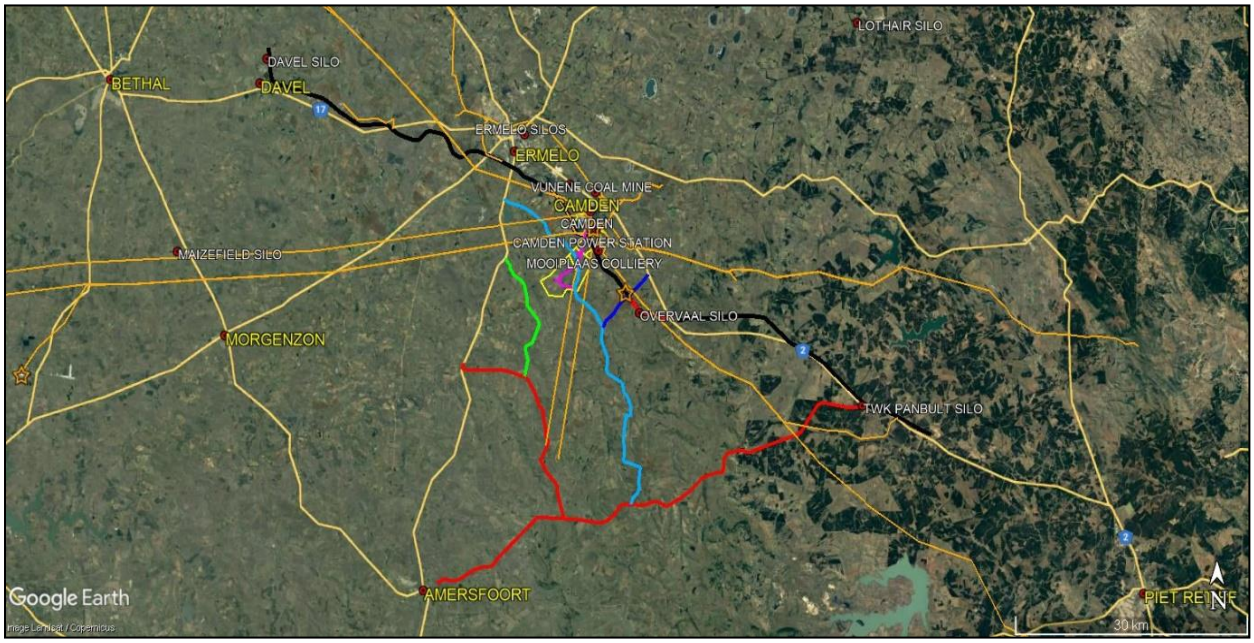

Figure 7.41: Proposed 400 kV line and collector substation alternatives (pink) and subject properties (yellow) indicated in relation to settlements, grain silos and local collieries, Camden power plant, existing Eskom lines (orange lines), railway line (black), and local public gravel road network, viz., the Familiehoek road (green) De Emigratie road (light blue), Overvaal road (dark blue) and other (red)

Study area properties are primarily accessed off three public gravel roads which intersect with the N11 or N2, viz. the De Emigratie- (N11), Familiehoek- (N11) and Overvaal (N2) roads. Of these, the De Emigratie road is of most relevance to the project. It functions as a north-south-aligned spine, ultimately providing two routes between the N11 and the N2 via the study area (**Figure 7.42**). Base farms are typically accessed directly off these roads, with internal roads providing access to uninhabited farm portions or properties. Access to farm roads is typically unrestricted (i.e., no access gates – but there are exceptions). A road off the Overvaal road (N2-De Emigratie Road) provides the only access road to the Overvaal silo complex.

Figure 7.42: De Emigratie road on Welgelegen (site property)

The study area essentially forms part of the Ermelo commercial farming district. Ermelo is a key producer of field crops and livestock, typically in mixed operations. Field crops are grown under dryland conditions. Key crops include maize and dry beans (**Figure 7.43**). Ermelo is a major producer of maize. Six large silo complexes are located within a 40 km distance of Ermelo. Those in significant proximity to the study area are located at Overvaal rail siding and in Ermelo and serve a broader area than the immediate study area (**Figure 7.42**).

Figure 7.43: Maize fields on Uitkomst farm along the De Emigratie gravel road; Camden power station in the background.

SITE PROPERTIES

The proposed 400 kV overhead line and associated collector substation directly affect four properties (including Camden Power station). The affected properties are owned by three landowners (**Table 7.17**). The properties owned by Ms Petronella Reyneke (322/1 and 322/2) would be affected by all infrastructure alternatives. The property owned by Mr de Jager (290/14/RE) would only be affected by the proposed 400 kV line alternatives (**Figure 7.44**).

Table 7.17: Overview of properties affected by proposed infrastructure

PROPERTY	IMPACT	OWNER	LAND USE
329	400 kV Alts 1& 2	Eskom	Eskom Camden power plant& substation
290/14/RE Mooiplaats	400 kV Alts 1& 2	Mr Lood de Jager	Dryland cropping; Grazing
322/1 Welgelegen	Substation Alt 2; 400 kV Alts 1& 2; LILO Alt 2	Ms Petronella Reyneke	Dryland cropping; Grazing Land leased out
322/2 Welgelegen	Substation Alt 1 400 kV Alt 1; LILO Alt 1		Residential (base farm); Residential (labour, tenured); Dryland cropping; Grazing; Land leased out

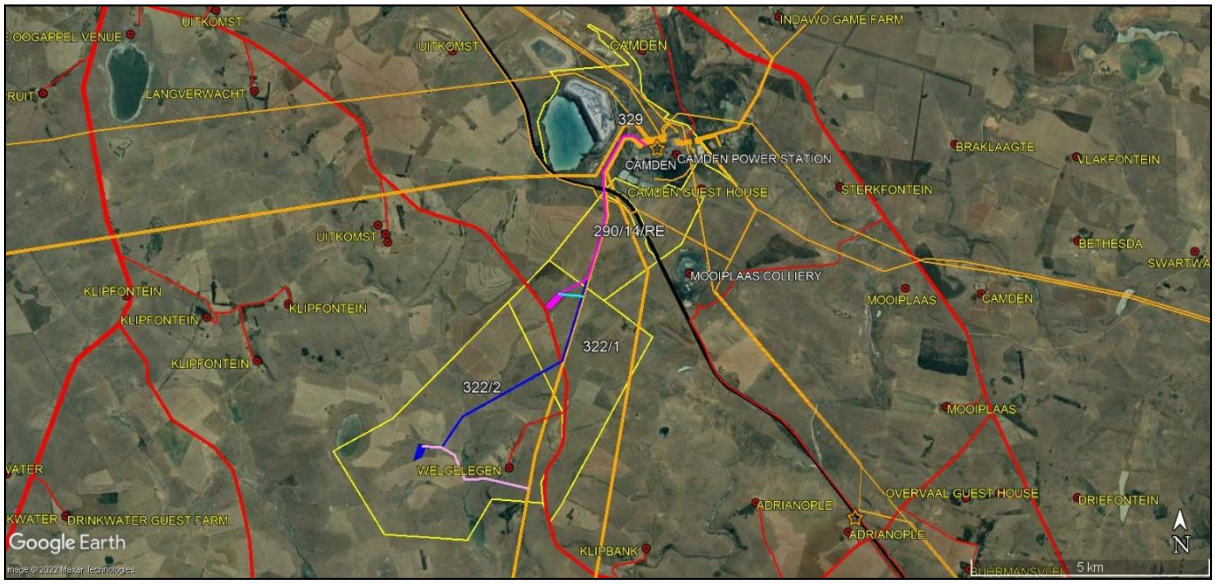

Figure 7.44: Proposed Camden I 400 kV line and Collector Substation alternatives and subject properties (yellow) indicated in relation to existing Eskom lines (orange lines), railway line (black) and local gravel roads (red). Also indicated are the proposed Collector substation Alt 1 (dark blue fill) and Alt 2 (pink fill); proposed 400 kV line Alt 1 (dark blue line) and Alt 2 (pink); and link-in/ link-out Alt 1 (light pink) and Alt 2 (light blue line).

8 IMPACT ASSESSMENT

The EIA phase of the S&EIR process has determined potential impacts associated with the proposed project. The anticipated environmental and social impacts have been identified and assessed by the various specialists according to the phases of the project's development. The assessment methodology is indicated in **Section 4.2.**

For the purpose of this project, these phases have been generically defined below:

- Construction Phase:
  - The construction phase includes the preparatory works/activities typically associated the creation of surface infrastructure, access and electrical power. The activities most relevant to this phase include but not limited to : Topsoil stripping; Cut and fill activities associated with site preparation (if required).
- Operation Phase:
  - The operational phase activities are limited to maintaining the servitude (including maintenance of access roads and cutting back or pruning of vegetation to ensure that vegetation does not affect the OHPL).
- Decommissioning Phase:
  - The closure phase includes the activities associated with the removal/dismantling of machinery/equipment/infrastructure no long necessary to the operation.

8.1 SOIL EROSION AND CONTAMINATION

8.1.1 *CONSTRUCTION PHASE*

SOIL EROSION

During the construction phase, measures should be implemented to manage stormwater and water flow on the site. If the stormwater and water flow is not regulated and managed on site, it could cause significant erosion of soil around the cleared areas.

During the construction phase, the Project activities could leave soils exposed and susceptible to erosion. The construction impact on soil erosion is indicated in **Table 8.1**

Table 8.1: Construction Impact on Soil Erosion

Potential Impact: / **SOIL EROSION**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	3	2	4	**32**	**Moderate**	(-)	High
With Mitigation	1	1	3	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	— Only areas required during construction and operation are to be cleared and the clearing footprint is to be limited as far as possible. This should be done in stages as construction works progress, if possible; — Implement stormwater management measures that will help to reduce the speed of the water. These measures must also assist with the prevention of water pollution, erosion and siltation; — Any exposed earth should be rehabilitated promptly, and this could include planting suitable vegetation (vigorous indigenous grasses) that mimics the surrounding environment to protect the exposed soil;								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
SOIL EROSION								
	— If excavations or foundations fill up with stormwater, these areas should immediately be drained and measures to prevent access to these areas should be implemented; — Erosion control measures should be implemented during the construction phase on large, exposed areas and where stormwater is temporarily channelled; — Stormwater channels and preferential flow paths should be delineated, filled with aggregate and/or logs (branches included) to dissipate and slow flows, limiting erosion; and — Rehabilitate the area to manage erosion as soon as practicably possible.							

SOIL CONTAMINATION

During construction activities, construction vehicles/trucks/machinery as well as hazardous substances stored on the site might spill and contaminate the soil. The impact of the construction phase on soil pollution is indicated in **Table 8.2**

Table 8.2: Construction Impact on Soil Contamination

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
SOIL CONTAMINATION									
Without Mitigation	2	1	3	3	4	**36**	**Moderate**	(-)	High
With Mitigation	1	1	3	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	— All construction vehicles, plant, machinery and equipment must be properly maintained to prevent leaks; — Plant and vehicles are to be repaired immediately upon developing leaks; — Drip trays shall be supplied for all idle vehicles and machinery; — Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants; — Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow; — Ensure appropriate handling of hazardous substances; — Keep adequate spill kits onsite and train personnel to use them appropriately; — Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded; and — Implement stormwater management measures that will help to reduce the speed of the water flows.								

The only potential source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and fairly easily mitigated through generic mitigation measures.

The construction impact and associated mitigation measures are outlined in the **Table 8.3** below.

Table 8.3: Construction impact on soil, land and agriculture

Potential Impact: / Soil erosion and topsoil loss	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	3	3	**27**	**Low**	(-)	High
With Mitigation	1	1	3	2	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	There are no additional mitigation measures required, over and above what has already been included in the generic environmental programme relevant to an application for environmental authorisation for substation and overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019								

8.1.2 *OPERATIONAL PHASE*

SOIL EROSION

There are no anticipated soil erosion impacts expected during the operational phase as maintenance activities will occur as and when required and will be extremely short-term. However, erosion and stormwater controls should be set up around the monopoles during construction to protect them during the operational phase.

SOIL CONTAMINATION

Soil contamination is expected to be limited during the operational phase as maintenance activities will occur as and when required and will be extremely short-term. The operational impact on soil contamination is indicated in **Table 8.4**

Table 8.4: Operation Impact on Soil Contamination

Potential Impact: / SOIL CONTAMINATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	3	3	**27**	**Low**	(-)	High
With Mitigation	1	1	3	2	2	**14**	**Very Low**	(-)	High
Mitigation and Management Measures	— All vehicles, plant, machinery and equipment must be properly maintained to prevent leaks; — Vehicles and machinery are to be repaired immediately upon developing leaks; — Drip trays shall be supplied for all idle vehicles and machinery; — Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants; — Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow; — Ensure appropriate handling of hazardous substances; — Keep a spill kit on site and train personnel to use it appropriately; and — Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded.								

8.1.3 DECOMISSIONING PHASE

The decommissioning impacts are expected to be the same as the construction phase impacts.

8.2 AQUATIC BIODIVERSITY

8.2.1 CONSTRUCTION PHASE

LOSS OF VERY HIGH SENSITIVITY SYSTEMS

During the construction phase, the loss of Very High Sensitivity systems is possible, namely the wetlands through physical disturbance, the proposed layout has avoided these systems with the exception of one of the buffer areas near the southern entrance. The impact and associated mitigation measures are outlined below in **Table 8.5.**

Table 8.5: Construction Impact on high sensitivity systems

Potential Impact: / **Loss of Very High Sensitivity Systems**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	4	4	5	4	2	**34**	**Moderate**	(-)	High
With Mitigation	2	2	2	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— All alien plant re-growth must be monitored as per the Alien Plant Management Plan, and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. — It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed. — Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts. — A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks. — No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure). — Strict use and management of all hazardous materials used on site. — Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Loss of Very High Sensitivity Systems								
	— Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. — Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided. — Appropriate waste management to be practiced on site to prevent pollution of nearby watercourses — Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Plan (EMPr) for the project and strictly enforced in the applicable phase/s. — In the instances where facility roads are required on the present road / track crossings already installed by local landowners / public works entities, install properly sized culverts with erosion protection measures.							

DAMAGE OR LOSS OF RIPARIAN AND OR RIVERINE SYSTEMS AND DISTURBANCE OF THESE WATERBODIES IN THE CONSTRUCTION PHASE

The physical removal of riparian zones within watercourses, however this would be localised as the number of watercourses is of moderate sensitivity and located in areas with minimal vegetation (riparian) and/ or previously disturbed areas. The impact and associated mitigation measures are outlined below in **Table 8.6.**

Table 8.6: Construction Impact on riparian and or riverine systems

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Damage or loss of riparian and or riverine systems									
Without Mitigation	4	4	5	4	2	**34**	**Moderate**	(-)	High
With Mitigation	2	2	2	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. — It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed. — Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts. — A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Damage or loss of riparian and or riverine systems								
	management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks. — No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure). — Strict use and management of all hazardous materials used on site. — Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas — Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. — Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided. — Appropriate waste management to be practiced on site to prevent pollution of nearby watercourses — Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Plan (EMPr) for the project and strictly enforced in the applicable phase/s. — In the instances where facility roads are required on the present road / track crossings already installed by local landowners / public works entities, install properly sized culverts with erosion protection measures.							

POTENTIAL IMPACT ON WATER QUALITY

During both construction and, to a limited degree, the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities, as well as maintenance activities, could be washed downslope via the watercourses. The impact and associated mitigation measures are outlined below in **Table 8.7.**

Table 8.7: Construction Impact on water quality

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Potential impact on water quality									
Without Mitigation	4	4	5	4	2	**34**	**Moderate**	(-)	High
With Mitigation	2	2	2	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. — It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Potential impact on water quality								
	the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed. — Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts. — A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks. — No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure). — Strict use and management of all hazardous materials used on site. — Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas — Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. — Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided. — Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Plan (EMPr) for the project and strictly enforced in the applicable phase/s. — In the instances where facility roads are required on the present road / track crossings already installed by local landowners / public works entities, install properly sized culverts with erosion protection measures.							

IMPACT ON HABITAT CHANGE AND FRAGMENTATION RELATED TO HYDROLOGICAL REGIMES

Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within the aquatic systems, which are currently ephemeral, i.e. aquatic vegetation species composition changes, which then results in habitat change / loss. The impact and associated mitigation measures are outlined below in **Table 8.8.**

Table 8.8: Construction impact on hydrological habitat change and fragmentation

Potential Impact: Impact on habitat change and fragmentation related to hydrological regimes	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	4	5	4	2	**34**	**Moderate**	(-)	High
With Mitigation	2	2	2	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. — It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed. — Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts. — A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks. — No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure). — Strict use and management of all hazardous materials used on site. — Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas — Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. — Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided. — Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Plan (EMPr) for the project and strictly enforced in the applicable phase/s. — In the instances where facility roads are required on the present road / track crossings already installed by local landowners / public works entities, install properly sized culverts with erosion protection measures.								

8.2.2 OPERATIONAL PHASE

IMPACT ON AQUATIC SYSTEMS THROUGH POSSIBLE INCREASE IN SURFACE WATER RUN-OFF

An increase in hard surface areas, and or roads that require stormwater management increases runoff from a site through the concentration of surface water flows. These higher volume flows, with increased velocity can result in downstream erosion and sedimentation if not managed. The impact and associated mitigation measures are outlined below in **Table 8.9.**

Table 8.9: Operational Impact on aquatic systems

Potential Impacts:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Impact on aquatic systems through possible increase in surface water run-off									
Without Mitigation	2	4	5	4	2	**30**	**Low**	(-)	High
With Mitigation	1	1	3	1	2	**14**	**Very Low**	(-)	High
Mitigation and Management Measures	— All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. — It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed. — Strict use and management of all hazardous materials used on site. — Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas — Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. — Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided. — Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Plan (EMPr) for the project and strictly enforced in the applicable phase/s.								

8.2.3 DECOMISSIONING PHASE

The decommissioning impacts are expected to be the same as the construction phase impacts.

8.3 TERRESTRIAL BIODIVERSITY

8.3.1 CONSTRUCTION PHASE

Vegetation on site is within the Grassland Biome. Mesic grasslands in South Africa have a life-form composition that includes a high number of resprouting sub-terranean species that constitute more than 50% of the species richness at any single location and a higher proportion, if counted across a wider area. Secondary grassland that develops in previously cleared areas (for example, cultivated lands) usually develop a perennial grass cover, but the resprouting component of the flora almost never recovers. This means that any clearing of grassland vegetation, even if temporary, results in permanent loss of the local species composition. Clearing of natural grassland is therefore a permanent impact. Habitat loss refers to physical disturbance of habitats through clearing, grading and other permanent to semi-permanent loss or degradation. Loss of habitat on site could lead to loss of biodiversity as well as habitat important for the survival of populations of various species. The impacts and associated mitigation measures are indicated in **Table 8.10** below.

Table 8.10: Construction impact on vegetation loss

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Loss of indigenous natural vegetation									
Without Mitigation	1	1	3	5	4	**40**	**Moderate**	(-)	High
With Mitigation	1	1	3	4	4	**36**	**Moderate**	(-)	High
Mitigation and Management Measures	— Restrict impact to development footprint only and limit disturbance in surrounding areas. — Prior to commencement of construction, compile a Rehabilitation Plan including monitoring specifications, to be included into the EMPr during final approval. — Prior to commencement of construction, compile an Alien Plant Management Plan, to be included into the EMPr during final approval								

Establishment and spread of declared weeds and alien invader plants due to the clearing and disturbance of indigenous vegetation. Major factors contributing to invasion by alien invader plants includes inter alia high disturbance (such as clearing for construction activities) and negative grazing practices. Exotic species are often more prominent near infrastructural disturbances than further away. Consequences of this may include:

- loss of indigenous vegetation;
- change in vegetation structure leading to change in various habitat characteristics;
- change in plant species composition;
- change in soil chemical properties;
- loss of sensitive habitats;
- loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
- fragmentation of sensitive habitats;
- change in flammability of vegetation, depending on alien species;
- hydrological impacts due to increased transpiration and runoff; and
- impairment of wetland function.

Low existing populations of alien plants were seen on site, but areas of farm infrastructure were not investigated in detail during the field survey. There is a high possibility that alien plants could be introduced to areas within the footprint of the proposed activities from surrounding areas in the absence of control measures. The potential consequences may be of moderate seriousness for affected natural habitats. Control measures could prevent the

impact from occurring. These control measures are relatively standard and well-known. During the construction phase there is a high a chance of the establishment of alien invasive species on the site. The impacts and associated mitigation measures are indicated in **Table 8.11** below.

Table 8.11: Construction impact on the alien vegetation

Potential Impact: **Establishment and spread of declared weeds and alien invader plants**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	3	1	3	**24**	**Low**	(-)	High
With Mitigation	1	1	3	1	2	**12**	**Very low**	(-)	High
Mitigation and Management Measures	— Prior to commencement of construction, compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control, including monitoring specifications. — Undertake regular monitoring to detect alien invasions early so that they can be controlled.								

8.3.2 OPERATIONAL PHASE

During the operational phase of the project, there will be continuous activity on site, including normal operational activities, maintenance and monitoring. There may also be minor additional construction. Rehabilitation of various sites, such as the construction camps, will also take place. These activities all have the potential to cause additional direct and/or indirect damage to natural habitat and vegetation. The impacts and associated mitigation measures are indicated in **Table 8.12** below.

Table 8.12: Operational impact on habitat disturbance

Potential Impact: **Continued disturbance to natural habitats due to general operational activities and maintenance**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	1	1	3	5	3	**30**	**Low**	(-)	High
With Mitigation	1	1	3	5	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— Restrict impact to development footprint only and limit disturbance in surrounding areas. — Prior to commencement of construction, compile a Rehabilitation Plan including monitoring specifications, to be included into the EMPr during final approval. — Prior to commencement of construction, compile an Alien Plant Management Plan, to be included into the EMPr during final approval.								

The presence of disturbed surfaces on site creates ecological edges and corridors along which alien species can travel and become established. The impacts and associated mitigation measures are indicated in **Table 8.13** below.

Table 8.13: Operational impact on alien vegetation

Potential Impact: Establishment and spread of declared weeds and alien invader plants	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	4	3	**36**	**Moderate**	(-)	High
With Mitigation	1	1	3	2	2	**14**	**Very Low**	(-)	High
Mitigation and Management Measures	— Prior to commencement of construction, compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. — Undertake regular monitoring to detect alien invasions early so that they can be controlled.								

Increased erosion (water and wind) and water run-off will be caused by the clearing of indigenous vegetation, creation of new hard surfaces and compaction of soil. The substation will be the main source of disturbance and erosion if not properly constructed and provided with water run-off structures. The substation site will be levelled and compacted causing run-off that may lead to erosion. Increased run-off and erosion could affect hydrological processes in the area and will change water and silt discharge into drainage lines and streams. The impact and associated mitigation measures are indicated in **Table 8.14** below.

Table 8.14: Operational impact on runoff and erosion

Potential Impact: Continued runoff and erosion	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	1	1	3	5	3	**30**	**Low**	(-)	High
With Mitigation	1	1	3	5	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— Prior to commencement of construction, compile and implement a stormwater management plan including monitoring specifications. — Monitor surfaces for erosion, repair and/or upgrade, where necessary.								

8.3.3 DECOMISSIOINING PHASE

It is expected that the project will operate for a minimum of twenty to twenty-five years (a typical planned life-span for a project of this nature) unless further economic use for the infrastructure is possible thereafter. Decommissioning will probably require a series of steps resulting in the removal of equipment from the site and rehabilitation of footprint areas. It is possible that the site could be returned to a rural nature, but it is unlikely that natural vegetation would become established at disturbed locations on site for a very long time thereafter. The reality is that it is not possible to determine at this stage whether rehabilitation measures will be implemented or not or what the future plans for the site would be nor is it possible at this stage to determine what surrounding land pressures would be. These uncertainties make it difficult to undertake any assessment to determine possible impacts of decommissioning. It is recommended that a closure and rehabilitation plan be compiled near to the decommissioning stage but in advance of when decommissioning is planned, and that this would be required to be implemented prior to closure of the project. The closure and rehabilitation plan must be in compliance with the regulatory requirements at the time of decommissioning. Possible impacts are described below.

The presence of disturbed surfaces on site creates ecological edges and corridors along which alien species can travel and become established. The impact and associated mitigation measures are indicated in **Table 8.15** below.

Table 8.15: Decommissioning impact on alien vegetation

Potential Impact: **Establishment and spread of declared weeds and alien invader plants**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	3	4	4	**44**	**Moderate**	(-)	High
With Mitigation	1	1	3	4	3	**27**	**Low**	(-)	High
Mitigation and Management Measures	— Rehabilitate disturbed areas in accordance with the specifications of an approved Rehabilitation Plan.								

8.4 PLANT SPECIES

8.4.1 CONSTRUCTION PHASE

For all infrastructure components located within natural habitat there is the possibility that individuals or populations of plant Species of Conservation Concern (SCC) may be lost due to construction impacts. Based on known information, and data collected on site, the probability of encountering species of conservation concern at any particular location is dependent on local habitat conditions. The impacts and mitigation measures are outlined in the **Table 8.16** below.

Table 8.16: Construction impact on plant Species of conservation concern

Potential Impact: **Loss of individuals of Species of Conservation Concern due to clearing for construction**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	5	5	3	**42**	**Moderate**	(-)	High
With Mitigation	2	2	5	5	1	**14**	**Very Low**	(-)	High
Mitigation and Management Measures	— Prior to construction commencing, undertake a detailed walk-through survey of footprint areas that are within habitats where SCC are likely to occur. — Where significant populations of SCC are found, collect the data for any flora permits or micro-siting of infrastructure that may be required. — Prior to construction commencing, compile a Plant Rescue Plan, including monitoring specifications (timeframe, frequency etc). — Undertake monitoring (as per the Plant Rescue Plan specifications) to evaluate whether further measures would be required to manage impacts								

8.4.2 OPERATIONAL PHASE

There are no impacts anticipated for the operational phase.

8.4.3 DECOMISSIOING PHASE

The impact associated with the decommissioning phase are expected to be the same as the construction phase.

8.5 ANIMAL SPECIES

8.5.1 CONSTRUCTION PHASE

Construction activities will require clearing of natural habitat, to be replaced by the infrastructure. This will result in permanent local loss of habitat. The impact and associated mitigation measures are outlined in **Table 8.17** below.

Table 8.17: Construction impact on faunal habitat

Potential Impact: / **Loss of faunal habitat**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	3	5	4	**44**	**Moderate**	(-)	High
With Mitigation	1	1	3	5	3	**30**	**Very Low**	(-)	High
Mitigation and Management Measures	— No driving of vehicles off-road outside of construction areas. — Apply mitigation measures recommended in the Terrestrial Biodiversity Assessment to minimize loss of natural vegetation.								

The construction phase has the potential to increase faunal mortality in the area. It is possible to mitigate this impact by applying the recommendations as outlined in the **Table 8.18** below.

Table 8.18: Construction impact on faunal mortality

Potential Impact: / **Direct mortality of fauna due to presence of traffic and heavy machinery**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	1	2	3	**18**	**Low**	(-)	High
With Mitigation	1	1	1	2	2	**10**	**Very low**	(-)	High
Mitigation and Management Measures	— It is a legal requirement to obtain permits for specimens or protected species that will be lost due to construction of the project. — Conduct a pre-construction walk-through of natural habitat within the development footprint prior to construction activities commencing in order to move any individual animals, such as tortoises, where required. — Personnel on site should undergo environmental induction training, including the need to abide by speed limits, to minimise risk of collisions with wild animals on roads in rural areas. — Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard. — No collecting, hunting or poaching of any animal species.								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Direct mortality of fauna due to presence of traffic and heavy machinery								
	— Personnel to be educated about protection status of species, including distinguishing features, to be able to identify protected species. — Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment.							

8.5.2 OPERATIONAL PHASE

During the operational phase the faunal mortality will likely be limited and lower that the construction phase, however, still must be taken into concern. The operational impact and associated mitigation measures are outlined in **Table 8.19** below.

Table 8.19: Operational impact on faunal mortality

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Direct mortality of fauna due to presence of traffic and heavy machinery									
Without Mitigation	2	1	1	4	3	**24**	**Low**	(-)	High
With Mitigation	1	1	1	4	2	**14**	**Very low**	(-)	High
Mitigation and Management Measures	— It is a legal requirement to obtain permits for specimens or protected species that will be lost due to construction of the project. — Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas. — Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard. — No collecting, hunting or poaching of any animal species. — Personnel to be educated about protection status of species, including distinguishing features, to be able to identify protected species. — Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment.								

8.5.3 DECOMISSIOING PHASE

Decommissioning phase impacts are identical in nature and rating to that of the construction phase impacts.

8.6 AVIFAUNA

8.6.1 CONSTRUCTION PHASE

Construction activities impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle, although this is often impractical to implement due to tight construction schedules.

Powerline sensitive species which are potentially vulnerable to displacement due to habitat transformation are mostly ground nesting species. Species that could be impacted are African Grass Owl, Black-bellied Bustard, Blue Crane, Blue Korhaan, Denham's Bustard, Grey Crowned Crane, Helmeted Guineafowl, Marsh Owl, Northern Black Korhaan, Secretary bird, Spotted Eagle-Owl and White-bellied Bustard. The impact is rated as moderate pre-mitigation and will be reduced to a low-level post-mitigation. The impact and associated mitigation measures are outlined in **Table 8.20** below.

Table 8.20: Construction impact on priority avifaunal species

Potential Impact: / **Disturbance of priority species**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	3	2	3	2	3	**30**	**Low**	(-)	High
Mitigation and Management Measures	— Conduct an inspection (avifaunal walk-through) to identify SCC that may be breeding within the infrastructure footprints. If a nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season, or other measures deemed suitable and practical at the time. — Bird Flight Diverters must be fitted to the entire powerline according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors and earthwires are strung. — Construction activity should be restricted to the immediate footprint of the infrastructure. — Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of powerline sensitive species. — Measures to control noise and dust should be applied according to current best practice in the industry. — Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. — Vegetation clearance should be limited to what is absolutely necessary. — The mitigation measures proposed by the biodiversity specialist must be strictly enforced. —								

During the construction of powerlines, service roads (jeep tracks), substations and other associated infrastructure, habitat destruction/transformation inevitably takes place. These activities could impact on birds

breeding, foraging and roosting in or in close proximity of the proposed powerline and collector substation through the transformation of habitat. Relevant to this development, very little mitigation can be applied to reduce the significance of this impact as the total permanent transformation of the natural habitat within the construction footprint of the on-site substation is unavoidable. In the case of the powerline, the direct habitat transformation is limited to the on-site substation and pole/tower footprints and the narrow access road/track under the proposed powerline. The loss of habitat in the substation footprint (7 ha) will be a relatively insignificant percentage of the habitat that regularly supports powerline sensitive species, and the resultant impact is likely to be fairly minimal. Powerline sensitive species which are potentially most vulnerable to displacement due to habitat transformation are mostly ground nesting species: African Grass Owl, Black-bellied Bustard, Blue Crane, Blue Korhaan, Denham's Bustard, Grey Crowned Crane, Helmeted Guineafowl, Marsh Owl, Northern Black Korhaan, Secretary bird, Spotted Eagle-Owl and, White-bellied Bustard. The impact is rated as moderate pre-mitigation and it will decrease to low post-mitigation. The impact and associated mitigation measures are outlined in **Table 8.21** below.

Table 8.21: Construction impact on avifaunal habitat

Potential Impact: **Habitat transformation**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	3	2	4	**36**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	3	**27**	**Low**	(-)	High
Mitigation and Management Measures	— Conduct an inspection (avifaunal walk-through) to identify SCC that may be breeding within the infrastructure footprints. If a nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season, or other measures deemed suitable and practical at the time. — Bird Flight Diverters must be fitted to the entire powerline according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors and earthwires are strung. — Construction activity should be restricted to the immediate footprint of the infrastructure. — Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of powerline sensitive species. — Measures to control noise and dust should be applied according to current best practice in the industry. — Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. — Vegetation clearance should be limited to what is absolutely necessary. — The mitigation measures proposed by the biodiversity specialist must be strictly enforced. —								

8.6.2 OPERATIONAL PHASE

Collisions could be the biggest threat posed by transmission lines to birds in southern Africa (Van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds, and to a lesser extent, vultures. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with transmission lines (Van Rooyen 2004, Anderson 2001). Despite doubts about the efficacy of line marking to reduce the collision risk for bustards (Jenkins et al. 2010; Martin et al. 2010), there are numerous studies which prove that marking a line with PVC

spiral type Bird Flight Diverters (BFDs) generally reduce mortality rates (e.g. Bernardino et al. 2018; Sporer et al. 2013, Barrientos et al. 2011; Jenkins et al. 2010; Alonso & Alonso 1999; Koops & De Jong 1982).Using a controlled experiment spanning a period of nearly eight years (2008 to 2016), the Endangered Wildlife Trust (EWT) and Eskom tested the effectiveness of two types of line markers in reducing power line collision mortalities of large birds on three up to 400kV transmission lines near Hydra substation in the Karoo. Marking was highly effective for Blue Cranes, with a 92% reduction in mortality, and large birds in general with a 56% reduction in mortality. Species potentially at risk are African Black Duck, African Darter, African Grass Owl, African Sacred Ibis, African Spoonbill, Black Heron, Black-bellied Bustard, Black-crowned Night Heron, Black-headed Heron, Black-necked Grebe, Blue Crane, Blue Korhaan, Blue-billed Teal, Cape Shoveler, Cape Teal, Cape Vulture, Denham's Bustard, Egyptian Goose, Fulvous Whistling Duck, Glossy Ibis, Goliath Heron, Great Egret, Greater Flamingo, Grey Crowned Crane, Grey Heron, Hadada Ibis, Hamerkop, Intermediate Egret, Lesser Flamingo, Little Egret, Little Grebe, Mallard, Marsh Owl, Northern Black Korhaan, Purple Heron, Red-billed Teal, Red-knobbed Coot, Reed Cormorant, Secretary bird, South African Shelduck, Southern Bald Ibis, Southern Pochard, Spotted Eagle-Owl, Spur-winged Goose, Squacco Heron, Wattled Crane, Western Barn Owl, Western Cattle Egret, White Stork, White-backed Duck, White-bellied Bustard, White-breasted Cormorant, White-faced Whistling Duck, Yellow-billed Duck. The impact is rated as moderate pre-mitigation but should be reduced to a low-level post-mitigation. The impact and associated mitigation measures are outlined in **Table 8.22** below.

Table 8.22: Operational impact on avifaunal collisions

Potential Impact: **Mortality of priority species due to collisions with the up to 400kV overhead power line**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	5	3	3	4	4	**60**	**Moderate**	(-)	High
With Mitigation	3	3	3	4	2	**26**	**Low**	(-)	High
Mitigation and Management Measures	— It is recommended that regular inspections are performed of the onsite substation yard to monitor the electrocution mortality. — If on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively.								

Electrocutions within the proposed substation yard are possible but should not affect the more sensitive Red List bird species, as these species are unlikely to use the infrastructure within the substation yard for perching or roosting. Species that are more vulnerable to this impact are corvids, owls, and certain species of waterbirds. The powerline sensitive species which are potentially vulnerable to electrocution impact are Common Buzzard, Jackal Buzzard, Cape Crow, Pied Crow, African Fish Eagle, Black-chested Snake Eagle, Brown Snake Eagle, Long-crested Eagle, Martial Eagle, Spotted Eagle-Owl, Amur Falcon, Lanner Falcon, Peregrine Falcon, Helmeted Guineafowl, Black-headed Heron, Hadada Ibis, Southern Bald Ibis, Black-winged Kite, Yellow-billed Kite, Western Osprey, African Grass Owl, Marsh Owl, Western Barn Owl, Black Sparrowhawk and Cape Vulture. The impact is rated as low pre- and post-mitigation. The impact and associated mitigation measures are outlined in **Table 8.23** below.

Table 8.23: Operational impact on avifaunal electrocution

Potential Impact: **Electrocution of priority species on the on-site substation infrastructure**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	5	3	3	4	2	**30**	**Low**	(-)	High
With Mitigation	1	2	3	4	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— It is recommended that regular inspections are performed of the onsite substation yard to monitor the electrocution mortality.								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Electrocution of priority species on the on-site substation infrastructure								
	— If on-going impacts are recorded once operational, site specific mitigation (insulation) be applied reactively.							

8.6.3 DECOMISSIONING PHASE

Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and up to 400kV overhead power line. The impacts and associated mitigation measures are outlined in the **Table 8.24** below.

Table 8.24: Decommissioning impact on avifauna

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Displacement of priority species									
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	3	2	3	2	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— Conduct an avifaunal inspection of the powerline prior to its decommissioning to identify nests on the poles/towers. — Decommissioning activity should be restricted to the immediate footprint of the infrastructure as far as possible. — Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of powerline sensitive species. — Measures to control noise and dust should be applied according to current best practice in the industry. — Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.								

8.7 VISUAL

8.7.1 CONSTRUCTION PHASE

The construction phase impacts on visual are expected to be Low but will be further reduced with the implementation of mitigation measures. The construction impact on the visual landscape for all alternatives are shown on **Table 8.25.**

Table 8.25: Construction Impacts rating on Visual Landscape associated with Camden Collector Substation, Main Transmission Substation and Associated 400kV Power Lines

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Carefully plan to minimise the construction period and avoid construction delays. — Inform receptors within 500m of the proposed power line and / or substation of the construction programme and schedules; — Make use of existing gravel access roads where possible. — Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. — Ensure that dust suppression techniques are implemented: — on all access roads; — in all areas where vegetation clearing has taken place; — on all soil stockpiles.								
Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Inform receptors within 500m of the proposed power line and / or substation of the construction programme and schedules; — Vegetation clearing should take place in a phased manner. — Make use of existing gravel access roads where possible. — Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. — Ensure that dust suppression techniques are implemented: — on all access roads; — in all areas where vegetation clearing has taken place; — on all soil stockpiles.								
Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Carefully plan to minimise the construction period and avoid construction delays. — Inform receptors within 500m of the proposed power line and / or substation of the construction programme and schedules; — Vegetation clearing should take place in a phased manner.								

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction.									
	— Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. — Ensure that dust suppression techniques are implemented: — on all access roads; — in all areas where vegetation clearing has taken place; — on all soil stockpiles.								
Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Inform receptors within 500m of the proposed power line and / or substation of the construction programme and schedules; — Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. — Ensure that dust suppression techniques are implemented: — on all access roads; — in all areas where vegetation clearing has taken place; — on all soil stockpiles.								
Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Vegetation clearing should take place in a phased manner. — Make use of existing gravel access roads where possible. — Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. — Ensure that dust suppression techniques are implemented: — on all access roads; — in all areas where vegetation clearing has taken place; — on all soil stockpiles.								

Potential Impact: **Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction.**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Potential Impact: **Potential visual pollution resulting from littering on the construction site.**	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Maintain a neat construction site by removing litter, rubble and waste materials regularly								

8.7.2 *OPERATIONAL PHASE*

The significance of visual impacts during operation are expected to be Low but will be further reduced with the implementation of mitigation measures. The operational impact on the visual landscape for all alternatives are shown on **Table 8.26**.

Table 8.26: Operational Impact rating on Visual Landscape associated with Camden Collector Substation, Main Transmission Substation and Associated 400kV Power Lines

Potential Impact: **The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
With Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
Mitigation and Management Measures	— Where possible, limit the number of maintenance vehicles using access roads. — Ensure that dust suppression techniques are implemented on all gravel access roads. — As far as possible, limit the amount of security and operational lighting present on the substation site. — The buildings on the substation site should not be illuminated at night and should be painted in natural tones that fit with the surrounding environment.								
Potential Impact: **The proposed development will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
With Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
Mitigation and Management Measures	— Where possible, limit the number of maintenance vehicles using access roads.								

Potential Impact: The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
	— Ensure that dust suppression techniques are implemented on all gravel access roads. — As far as possible, limit the amount of security and operational lighting present on the substation site. — The buildings on the substation site should not be illuminated at night and shuould be painted in natural tones that fit with the surrounding environment.								
Potential Impact: The proposed development will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
With Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
Mitigation and Management Measures	— Where possible, limit the number of maintenance vehicles using access roads. — Ensure that dust suppression techniques are implemented on all gravel access roads. — As far as possible, limit the amount of security and operational lighting present on the substation site. — Light fittings for security at night should reflect the light toward the ground and prevent light spill. — The buildings on the substation site should not be illuminated at night and should be painted in natural tones that fit with the surrounding environment.								
Potential Impact: The night-time visual environment could be altered as a result of operational and security lighting at the proposed substation.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
With Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High
Mitigation and Management Measures	— As far as possible, limit the amount of security and operational lighting present on the substation site. — Light fittings for security at night should reflect the light toward the ground and prevent light spill. — Lighting fixtures should make use of minimum lumen or wattage. — Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. — If possible, make use of motion detectors on security lighting. — Non-reflective surfaces should be used where possible								

8.7.3 DECOMISSIONIG PHASE

The decommissioning impact on the visual landscape for all alternatives are shown on **Table 8.27.**

Table 8.27: Decommissioning Impact on Visual Landscape of Camden Collector Substation, Main Transmission Substation and Associated 400kV Power Lines

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Maintain a neat decommissioning site by removing rubble and waste materials regularly. — Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.								
Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Decommissioning activities may be perceived as an unwelcome visual intrusion.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— All infrastructure that is not required for post-decommissioning use should be removed. — Maintain a neat decommissioning site by removing rubble and waste materials regularly. — Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. — All cleared areas should be rehabilitated as soon as possible. — Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.								
Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. — All cleared areas should be rehabilitated as soon as possible.								
Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.									
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High

Mitigation and Management Measures	— Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. — Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. — All cleared areas should be rehabilitated as soon as possible. — Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.								
Potential Impact: **Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	2	3	2	2	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. — Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. — All cleared areas should be rehabilitated as soon as possible. — Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.								

8.8 HERITAGE RESOURCES

Based on the current layout, three ruins will be directly impacted on by the proposed Grid infrastructure. Alt 1 will impact on CA 002 and CA012 and the LILO will impact on CA 010. The significance of the recorded ruins (CA002, 010 and 012) ranges from low to high (if associated with stillborn graves) and the sites should be indicated on development plans and avoided during construction (and this can be done with micro siting of pylons of the powerline) after which the impacts will be very low Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the construction activities.

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a Chance Find Procedure. All known sites should be avoided and additional recommendations in this report should be implemented during all phases of the project. With the implementation of the recommended mitigation measures impacts of the project on heritage resources is acceptable.

8.8.1 *CONSTRUCTION PHASE*

It is assumed that the construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources. The impact and associated mitigation measures are outlined in **Table 8.28.**

Table 8.28: Construction Impact on Damage to Heritage Resources

Potential Impact: **Destruction Or Damage To Recorded Ruins**	**Magnitude**	**Extent**	**Reversibilit**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	1	5	5	1	**28**	**Low**	(-)	High
With Mitigation	2	1	5	5	1	**14**	**Very Low**	(-)	High

Mitigation and Management Measures	– Implementation of a Chance Find Procedure for the Project. – The study area should be monitored by the ECO during construction. – Recorded heritage features should be indicated on development plans and avoided with a 30 m buffer. – The final alignment should be subjected to a heritage walkthrough.

8.8.2 OPERATIONAL PHASE

No impacts are expected during the operation phase.

8.8.3 DECOMISSIONING PHASE

The decommissioning impacts are expected to be the same as the construction phase impacts.

8.9 PALEONTOLOGICAL

The proposed Common Collector Substation and Grid transmission line will be undertaken within the Vryheid Formation and non-fossiliferous Jurassic dolerite. The Vryheid Formation is classified as very highly sensitive.

8.9.1 CONSTRUCTION PHASE

During the construction phase there is a chance that fossils maybe encountered. The impact and associated mitigation measures are outlined in **Table 8.29.**

Table 8.29: Potential loss to paleontological resources due to excavation during construction phase.

Potential Impact: **Loss of Fossils**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	3	4	2	**20**	**Low**	(-)	High
With Mitigation	1	1	3	1	6	6	**Very low**	(-)	High
Mitigation and Management Measures	If fossils occur in the footprint of any section of the project, the route for the grid connection (overhead powerline pole foundations/below ground piping), the hydrogen and ammonia facilities, access roads or infrastructure, they can be removed (Fossil Chance Find Protocol), and the project can continue. If fossils are recovered, removed and placed in a recognised institution such as a museum or university palaeontology collection this will be a positive impact because the fossils will be available for research. Otherwise they would have remained unknown to science.								

8.9.2 OPERATIONAL PHASE

No impacts anticipated during the operational phase.

8.9.3 *DECOMISSIONING PHASE*

The decommissioning impacts are expected to be the same as the construction phase impacts.

8.10 SOCIO-ECONOMIC

The findings of the SIA indicate that social impacts for the construction of both Common Collector Substations (Alternative 1 and 2) and associated 400 kV lines will be similar. Separate assessments have therefore not been undertaken. The significance ratings apply to both Collector Substations options.

8.10.1 *CONSTRUCTION PHASE*

CREATION OF LOCAL EMPLOYMENT, TRAINING, AND BUSINESS OPPORTUNITIES

Based on similar projects the construction phase of for the grid connection and collector substations will extend over a period of approximately 12 months and create in the region of 100 employment opportunities. Approximately 80% of the jobs will be low-skilled, 15% semi-skilled and 5% skilled. Most of the low and semi-skilled employment opportunities would benefit community members from Ermelo. A percentage of the high skilled positions may also benefit the local community. Most of the employment opportunities are also likely to accrue to Historically Disadvantaged (HD) members from these local communities. The total wage bill will be in the region of R 10 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in MM.

The capital expenditure associated with the construction of grid infrastructure and associated collector substations will be ~ R 100 million and will create opportunities for local companies and the regional and local economy. Implementing the enhancement measures listed below can enhance these opportunities. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

The impact on employment, skills development, and business creation opportunities is shown in **Table 8.30.**

Table 8.30: Construction Impact on Employment, Skills Development and Business Opportunities

Potential Impact: **Creation of employment and business opportunities during the construction phase**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	N/A	2	3	**18**	**Low**	(+)	High
With Mitigation	3	3	N/A	2	4	**32**	**Moderate**	(+)	High
Mitigation and Management Measures	**Employment** — Stakeholder engagement processes should be put in place to make sure that all interested and affected party have buy in in the process which will be designed and followed for employment and local procurement opportunities — Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. — Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.								

Potential Impact: **Creation of employment and business opportunities during the construction phase**	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence

- Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

IMPACT OF CONSTRUCTION WORKERS ON LOCAL COMMUNITIES

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

Given the relatively small number of construction workers, namely ~ 20-30, and short duration of the construction phase, the potential impact on the local community is likely to be negligible.

The Impact of construction workers on local communities is show in **Table 8.31**.

Table 8.31: Construction Impact of workers on local communities

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Potential impacts on family structures and social networks associated with the presence of construction workers									
Without Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
With Mitigation	1	1	3	2	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. — The proponent and the contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. — The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. — The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site. — The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end. — No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.								

RISK TO SAFETY, LIVESTOCK, AND FARM INFRASTRUCTURE

The presence on and movement of construction workers on and off the site poses a potential safety threat to local famers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of farm workers on the site.

Given the relatively small number of construction workers, namely ~ 20-30, and short duration of the construction phase, the potential impacts are likely to be negligible. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on and off the site workers during the construction phase

The impact of the risk to safety, livestock, and farm infrastructure is shown in **Table 8.32**.

Table 8.32: Construction Impact on Safety, Livestock, and Farm Infrastructure

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site.									
Without Mitigation	3	2	3	2	4	**40**	**Moderate**	(-)	High
With Mitigation	2	1	3	2	2	**16**	**Low**	(-)	High

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site.								
Mitigation and Management Measures	— The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. — All farm gates must be closed after passing through. — Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. — The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site. — The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below). — The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. — Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. — Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation. — It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.							

INCREASED RISK OF GRASS FIRES

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October. The impacts will be largely local and can be effectively mitigated.

The impact of veld fires to livestock, farm infrastructure and grazing is shown in **Table 8.33**.

Table 8.33: Construction Impact on Noise, Dust and Safety

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Potential loss of livestock and grazing and damage to farm infrastructure associated with increased incidence of grass fires.									
Without Mitigation	3	2	3	2	3	**30**	**Moderate**	(-)	High
With Mitigation	2	1	3	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. — Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. — Smoking on site should be confined to designated areas. — Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months. — Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. — Contractor should provide fire-fighting training to selected construction staff. — No construction staff, with the exception of security staff, to be accommodated on site overnight. — As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.								

NUISANCE IMPACTS ASSOCIATED WITH CONSTRUCTION RELATED ACTIVITIES

The construction activities on site and movement of heavy construction vehicles during the construction phase has the potential to create noise and dust impacts, damage local roads and create safety impacts for other road users. Based on the findings of the SIA the potential dust and noise impacts associated with the construction of the power line are likely to be negligible. The traffic related impacts associated with the transport of materials to the site are also likely to be limited. Given the relatively small number of construction workers and the short construction period the traffic related impacts associated with transporting workers to and from the site are likely to be limited.

The impact associated with construction related activities are shown in **Table 8.34**.

Table 8.34: Construction Impact on Veld Fires

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site.									
Without Mitigation	2	2	1	2	3	**21**	**Low**	(-)	High
With Mitigation	2	1	1	2	2	**12**	**Low**	(-)	High

Potential Impact: Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site.	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
Mitigation and Management Measures	— As indicated above, the proponent should consider the establishment of a Monitoring Forum (MF) to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts. — Ongoing communication with landowners and road users during construction period. — Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. — Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads maintained in a good condition and repaired once the construction phase is completed. — Repair of all affected road portions at the end of construction period where required. — Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers. — All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.							

8.10.2 *OPERATIONAL PHASE*

The findings of the SIA indicate that social impacts associated with the operational phase of both Collector Substations (Alternative 1 and 2) and associated 400 kV lines will be similar. Separate assessments have therefore not been undertaken for CS 1 and 2. However, based on the findings of the SIA CS 2 (the northern option) is the preferred option. CS 1 and C2 are both located on property owned by Ms Reyneke who indicated that CS 2 was the preferred option.

IMPROVE ENERGY SECURITY AND SUPPORT THE RENEWABLE ENERGY SECTOR

The primary goal of the proposed renewable energy facilities (REFs) proposed for the area is to improve energy security in South Africa by generating renewable energy. The proposed power line is essential to enable the energy from the REFs to feed into the national grid. The proposed power line should therefore be viewed within the context of the South Africa's current power supply constraints and the reliance on coal powered energy to meet most of its energy needs.

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all

sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million was spent by businesses on backup generators. A survey of 3 984 small business owners found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more or revenue during due to load shedding period.

The operational impact on energy security, reduce reliance on coal generated power sector is shown in **Table 8.35**.

Table 8.35: Operational Impact on Improved energy security, reduce reliance on coal generated power sector

Potential Impact: **Development of infrastructure to improve energy security and reduce reliance on coal.**	**Magnitude**	**Extent**	**Reversibilit**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	4	0	4	4	**44**	**Moderate**	(+)	High
With Mitigation	3	4	0	4	5	**44**	**Moderate**	(+)	High
Mitigation and Management Measures	— Maximise the number of employment opportunities for local community members. — Implement training and skills development programs for members from the local community. — Maximise opportunities for local content and procurement.								

Residual impacts include improved energy security and overall benefit for economic development and investment, reduction in CO_2 emission and reduction in water consumption for energy generation.

CREATION OF EMPLOYMENT AND BUSINESS OPPORTUNITIES

The potential employment, skills development and business related opportunities associated with the power line and collector substations will be limited and largely confined to periodic maintenance and repairs. The potential socio-economic benefits are therefore likely to be limited. The potential opportunities can however be enhanced if a local service provider is appointed to undertake the work required. This may involve providing training and skills development to enable a locally based service provider to provide the required services.

The impact on employment opportunities and business opportunities is shown in **Table 8.36**.

Table 8.36: Operational Impact on Employment Opportunities

Potential Impact: **Creation of employment, skills development and business opportunities associated with the operational phase.**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	0	4	2	**14**	**Low**	(+)	High
With Mitigation	2	2	0	4	3	**24**	**Low**	(+)	High
Mitigation and Management Measures	— Maximise the number of employment opportunities for local community members. — Implement training and skills development programs for members from the local community. — Maximise opportunities for local content and procurement.								

VISUAL IMPACT AND IMPACT ON SENSE OF PLACE

The proposed development has the potential to impact on the areas existing rural sense of place. Based on the findings of the site visit the potential impact on the areas sense of place is likely to be limited. This is due to the

existence of the Camden Power station and existing power lines in the area. None of the landowners interviewed raised concerns regarding the potential visual impact on the areas sense of place. The visual impact and impact on sense of place is shown in **Table 8.37**

Table 8.37: Operational Impact on Visual impact and impact on sense of place

Potential Impact: RISKS POSED TO FARMING ACTIVITIES BY MAINTENANCE WORKERS	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	2	1	4	3	**27**	**Low**	(-)	High
With Mitigation	2	2	1	4	3	**27**	**Moderate**	(-)	High
Mitigation and Management Measures	— Implement recommendations of the VIA.								

IMPACT ON FARMING OPERATIONS DURING MAINTENANCE

The presence on and movement of maintenance workers on and off the site poses a potential risk to farming operations. Farm fence and gates may be damaged and stock losses may also result from gates being left open. The presence of maintenance workers on the site also increases the exposure of their farming operations and livestock to the outside world, which, in turn, increased the potential risk of stock theft and crime.

The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by ensuring the maintenance teams take care to ensure that gates are kept closed and affected property owners are kept informed about timing of maintenance operations. Mitigation measures to address these risks are outlined below.

The impact on farming operations during maintenance is shown in **Table 8.38.**

Table 8.38: Operational Impact on on Farming Operations during Maintenance

Potential Impact: RISKS POSED TO FARMING ACTIVITIES BY MAINTENANCE WORKERS	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	2	4	**30**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	3	**27**	**Low**	(-)	High
Mitigation and Management Measures	— Affected property owners should be notified in advance of the timing and duration of maintenance activities. — Maintenance teams must ensure that all farm gates must be closed after passing through. — Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities. — Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations. — Strict traffic speed limits must be enforced on the affected farms. — No maintenance workers should be allowed to stay over-night on the affected properties.								

8.10.3 DECOMISSIONING PHASE

The decommissioning impacts are expected to be the same as the construction phase impacts.

8.11 NOISE

8.11.1 CONSTRCUTION PHASE

Elevated noise levels are likely to be generated by the construction activities (machinery and vehicles) and the workforce. It is important to note that noise impacts (nuisance factor) may vary in the different areas as a result of the surrounding land uses and will be temporary in nature. Due to the temporary and limited nature of the Project activities, coupled with the fact that there are a limited number of noise receptors around the Project area, the impact is regarded as low.

During the construction phase of the facility various noise sources will be present onsite including earth-moving equipment (trucks, cranes, scrapers and loaders), compressors and generators, pumps, rotary drills, concrete mixers and materials handling activities among others. All of these sources will generate substantial amounts of noise and may impact on neighbouring sensitive receptors. As such, mitigation interventions are advised during the construction phase. The construction impact and mitigation recommendations are detailed in **Table 8.39.**

Table 8.39: Construction impact on noise

Potential Impact: / **Noise generated during construction**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	1	1	3	**18**	**Low**	(-)	High
With Mitigation	1	2	1	1	2	**10**	**Very low**	(-)	High
Mitigation and Management Measures	— Planning construction activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance. Information regarding construction activities should be provided to identified and nearby receptors likely to be affected. Such information includes: — Indicate Proposed working times on notice boards. — Indicate Anticipated duration of activities on notice boards. — Explanations on activities to take place and reasons for activities. — Contact details of a responsible person on site should complaints arise. — When working near a potential sensitive receptor, limit the number of simultaneous activities to a minimum, as far as possible; — Using noise control devices, such as temporary noise barriers and deflectors for high impact activities, and exhaust muffling devices for combustion engines. — Selecting equipment with the lowest possible sound power levels whilst still being suitable for the specific task. — The equipment must be in maintained in good working order, within service dates, and inspected before use; — Install noise reducing fittings on machinery (if required).								

8.11.2 OPERATIONAL PHASE

There are no significant noise impacts anticipated for the proposed development.

8.11.3 DECOMISSIONING PHASE

The noise impacts associated with the decommissioning phase will be the same as the construction phase

9 CUMULATIVE IMPACT ASSESSMENT

Although the S&EIR process is essential to assessing and managing the environmental and social impacts of individual projects, it often may be insufficient for identifying and managing incremental impacts on areas or resources used or directly affected by a given development from other existing, planned, or reasonably defined developments at the time the risks and impacts are identified. IFC PS 1 recognizes that, in some instances, cumulative effects need to be considered in the identification and management of environmental and social impacts and risks. For private sector management of cumulative impacts, IFC considers good practice to be two pronged:

— effective application of and adherence to the mitigation hierarchy in environmental and social management of the specific contributions by the project to the expected cumulative impacts; and

— best efforts to engage in, enhance, and/or contribute to a multi-stakeholder, collaborative approach to implementing management actions that are beyond the capacity of an individual project proponent.

Even though Performance Standard 1 does not expressly require, or put the sole onus on, private sector clients to undertake a cumulative impact assessment (CIA), in paragraph 11 it states that the impact and risk identification process "will take into account the findings and conclusions of related and applicable plans, studies, or assessments prepared by relevant government authorities or other parties that are directly related to the project and its area of influence" including "master economic development plans, country or regional plans, feasibility studies, alternatives analyses, and cumulative, regional, sectoral, or strategic environmental assessments where relevant."

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities (IFC GPH). Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that "Risks and impacts will be analysed in the context of the project's area of influence. This area of influence encompasses…areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location." (IFC 2006).

A cumulative impact assessment is the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible (IFC GPH).

Cumulative impacts with existing and planned facilities may occur during construction and operation of the proposed OHPL and substation infrastructure. While one project may not have a significant negative impact on sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts.

Potential cumulative impacts identified are summarised below. Other planned or existing projects that can interact with the Project will be identified during stakeholder engagement and finalisation of the S&EIA process.

9.1 TERRESTRIAL BIODIVERSITY CUMULATIVE IMPACTS

The regional terrestrial vegetation type in the broad study area is listed as Vulnerable and is impacted across its range by historical activities. Loss of habitat will definitely occur for the project, which will be a small area in comparison to the total area of the vegetation type. However, the total loss of habitat due to a number of projects

together will be greater than for any single project, so a cumulative effect will occur. The area lost in total will be very small compared to the total area of the vegetation type concerned. The cumulative effect will therefore be low for vegetation loss. The cumulative impact is outlined below **Table 9.1.**

Table 9.1: Cumulative impacts on indigenous natural vegetation

Potential Impact: / **Clearing of natural habitat for construction**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Current project	1	1	3	4	4	**36**	**Moderate**	(-)	High
Combination of projects	2	3	3	5	5	**65**	**High**	(-)	High

There are various ecological processes that may be affected at a landscape level by the presence of multiple projects. This includes population processes, such as migration (movement of species through the landscape), pollination (can be disrupted if insect pollinators are blocked from movement)and dispersal, but also more difficult to interpret factors, such as spatial heterogeneity (the diversity of habitats and their spatial relationship to one another), community composition (the species that occur in the landscape) and environmental gradients, that can become disrupted when landscapes are disturbed at a high level. Disturbance can alter the pattern of variation in the structure or function of ecosystems. Fragmentation is the breaking up of a habitat, ecosystem, or land-use type into smaller parcels. An important consequence of repeated, random clearing is that contiguous cover can break down into isolated patches. This happens when the area cleared exceed a critical level and landscapes start to become disconnected. Spatially heterogenous patterns can be interpreted as individualistic responses to environmental gradients and lead to natural patterns in the landscape. Disrupting gradients and creating disturbance edges across wide areas is very disruptive of natural processes and will lead to fundamental changes in ecosystem function.

The current project has been designed to mostly occupy areas that are already disturbed. Where infrastructure is located in natural areas, it is near to edges or follows existing roads. There are few places where it intrudes significantly into natural areas. The cumulative impact is outlined below **Table 9.2.**

Table 9.2: Cumulative impacts on ecological processes

Potential Impact: / **Disruption of ecological processes at landscape level**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Current project	2	1	3	4	3	**30**	**Low**	(-)	High
Combination of projects	3	3	3	4	4	**52**	**Moderate**	(-)	High

There is a moderate possibility that alien plants could be introduced to areas within the footprint of the proposed infrastructure from surrounding areas in the absence of control measures. The greater the number of projects, the more likely this effect will happen; therefore, the effect is cumulative. For the current site, the impact is predicted to be low due to the current absence of invasive species on site and the high ability to control any additional impact. The significance will therefore be low, especially if control measures are implemented. However, the increased overall disturbance of the landscape will create opportunities and, if new invasions are not controlled, can create nodes that spread to new locations due to the heightened disturbance levels. The cumulative impact is outlined below **Table 9.3.**

Table 9.3: Cumulative impacts due to establishment and spread of declared weeds and alien invader plants

Potential Impact: / **Establishment and spread of declared weeds and alien invader plants**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Current project	1	1	3	2	2	**14**	**Very low**	(-)	High

Combination of projects	3	3	3	4	4	**52**	**Moderate**	(-)	High

9.2 ANIMAL SPECIES CUMULATIVE IMPACTS

Construction activities will require clearing of natural habitat, to be replaced by the infrastructure. This will result in possible loss of habitat for populations of SCC. The cumulative impact is outlined below **Table 9.4.**

Table 9.4: Cumulative impact on faunal habitat from construction clearing due to a number of projects

Potential Impact: / **Loss of faunal habitat**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Type of impact**
Overall impact of the proposed project considered in isolation	2	1	3	5	4	**44**	**Moderate**	(-)	Direct
Cumulative impact of the project and other projects in the area	3	3	3	5	4	**56**	**Moderate**	(-)	

Construction activities will require clearing of natural habitat, to be replaced by the infrastructure. This will result in possible mortalities for populations of SCC. The cumulative impact is outlined below **Table 9.5.**

Table 9.5: Cumulative impacts of direct faunal mortality due to a number of projects- Construction phase

Potential Impact: / **Faunal mortality**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Type of impact**
Overall impact of the proposed project considered in isolation	2	1	1	2	3	**18**	**Low**	(-)	Direct
Cumulative impact of the project and other projects in the area	3	3	1	2	4	**36**	**Moderate**	(-)	

Operational activities will require maintenance of areas around the infrastructure. This will result in possible loss of habitat for populations of SCC. The cumulative impact is outlined below **Table 9.6.**

Table 9.6: Cumulative impacts of direct faunal mortality due to a number of projects: Operational phase

Potential Impact: / **Faunal mortality**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Type of impact**
Overall impact of the proposed project considered in isolation	2	1	1	4	3	**24**	**Low**	(-)	Direct
Cumulative impact of the project and other projects in the area	3	3	1	4	4	**44**	**Moderate**	(-)	

9.3 PLANT SPECIES CUMULATIVE IMPACTS

Construction activities will require clearing of natural habitat, to be replaced by the infrastructure. This will result in possible loss of populations of SCC. The cumulative impact is outlined in **Table 9.7** below.

Table 9.7: Cumulative impacts on SCC from construction clearing due to a number of projects

Potential Impact: / **Cumulative Loss of individuals of Species of Conservation Concern**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Type of impact**
Overall impact of the proposed project considered in isolation	2	2	5	5	1	**14**	**Very low**	(-)	Direct
Cumulative impact of the project and other projects in the area	3	3	5	5	3	**48**	**Moderate**	(-)	

9.4 AVIFAUNAL CUMULATIVE IMPACTS

According to the official database of DFFE and other documents in the public domain, there are currently three planned renewable energy facility within a 30km radius around the proposed development, namely the Camden I and II Wind Energy Facilities and the Camden Solar Energy Facility (SEF) . These developments will include grid connections with a maximum combined length of 31.2km. The up to 400kV HV powerline connection to the Camden Power Station Substation will have a maximum length of 8.9km. The maximum combined length of the grid connections for the Camden I and II renewable wind energy projects listed above, the up to 400kV HV powerline to Camden Power Station Substation, and the Camden I SEF (maximum 13.7km) will therefore be approximately 40.1km. The existing high voltage lines in the 30km radius around the proposed Camden I SEF run into hundreds of kilometres. The Camden up to 400kV contribution (maximum 8.9km) to the total length of high voltage lines within a 30km radius is Low. However, the density of all planned and existing high voltage lines within a 30km radius, and by implication the cumulative impact on avifauna, is considered to be Moderate.

<u>The collector substation and Camden Power Station SS extension</u>

The collector substation and Camden PS substation extension will transform an area of approximately 6 ha. Given the available habitat of 4 258km² within a 30km radius around the project site, the cumulative impact of displacement and habitat transformation caused by these developments is Low due to the small footprint.

The cumulative impact of the powerline collision mortality of priority avifauna due to the construction of the overhead power line is outlined in **Table 9.8** below.

Table 9.8: Cumulative impact on avifaunal collisions

Potential Impact: / **Mortality: Collision**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	2	4	3	**30**	**Low**	(-)	High
With Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High

The collector substation and Camden PS substation extension will transform an area of approximately 6 ha. Given the available habitat of 4 258km² within a 30km radius around the project site, the cumulative impact of displacement and habitat transformation caused by these developments is Low due to the small footprint. The cumulative impact is outlined in **Table 9.9** below.

Table 9.9: Cumulative impact on avifaunal displacement

Potential Impact: / Displacement	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	2	3	**30**	**Low**	(-)	High
With Mitigation	3	2	3	2	2	**20**	**Low**	(-)	High

Mortality (electrocution) of priority avifauna due to the construction of the on-site substation. The cumulative impact on the avifaunal electrocutions is outlined in **Table 9.10** below.

Table 9.10: Cumulative impact on avifaunal electrocutions

Potential Impact: / Mortality: Electrocution	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	3	3	4	2	**26**	**Low**	(-)	High
With Mitigation	1	2	3	4	2	**20**	**Low**	(-)	High

9.5 AQUATIC BIODIVERSITY CUMULATIVE IMPACTS

All of the projects have indicated that their intention with regard to mitigation, i.e. selecting the best possible sites to minimise the local and regional impacts, or improving the drainage or hydrological conditions within these rivers, and therefore the cumulative impact could be seen as a net benefit. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects such as stormwater management. In the assessment of this project, a number of projects have been assessed by the report author within a 35km radius and or other sites were accessed during the course of travelling between the various projects. Of these potential projects, this report author has been involved in the initial EIA aquatic assessments. The cumulative impact is outlined in **Table 9.11** below.

Table 9.11: Cumulative impact on aquatic biodiversity

Potential Impact: / Cumulative impact on aquatic systems	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	4	5	4	2	**34**	**Moderate**	(-)	High
With Mitigation	2	2	2	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— There is no impact as it maintains the current status quo. — No mitigation measures are required.								

9.6 SOCIO ECONOMIC CUMULATIVE IMPACTS

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. In this regard the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues are also likely to be relevant to solar facilities and associated infrastructure. The relevant issues identified by Scottish Natural Heritage study include:

— Combined visibility (whether two or more wind farms (power lines) will be visible from one location).

- Sequential visibility (e.g. the effect of seeing two or more wind farms (power lines) along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms (power lines) in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

The guidelines also note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual impacts, not just as the cumulative impact of several developments on one location. The viewer may only see one renewable energy facility and the associated infrastructure at a time, but if each successive stretch of the road is dominated by views of renewable energy facilities, then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010).

There are a number of existing power lines in the area associated with the Camden Power Station. The potential for cumulative impacts therefore exists. However, at the same time the areas sense of place has been altered by the existing power lines and the Camden Power station. The sense of place has also been impacted by coal mining operations. As a result, the potential impact of the proposed power lines on the areas sense of place is likely to be limited. The cumulative impacts are also likely to be limited. In addition, none of the landowners interviewed raised concerns regarding the potential visual impact on the areas sense of place. **Table 9.12** below outlines the potential cumulative impacts

Table 9.12: Cumulative impacts on sense of place and the landscape

Potential Impact: **Visual impacts associated with the establishment of associated grid infrastructure and the potential impact on the area's rural sense of place and character of the landscape.**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Overall impact of the proposed project considered in isolation	2	2	1	4	3	**27**	**Low**	(-)	High
Cumulative impact of the project and other projects in the area	3	2	1	4	4	**40**	**Moderate**	(-)	High
Mitigation and Management Measures	— There is no impact as it maintains the current status quo. — No mitigation measures are required.								

9.7 VISUAL CUMULATIVE IMPACTS

Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. In this instance, such developments would include:

- existing and proposed mining / quarrying activities,
- electrical infrastructure including Camden Power Station and associated power lines; and
- proposed renewable energy facilities comprising the Camden Renewable Energy Complex (Wind, Solar, Hydrogen and associated grid connection infrastructure).

Existing mining / quarrying and electrical infrastructure have already resulted in large scale visual impacts, mostly along the N2 national route, extending south-eastwards from Ermelo to Camden Power Station. These developments have significantly altered the sense of place and visual character in the broader region.

Renewable energy facilities have the potential to cause large-scale visual impacts, and although the level of transformation already present in the landscape will reduce the contrast and overall visual impact of the new power line / substation development, the incremental change in the landscape will be increased and the visual impacts on surrounding visual receptors would be exacerbated. Although the South African Renewable Energy EIA

Application Database from DFFE does not record any existing or proposed renewable projects within 35kms of the proposed development, a cumulative assessment must include all elements of the proposed Camden Renewable Energy Complex. This complex, including wind, solar and green hydrogen energy facilities as well as associated grid connection infrastructure, will affect a large portion of the study area.

From a visual perspective, the concentration of renewable energy facilities as proposed will further change the visual character of the area and alter the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In addition, it is possible that these developments in close proximity to each other could be seen as one large Renewable Energy Facility (REF) rather than several separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.

Visual intrusion of multiple renewable energy developments and associated infrastructure may be exacerbated, particularly in more natural undisturbed settings.

Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.

The night-time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area. The cumulative impacts are outlined in **Table 9.13** below.

Table 9.13: Cumulative Impacts rating associated with Camden Collector Substation, Main Transmission Substation and Associated 400kV Power Lines

Potential Impact: **Visual intrusion of multiple renewable energy developments**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	5	3	3	5	4	**64**	**High**	(-)	High
With Mitigation	4	3	3	4	4	**56**	**Moderate**	(-)	High
Mitigation and Management Measures	— Where possible, limit the number of maintenance vehicles using access roads. — Non-reflective surfaces should be utilised where possible. — Where possible, limit the amount of security and operational lighting present at the on-site substation. — Light fittings for security at night should reflect the light toward the ground and prevent light spill.								

9.8 HERITAGE AND PALAEONTOLOGY CUMULATIVE IMPACTS

Cumulative impacts or effects can be described as “changes to the environment that are caused by an action in combination with other past, present and future human actions”. They are the result of multiple activities whose individual direct impacts may be relatively minor but which, in combination with others result are significant environmental effects (DEAT 2004:5).

Cumulative impacts considered as an effect caused by the proposed action that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions. (Cornell Law School Information Institute, 2020). Cumulative impacts occur from the combination of effects of various impacts on heritage and palaeontological resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. In the case of this project, impacts can be mitigated to an acceptable level. However, this and other projects in the area can have a negative impact on heritage and

palaeontological sites in the area where these sites have been destroyed unknowingly. The cumulative impact is outlined in **Table 9.14** below.

Table 9.14: Cumulative impact on heritage and palaeontological finds

Potential Impact: / **Damage or loss of Heritage or palaeontological finds**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	2	5	5	3	**42**	**Moderate**	(-)	High
With Mitigation	3	1	5	5	2	**28**	**Low**	(-)	High
Mitigation and Management Measures	— Implementation of a Chance Find Procedure for the Project. — The study area should be monitored by the ECO during construction. — Recorded heritage features should be indicated on development plans and avoided with a 30 m buffer. — The final alignment should be subjected to a heritage walkthrough.								

9.9 SOIL, LAND AND AGRICULTURAL CUMULATIVE IMPACTS

The potential cumulative agricultural impact of importance is a regional loss of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

What level of loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

Power lines have an insignificant agricultural impact and an insignificant cumulative agricultural impact. Many times more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change in terms of loss of production potential are exceeded. In reality the landscape in this environment could be covered with power lines and agricultural production potential would not be affected. It therefore does not make sense to conduct a more formal assessment of the development's cumulative impacts as per DFFE requirements for cumulative impacts.

Due to the considerations discussed above, the cumulative impact of loss of future agricultural production potential can confidently be assessed as not having an unacceptable negative impact on the area. In terms of cumulative impact, the proposed development is therefore acceptable and it is therefore recommended that it be approved.

The cumulative impact on the soil, land and agricultural potential in the area as a result of the surrounding proposed developments is outlined in the **Table 9.15** below.

Table 9.15: Cumulative land, soil and agricultural impact

Potential Impact: / **Regional loss of future agricultural production potential**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Current project without mitigation	1	2	1	1	2	**10**	**Very Low**	(-)	High
Combination of projects with mitigation	2	2	1	1	5	**30**	**Low**	(-)	High

9.10 NOISE/ACOUSTIC CUMULATIVE IMPACTS

The cumulative noise impact on the identified receptors in the area will not be significantly affected by the proposed developments in the area. The proposed Camden I WEF will be the other source of noise on the site to consider. However, the impacts can be brought to an acceptable level provided the recommended mitigation measures stipulated by the specialist are implemented. The cumulative is outlined in **Table 9.16** below.

Table 9.16: Cumulative acoustic impact on environment

Potential Impact: / **Cumulative acoustic impacts**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	1	4	4	**36**	**Moderate**	(-)	High
With Mitigation	2	2	1	4	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Implement all recommended mitigations for the constructions phase across all proposed projects								

10 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that "*development must be socially, environmentally and economically sustainable…. and requires the consideration of all relevant factors…*". NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA's preventative principle, potentially negative impacts on the environment and on people's environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of "reasonable measures".

In assessing the environmental feasibility of the proposed project, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience, and the relevant legislation (where applicable).

The conclusions of this EIR are the result of comprehensive assessments. These assessments were based on issues identified through the S&EIR process and public participation undertaken to date. The EIR will be subject to public review, which will be undertaken according to the requirements of NEMA with every effort made to include representatives of all stakeholders within the process. The EIR will be updated and finalised taking into consideration all comments received during the public review period before being submitted to the CA for consideration.

10.1 ENVIRONMENTAL SENSITIVITIES

The following environmental sensitivities were identified for the proposed project, as a result of the Project location and proposed activities and will require specific applications or measures for mitigation to minimise impact.

- **Agriculture Assessment**
  - High agricultural sensitivity because of both its land capability and because of its status as cropland
- **Aquatic Ecology Assessment**
  - Riverine Floodplains with Riparian Vegetation or wetland areas
  - Valley Bottom Wetlands
  - Endorheic Pans
  - Seepage Wetlands
  - Artificial dams or mine works
- **Terrestrial Ecology Assessment**
  - Wetlands: These are described here only in terms of being a unique botanical habitat and not in the sense of a formal wetland delineation, which is normally assessed in a separate specialist study. The wetlands must be delineated according to "DWAF, 2003: A Practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". Restrictions in terms of infrastructure within these areas should be according to the National Water Act (Act 36 of 1998).
  - Listed ecosystems: Chrissiesmeer Panveld is listed as Endangered, and Eastern Highveld Grassland and Eastern Temperate Freshwater Wetlands are both listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).
  - Grasslands: Grassland vegetation, in a general sense has been identified as threatened nationally as a habitat type. Indications are that loss of any grassland habitat is permanent in an ecological and biodiversity sense, and it is not possible to restore grassland to a natural state after they have been disturbed. They should therefore be treated as sensitive and all efforts made to minimize impacts on any

area of grassland. If possible, the footprint of any proposed infrastructure should be kept to a minimum within any undisturbed, natural grasslands, especially those in a moderate to good condition.

- **Avifaunal Assessment**
  - High value habitat unit (wetlands, pans and grassland)
  - Presence of Red List priority species
- **Heritage**
  - Burial sites
  - Demolished remains of structures

The above sensitivities are discussed in the sub-sections below. The combined environmental sensitivities of the proposed Project footprint are shown in **Figure 10.8.**

10.1.1 AGRICULTURE

The verification of agricultural sensitivity of the power line route has very little relevance to this assessment because the agricultural impacts of a power line are insignificant in such an agricultural environment, regardless of the level of agricultural sensitivity of the land which it traverses.

The **Figure 10.1** below outlines the agricultural sensitivities as per the DFFE screening tool.

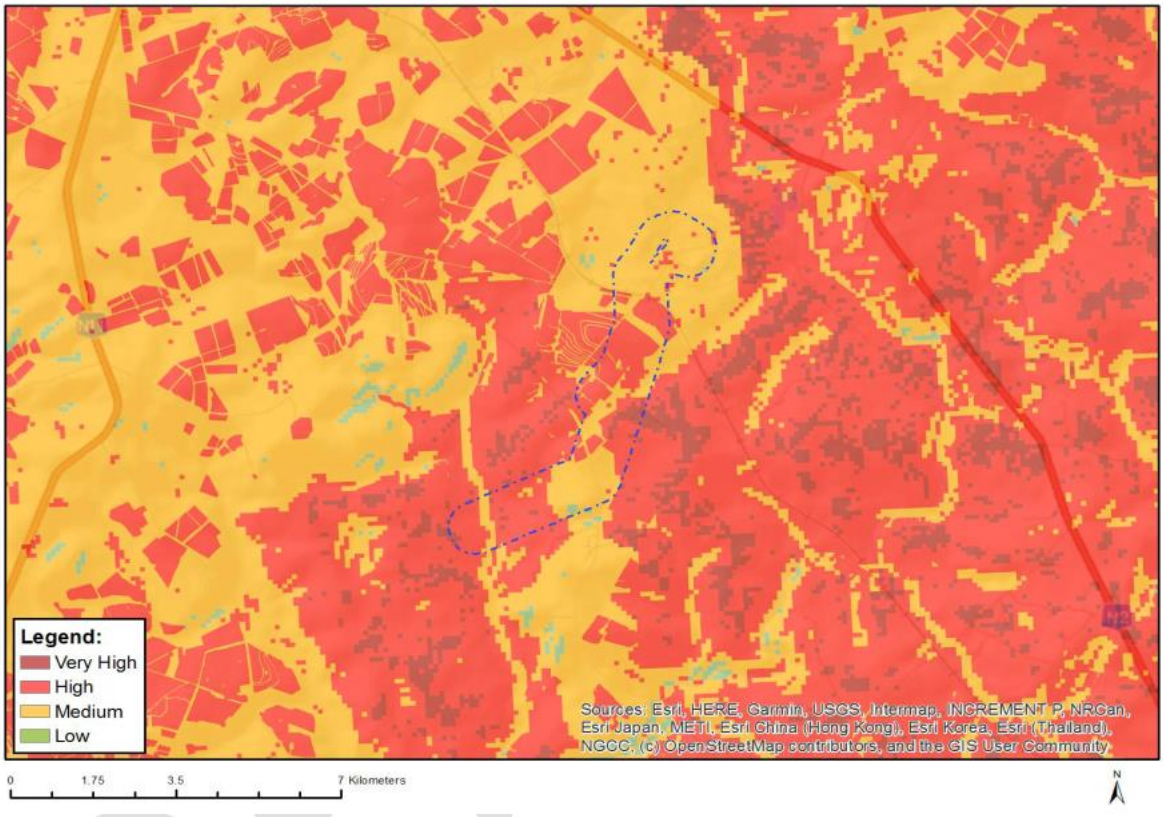

Figure 10.1: Agricultural theme, DFFE screening tool

As noted above, the screening tool sensitivity of the power line corridors is irrelevant to agricultural impact. The agricultural sensitivity of the entire area, for the purposes of this impact assessment, can be considered to be low.

It is important to recognise that the agricultural sensitivity of land, in terms of a particular development, is not only a function of the screening tool sensitivity, but is also a function of the severity of the impact which that development poses to agriculture. This is not recognised in the screening tool classification of sensitivity. The sensitivity of an agricultural environment to overhead power lines is not what the screening tool classifies the sensitivity as, because most agricultural environments have a very low sensitivity to overhead power lines

because these have negligible agricultural impact, regardless of the agricultural production potential of the land that they cross. Therefore, in the context of the development of overhead power lines, almost no land can be considered to have high sensitivity for impacts on agricultural resources.

10.1.2 AQUATIC BIODIVERSITY

The **Figure 10.2** below outlines the aquatic biodiversity sensitivities as per the DFFE screening tool.

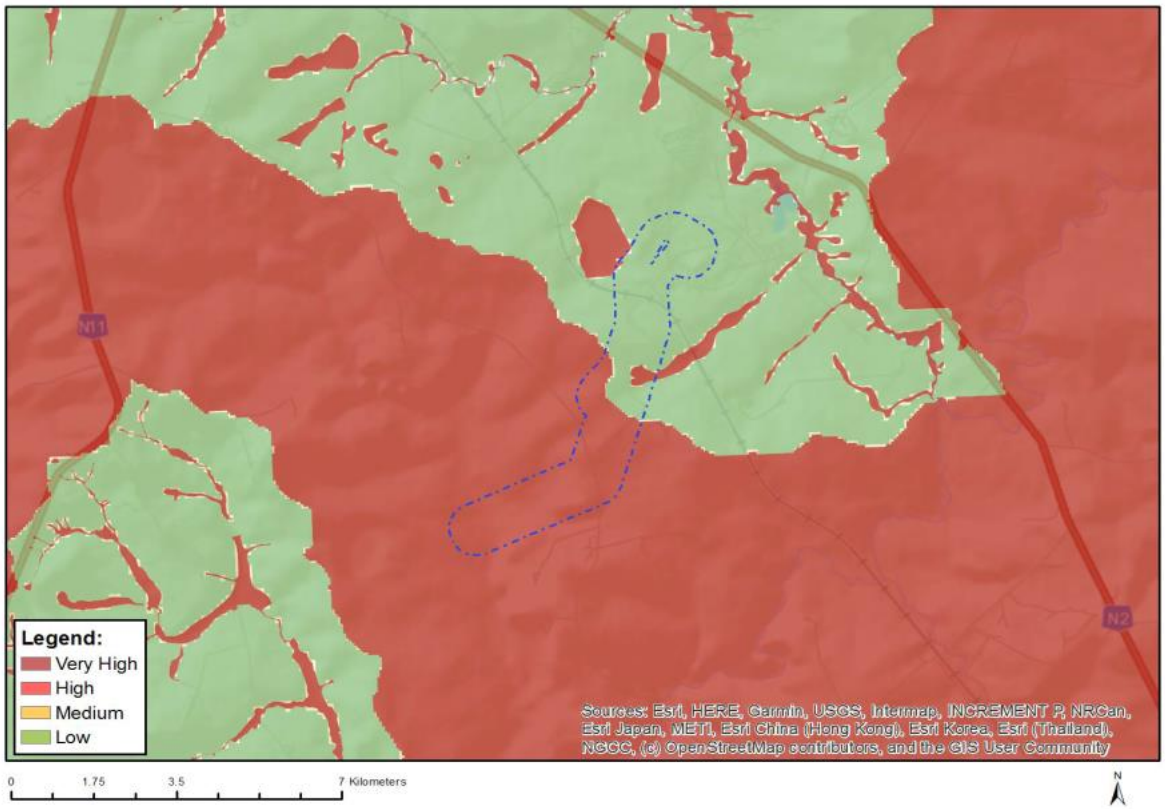

Figure 10.2: Aquatic biodiversity theme, DFFE screening tool

The current proposed layouts have, to a large degree, avoided these sensitive features and buffer areas, greatly reducing the potential overall impact and risk to aquatic resources. The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Low (-). Furthermore, noteworthy areas, that have been avoided, include the Very High Sensitivity areas.

10.1.3 TERRESTRIAL BIODIVERSITY

The **Figure 10.3** below outlines the terrestrial biodiversity sensitivities as per the DFFE screening tool.

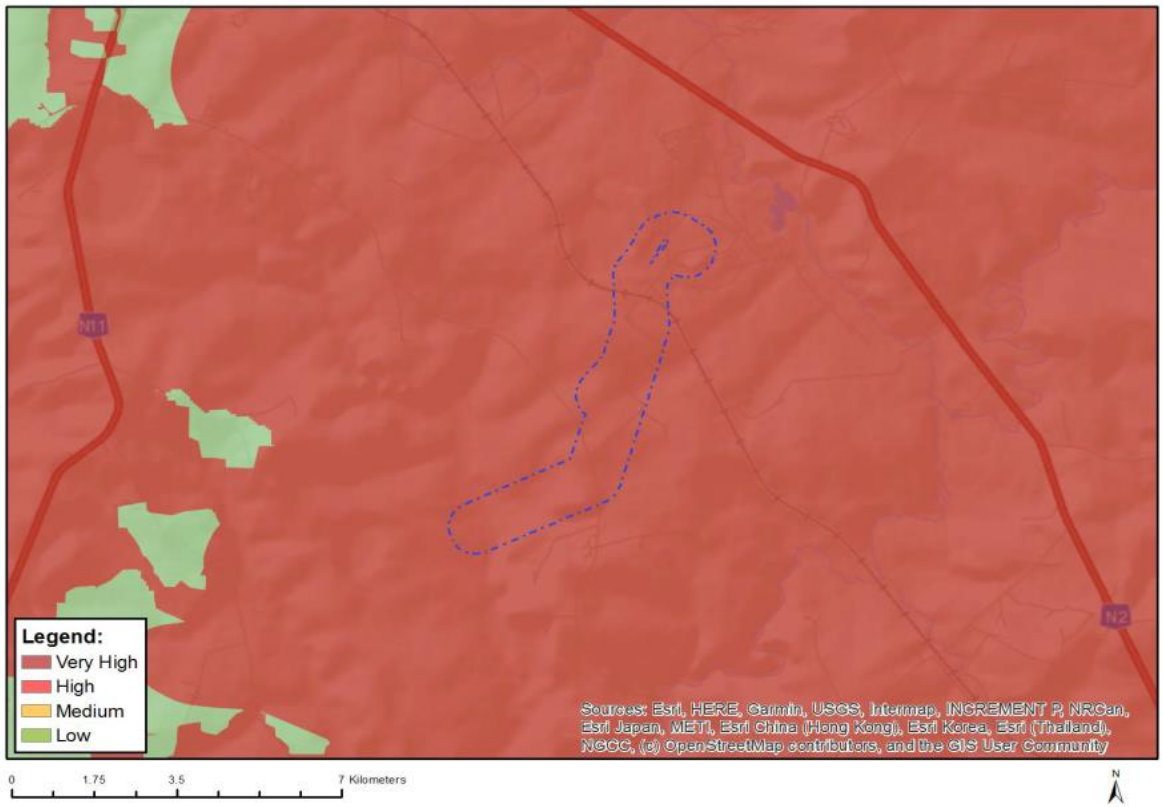

Figure 10.3: Terrestrial biodiversity theme, DFFE screening tool

According to the screening tool, there is a proclaimed conservation area on site, the Langcarel Private Nature Reserve. This area has not been managed as a protected area and has undergone similar levels of degradation as surrounding areas due primarily to overgrazing, but also partially due to alien invasive plants.

In addition, no conservation management activities were evident on site during the field assessment. This pattern of over-utilization affects all grasslands on site, resulting in them being in moderate to poor condition.

A separate process is underway to have it (or part thereof) de-proclaimed as part of ongoing province-wide reserve verification efforts by the provincial authorities. The habitat has been used for livestock production and is impacted by this land use. It is therefore the authors' opinion on the basis of the current land use and levels of modification, that the private nature reserve does not align with the objective and purpose of the protected area status.

Natural grassland on site is in moderate to poor condition, primarily due to heavy overgrazing. There are significant areas of low grass cover and bare areas, and plant species composition has been degraded by grazing effects. The sensitivity of the area from a terrestrial biodiversity perspective is therefore not very high as indicated by the screening tool.

Critical Biodiversity Areas (CBA): Irreplaceable: two small patches – note that the on-site habitat assessment has determined that these areas (where the alignment crosses the CBA) are no longer in a natural state – the small area crossed near to SS Alt2 is degraded, the finger that sticks out north of that is a combination of old land and degraded, and the small area near Camden PS is degraded.

Optimal: a small nearby patch – areas crossed by the alignment are degraded, as indicated for CBA (Irreplaceable).

10.1.4 PLANT SPECIES

The **Figure 10.4** below outlines the plant species sensitivities as per the DFFE screening tool.

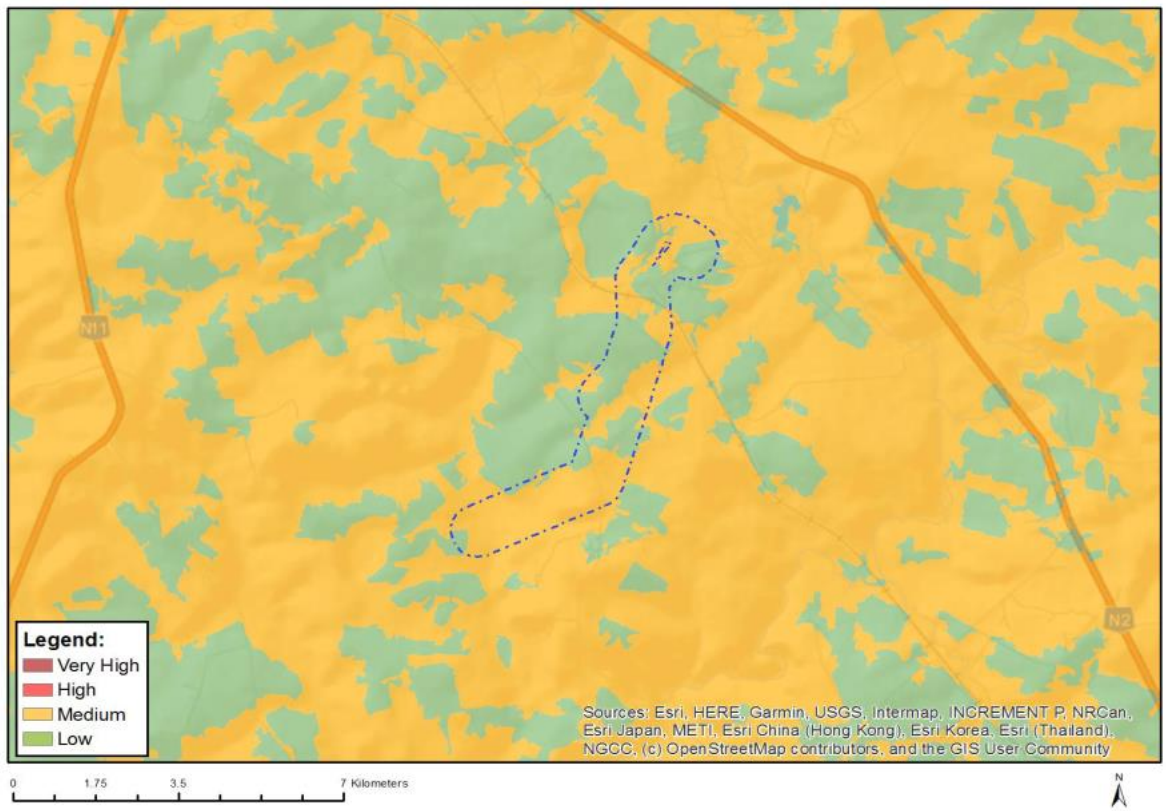

Figure 10.4: Plant species theme, DFFE screening tool

There are seven plant species of conservation concern flagged by the screening tool that could possibly occur on site, as well as additional species from historical records from SANBI databases, but none were seen during general field surveys. A targeted walk-through survey of footprint of construction areas is required prior to the commencement of construction, to determine whether or not any occur in the footprint of the development. This survey can take place at the same time as the required walk-through surveys for permitting purposes, or it can be undertaken as a separate targeted survey. It is recommended that this is undertaken in optimum growing season where possible.

10.1.5 ANIMAL SPECIES

The **Figure 10.5** below outlines the animal species sensitivities as per the DFFE screening tool.

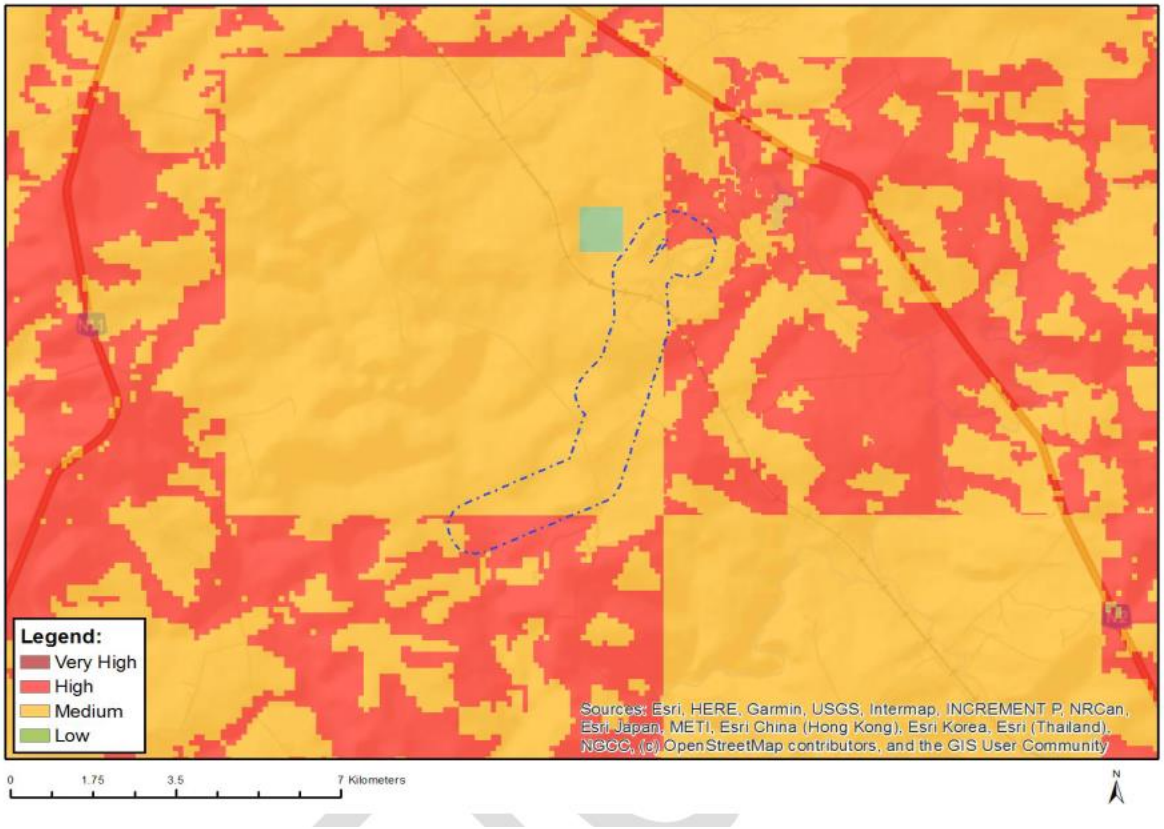

Figure 10.5: Animal species theme, DFFE screening tool

There are a number of threatened animal species that are flagged for the site as per the DFFE screening tool above, as well as others not directly flagged that may occur there. The two non-bird species flagged for the site are the Maquassie Musk Shrew and the Oribi. Both could possibly occur on site, but the likelihood is not high. These animals may make use of various habitats available on site, which consists mostly of grasslands and wetlands within shallow drainage valleys.

The majority of the flagged animal species are birds, which are assessed in a dedicated avifaunal assessment. The proposed up to 400kV HH powerline, collector substation and Camden PS substation extension will have a mostly low to moderate impact on priority avifauna which, in all instances, could be reduced to a low impact through appropriate mitigation. No fatal flaws were discovered during the onsite investigations

10.1.6 HERITAGE

The **Figure 10.6** below outlines the animal species sensitivities as per the DFFE screening tool.

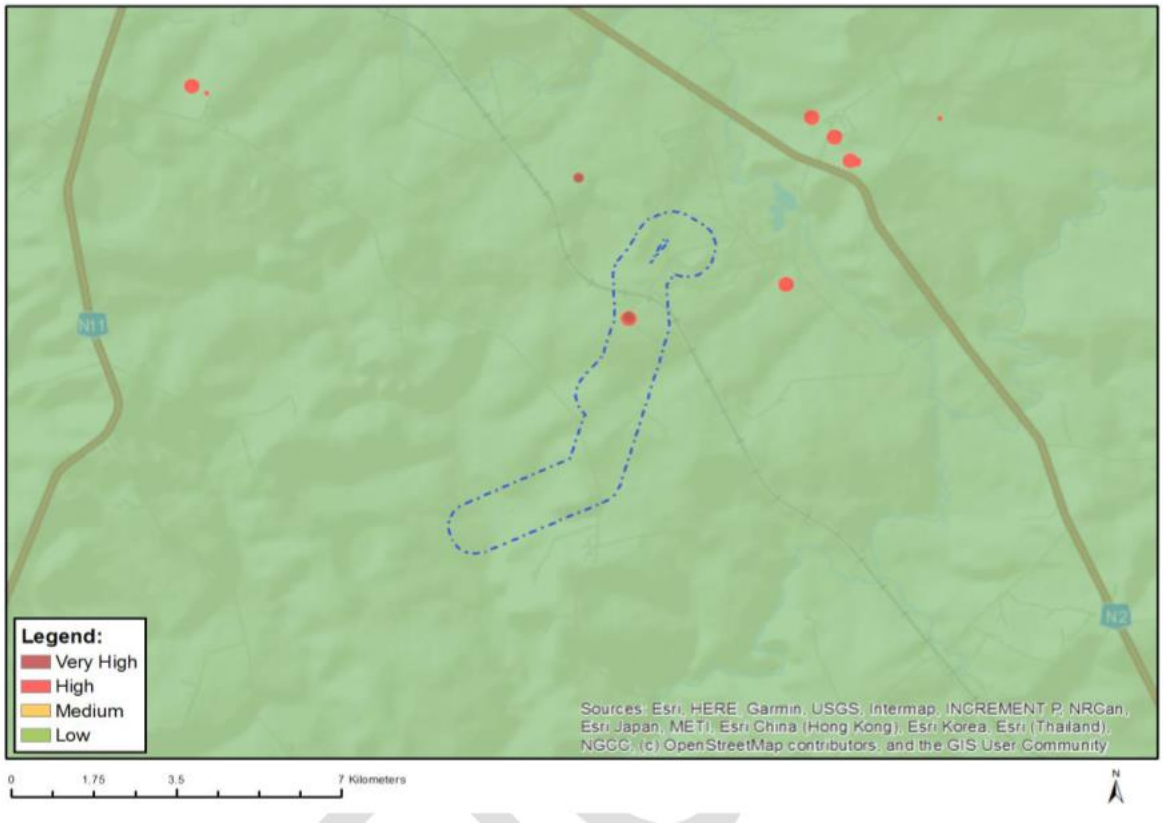

Figure 10.6: Heritage theme, DFFE screening tool

10.1.7 PALAEONTOLOGY

The **Figure 10.7** below outlines the palaeontological sensitivities as per the DFFE screening tool.

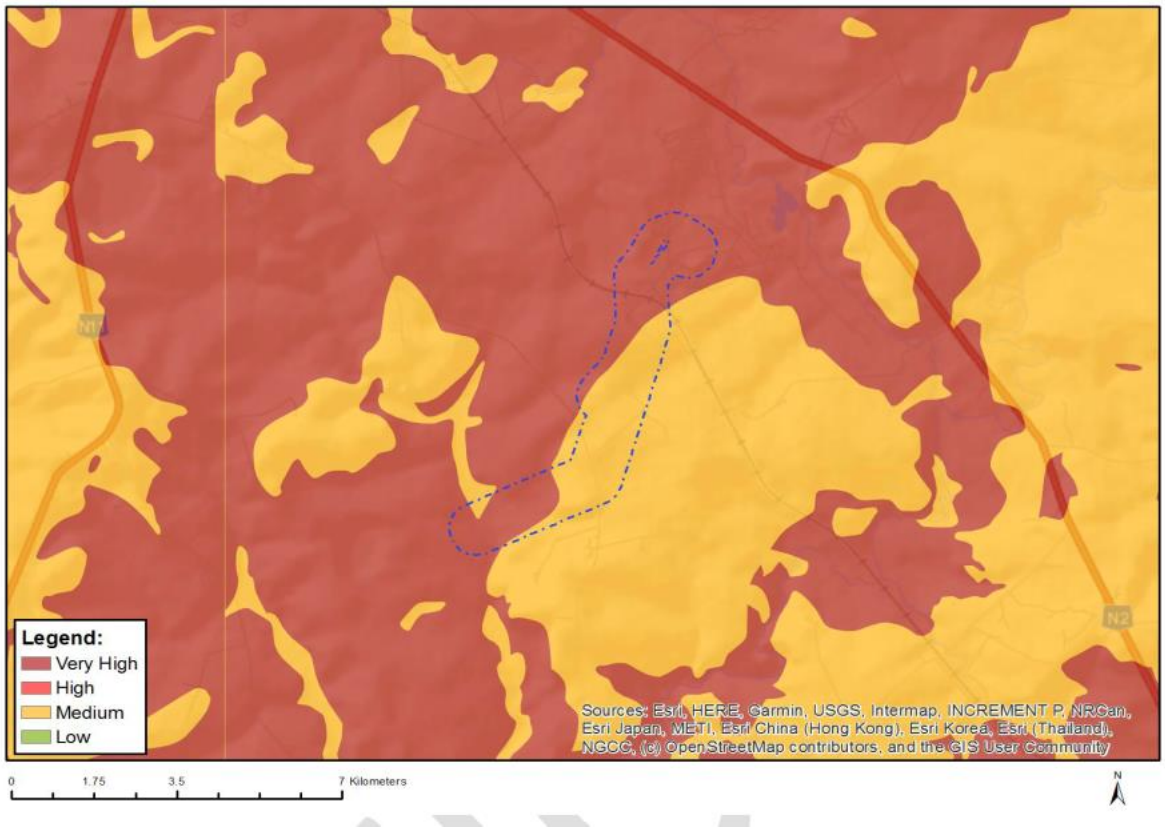

Figure 10.7: Palaeontology theme, DFFE screening tool

The agricultural land is either cultivated now, has recently been cultivated or is used for grazing. Nonetheless, it is disturbed and covered with soils and medium height grasses. There are no rocky outcrops of shale, just some dolerite outcrops (no fossils expected). No fossils were seen in the Vryheid Formation either.

Based on the fossil record, but confirmed by the site visit and walk through, there are NO FOSSILS of the Glossopteris flora even though fossils have been recorded from rocks of a similar age and type in South Africa. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation (Ecca Group, Karoo Supergroup) so a Fossil Chance Find Protocol should be added to the EMPr. Based on the specialist report, the very high sensitivity theme outlined by the screening tool above is not accurate.

10.2 SENSITIVITY MAPPING

A consolidated environmental sensitivity map (Figure 10.8**)** has been compiled based on the sensitivities and buffers outlined in the specialist studies

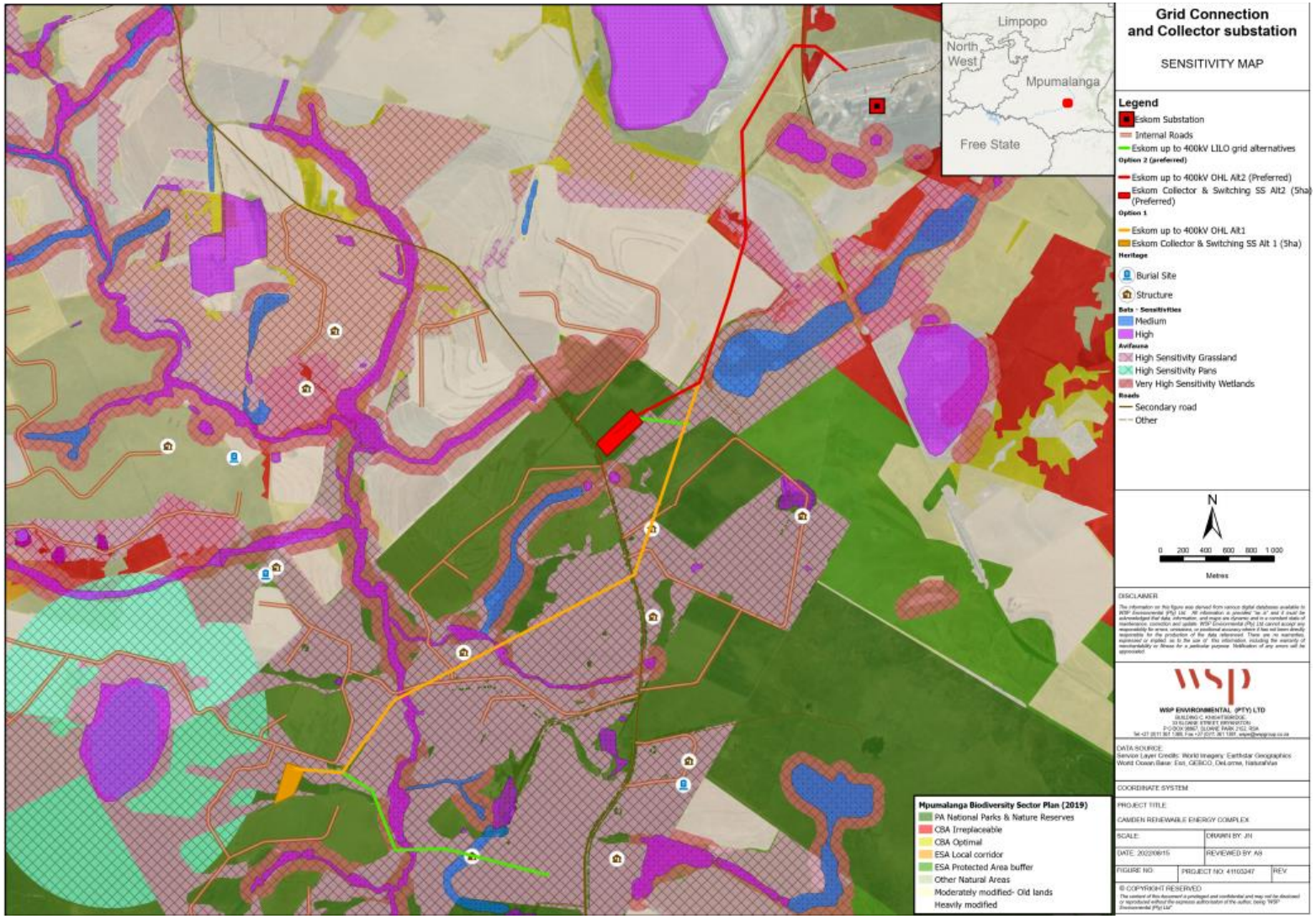

Figure 10.8: Combined Sensitivity Map

10.3 SPECIALIST CONCLUSIONS

10.3.1 AVIFAUNA

The proposed up to 400kV HH powerline, collector substation and Camden PS substation extension will have a mostly low to moderate impact on priority avifauna which, in all instances, could be reduced to a low impact through appropriate mitigation. No fatal flaws were discovered during the onsite investigations. The proposed developments are therefore supported, provided the mitigation measures listed in this report are strictly implemented.

10.3.2 TERRESTRIAL BIODIVERSITY

The vegetation type that occurs on site is Eastern Highveld Grassland, is listed as Vulnerable. All areas on site within Eastern Highveld Grassland also fall within another listed ecosystem, Chrissiesmeer Panveld, listed as Vulnerable, and defined independently to the vegetation types. The site is therefore within two listed ecosystems that overlap.

There is a proclaimed conservation area on site, the Langcarel Private Nature Reserve. This area has not been managed as a protected area and has undergone similar levels of degradation as surrounding areas due primarily to overgrazing, but also partially due to alien invasive plants. In addition, no conservation management activities were evident on site during the field assessment. This pattern of over-utilization affects all grasslands on site, resulting in them being in moderate to poor condition. A separate process is underway to have it (or part thereof) de-proclaimed as part of ongoing province-wide reserve verification efforts by the provincial authorities. The habitat has been used for livestock production and is impacted by this land use. It is therefore the authors' opinion on the basis of the current land use and levels of modification, that the private nature reserve does not align with the objective and purpose of the protected area status.

Natural grassland on site is in moderate to poor condition, primarily due to heavy overgrazing. There are significant areas of low grass cover and bare areas, and plant species composition has been degraded by grazing effects.

The tower structures of the proposed powerline will occupy a maximum of 2 ha footprint area, if the longer powerline option (Alternative 1) is used that crosses the most amount of natural habitat. Nevertheless, assuming a worst-case scenario, the proposed powerline will have a barely detectable impact on surface areas of natural habitat. However, Alternative 2 is the preferred option here, although all options are considered feasible.

For the two substation options, Alternative 2 does not affect any natural habitat whereas Alternative 1 is almost entirely within a natural area. Alternative 2 is therefore preferred, although all options are considered feasible.

Assessed impact with moderate significance after mitigation is "Loss of indigenous natural vegetation". However, these are only moderate because they are permanent and will definitely happen – the extent of the impact is negligible. On this basis, the project is therefore deemed acceptable from a terrestrial biodiversity perspective and it is recommended the Environmental Authorisation be granted. The specialist is of the opinion that the impacts associated with the project can be mitigated to acceptable levels provided the recommended mitigation measures identified are implemented.

10.3.3 ANIMAL SPECIES

There are a number of threatened animal species that are flagged for the site, as well as others not directly flagged that may occur there. The majority of the flagged animal species are birds, which are assessed in a dedicated avifaunal assessment. The two non-bird species flagged for the site are the Maquassie Musk Shrew and the Oribi. Both could possibly occur on site, but the likelihood is not high. These animals may make use of various habitats available on site, which consists mostly of grasslands and wetlands within shallow drainage valleys.

The proposed project consists of a substation, powerline connecting the collector substation to the Eskom Camden Substation as well as upgrade works contemplated at the Camden Power Station. There are two possible direct-alternatives for this powerline, along with another two Loop-In-Loop-Out options. If the longer option is chosen, that also has the greatest distance across natural habitats, then the total footprint area of the powerline towers is less than 2 ha, which is a negligible footprint area. Either option is therefore feasible and has negligible effect on animal habitats.

For the collector substation, there are two options. Alternative 1 is almost entirely within natural habitat (4.68 ha of natural habitat), whereas Alternative 2 (the preferred project alternative) is entirely within a cultivated land. From an animal species perspective, Alternative 2 is therefore preferred. If Option 2 (preferred) is selected, it also means that the powerline Alternative 2 is selected over Alternative 1, which affects a smaller amount of natural habitat, which means it is unlikely that any animal species of conservation concern will be affected. However, all alternatives are considered feasible from and animal perspective.

The main concern in terms of threatened animal species is direct loss of habitat, but this will be limited for this project, especially if Alternative 2 is selected for the substation. Fragmentation of habitat is assessed but will be very limited due to the placement of infrastructure as well as existing patterns of transformation on site. There may also be direct mortality of individual animals but this is not very likely due to the placement of most of the infrastructure away from natural habitats. From an animal species perspective all alternatives are still considered feasible however.

An assessment of these impacts indicates that they will have a significance of low or very low.

10.3.4 PLANT SPECIES

There are seven plant species of conservation concern flagged by the screening tool that could possibly occur on site, as well as additional species from historical records from SANBI databases, but none were seen during general field surveys. A targeted walk-through survey of footprint of construction areas is required prior to the commencement of construction, to determine whether or not any occur in the footprint of the development. This survey can take place at the same time as the required walk-through surveys for permitting purposes, or it can be undertaken as a separate targeted survey. It is recommended that this is undertaken in optimum growing season where possible.

The proposed project consists of a substation, powerline connecting the collector substation to the Eskom Camden Substation as well as the upgrade works contemplated at the Power Station. There are two possible direct-alternatives for this powerline, and two Loop-In-Loop-Out options. If the longer option is chosen, that also has the greatest distance across natural habitats, then the total footprint area of the powerline towers is less than 2 ha, which is a negligible footprint area. From a plant species perspective all alternatives are still considered feasible however.

For the collector substation, there are two options. Alternative 1 is almost entirely within natural habitat (4.68 ha of natural habitat), whereas Alternative 2 (the preferred project alternative) is entirely within a cultivated land. From a plant species perspective, Alternative 2 is therefore preferred. If Option 2 (preferred) is selected, it also means that the powerline Alternatives 2 is selected over Alternatives 1, which affects a smaller amount of natural habitat, which means no plant species of conservation concern will be affected. From a plant species perspective all alternatives are still considered feasible.

10.3.5 SOCIAL

The energy security benefits associated with the proposed Camden REFs are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. The construction of the proposed Camden up to 400 kV power line and associated collector substation is therefore an essential component of the overall project.

The findings of the SIA indicate that the construction and maintenance of the up to 400 kV powerline and associated collector substation will create employment and business opportunities. However, these opportunities will be limited. The findings of the SIA also indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed Camden up to 400 kV overhead power line and the associated collector substation are Low Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The

establishment of proposed Camden up to 400 kV overhead power line and associated substation is therefore supported by the findings of the SIA.

Collector Substation (CS) Alternative 2 (Northern option located on 322/1 Welgelegen) is the preferred option from a social perspective. The Loop-in-Loop-out Option linking into the Eskom Camden I – Incandu 400kV line associated with CS Alternative 2 is the preferred grid connection option. However, the findings of the SIA also indicate that the remainder of the grid connection options are suitable and acceptable from a social perspective.

10.3.6 VISUAL

The visual impact assessment was conducted to assess the magnitude and significance of the potential visual impacts associated with the development the Camden Collector Substation, a Main Transmission Substation and associated 400kV power lines near Ermelo in Mpumalanga Province.

The VIA has demonstrated that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with Camden Power Station, Camden residential area and Mooiplaats Colliery in the north-east to a more rural / pastoral character across the remainder of the study area. Hence, although a power line / substation development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed development in close proximity to Camden Power Station and the associated power lines, mining activity and rail infrastructure will significantly reduce the level of contrast.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

One formal protected area (Langcarel Private Nature Reserve) was identified within the study area, although the area is entirely managed for commercial agriculture with no conservation activities present and no evidence of public access to the site. Any landscape value or visual appeal has therefore been reduced. The area is not typically valued for its tourism significance and relatively few leisure-based tourism facilities (lodges/accommodation facilities) were identified inside the study area. This factor in conjunction with the high levels of transformation in the north-east have reduced the overall visual sensitivity of the broader area.

A total of twenty-five (25) sensitive receptors were identified in the study area, only one of which (SR2) is considered to be a sensitive receptor as it is linked to leisure/nature-based tourism activities in the area. The remaining receptor locations, are all believed to be farmsteads that are regarded as potentially sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. Six (6) of these farmsteads are not expected to experience any visual impacts as a result of the proposed development as they are outside the viewshed for the proposed power line and substation.

One of the remaining receptors (VR16) would experience high levels of visual impact, largely as a result of its location within the assessment corridor. As this receptor is located in close proximity to an existing 400kV power line servitude, and also within the Camden I WEF project area, the level of visual impact would be reduced. The remaining receptor locations, including the only sensitive receptor (SR2) are expected to experience moderate or low levels of impact as a result of the proposed power line / substation development. Considering that Eight of these receptors are located within the Camden I WEF project area, and it has been confirmed by the Proponent that the relevant land owners are in support of the overall Camden Renewable Energy Complex project it has been assumed that the relevant land owners are involved in the overall Camden Renewable Energy Complex project. As such, they are not expected to perceive the proposed development in a negative light and this would reduce the level of visual impact experienced at these locations.

Although the N2 receptor road traverses the study area, motorists travelling along this route are only expected to experience low impacts from the proposed development.

A preliminary assessment of overall impacts revealed that visual impacts (post mitigation) associated with the proposed power line and substations are of low significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of existing and proposed mining activity and electrical generation and distribution infrastructure, the introduction of new electrical grid infrastructure in the area will result in further change in the visual character of the area and alteration of the inherent sense of place, extending an increasingly industrial

character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In light of this, cumulative impacts have been rated as moderate.

A comparative assessment of the substation and power line route alternatives put forward for the EIA phase of this project was undertaken in order to determine which of the alternatives would be preferred from a visual perspective. No fatal flaws were identified in respect of any of the alternatives for the proposed collector substation or any of the grid connection infrastructure alternatives. No preference was determined for either of the substation site alternatives and both alternatives were found to be favourable. LILO Corridor Option 1 was identified as the Preferred Alternative, while Corridor Options 1 and 2 and LILO Option 2 were all found to be favourable.

It is opinion of the specialist that the potential visual impacts associated with the proposed Camden Collector Substation, Main Transmission Substation and associated 400kV power lines are negative and of moderate significance. Given the relatively low number of sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed development, the project is deemed acceptable from a visual perspective and the EA should be granted. The specialist is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

10.3.7 SOIL LAND AND AGRICULTURAL

The conclusion of this assessment is that the proposed development will have insignificant agricultural impact and will therefore be acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the facts that the loss of agricultural production potential resulting from the development is insignificant because of the insignificant amount of land excluded from agricultural production.

The only source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and fairly easily mitigated through generic mitigation measures included in the EMPr. However, farmers frequently complain that these impacts occur because the EMPr is not adequately implemented.

There is likely to be some nuisance disturbance to agricultural activities during construction. A common complaint from farmers is that gates are left open by contractors. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact.

From an agricultural impact point of view, it is recommended that the development be approved.

The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

10.3.8 PALAEONTOLOGY

Based on the fossil record, but confirmed by the site visit and walk through, there are NO FOSSILS of the Glossopteris flora even though fossils have been recorded from rocks of a similar age and type in South Africa. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation (Ecca Group, Karoo Supergroup) so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations and drilling for foundations and amenities have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample.

The Alternative 1 site for the Collector Substation is on the Vryheid Formation, but no fossils were found. The Alternative 2 site is on dolerite so no fossils would be expected to occur above or below ground, so this would be the preferred site a far as the palaeontology is concerned. Regardless of preference, both sites are considered feasible from a Palaeontological perspective. The grid routes, however, are on both fossiliferous and non-fossiliferous land but no fossils were found. There is no preference.

10.3.9 HERITAGE AND CULTURAL

The Project area is a characterised by agricultural activities (mainly grazing and cultivated fields) without any major focal points like pans or hills that would have attracted human occupation in antiquity and is considered to be of low archaeological potential. This was confirmed during the field survey and no archaeological sites of significance were noted and finds were limited to ruins (CA002, CA010, CA0012) in the wider impact area. The impact of the project on the recorded heritage resources can be avoided with micro siting of pylons of the powerline. The project and the assessed alternatives are acceptable from a heritage point of view.

According to the SAHRA Paleontological sensitivity map the study area is of zero to very high paleontological significance and an independent study was conducted for this aspect. Bamford (2022) concluded an assessment of the paleontological significance of the area (Bamford 2022) concluded that the impact on palaeontological resources is low and the project should be authorised from a paleontological point of view. A Fossil Chance Find Protocol should be added to the EMPr.

The project can commence with the implementation of the recommendations in this report are implemented as part of the EMPr, based on the South African Heritage Resource Authority (SAHRA) 's approval.

10.3.10 AQUATIC

During the assessment, several sensitive aquatic habitats were observed and are shown in the maps provided in this report. Noteworthy areas, that should be avoided, include the main riverine systems with wetlands, valley bottom wetlands, seeps and the endorheic pans. The only exception being where existing crossings may be used and/or upgraded that intersect valley bottom wetlands and riverine systems.

The current layouts have, to a large degree, avoided these sensitive features and buffer areas, greatly reducing the potential overall impact and risk to Aquatic resources. The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Low (-).

Noteworthy areas, that have been avoided, include the Very High Sensitivity areas as shown in this report. Existing crossings may be used and/or upgraded that intersect these systems or individual water pipeline crossings permitted (where unavoidable) however, detailed monitoring plan must be developed prior to the construction phase.

Based on the findings of this study, the specialist finds no reason to withhold to an authorisation of any of the proposed activities for the various projects, assuming that key mitigations measures are implemented. Lastly no preference is provided with regard any of the grid connections, as it assumed based on the characteristics of the site, that all the aquatic systems could be spanned, while making use of existing tracks, only. This also applies to the various substation / construction and laydown positioning as none of these have a direct impact on the aquatic environment are anticipated for each of the projects.

10.4 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the proposed powerline is provided in **Table 10.1** below.

Table 10.1: Impact Summary Table

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Soil Erosion & Contamination	Soil Erosion	Construction	**Moderate**	(-)	**Low**	(-)
	Soil Contamination	Construction	**Moderate**	(-)	**Low**	(-)
	Soil erosion and topsoil loss	Construction	**Low**	(-)	**Low**	(-)
	Soil Contamination	Operation	**Low**	(-)	**Very Low**	(-)
Aquatic Biodiversity	Loss of Very High Sensitivity Systems	Construction	**Moderate**	(-)	**Low**	(-)
	Damage or loss of riparian and or riverine systems	Construction	**Moderate**	(-)	**Low**	(-)
	Potential impact on water quality	Construction	**Moderate**	(-)	**Low**	(-)
	Impact on habitat change and fragmentation related to hydrological regimes	Construction	**Moderate**	(-)	**Low**	(-)
	Impact on aquatic systems through possible increase in surface water run-off	Operation	**Low**	(-)	**Very Low**	(-)
Terrestrial Biodiversity	Loss of indigenous natural vegetation	Construction	**Moderate**	(-)	**Moderate**	(-)
	Establishment and spread of declared weeds and alien invader plants	Construction	**Low**	(-)	**Very Low**	(-)
	Continued disturbance to natural habitats due to general operational activities and maintenance	Operation	**Low**	(-)	**Low**	(-)
	Establishment and spread of declared weeds and alien invader plants	Operation	**Moderate**	(-)	**Very Low**	(-)
	Continued runoff and erosion	Operation	**Low**	(-)	**Low**	(-)
	Establishment and spread of declared weeds and alien invader plants	Decommissioning	**Moderate**	(-)	**Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Plant Species	Loss of individuals of Species of Conservation Concern due to clearing for construction	Construction	**Moderate**	(-)	**Very low**	(-)
Animal Species	Loss of faunal habitat	Construction	**Moderate**	(-)	**Very low**	(-)
	Direct mortality of fauna due to presence of traffic and heavy machinery	Construction	**Low**	(-)	**Very low**	(-)
	Direct mortality of fauna due to presence of traffic and heavy machinery	Operation	**Low**	(-)	**Very low**	(-)
Avifauna	Disturbance of priority species	Construction	**Moderate**	(-)	**Low**	(-)
	Habitat transformation	Construction	**Moderate**	(-)	**Low**	(-)
	Mortality of priority species due to collisions	Operation	**Moderate**	(-)	**Low**	(-)
	Electrocution of priority species on the on-site substation infrastructure	Operation	**Low**	(-)	**Low**	(-)
	Displacement of priority species	Decommissioning	**Moderate**	(-)	**Low**	(-)
Visual	Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction.	Construction	**Low**	(-)	**Low**	(-)
	Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.	Construction	**Low**	(-)	**Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Construction	**Low**	**(-)**	**Low**	**(-)**
	Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.	Construction	**Low**	**(-)**	**Low**	**(-)**
	Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.	Construction	**Low**	**(-)**	**Low**	**(-)**
	Potential visual pollution resulting from littering on the construction site.	Construction	**Low**	**(-)**	**Low**	**(-)**
	The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts	Operation	**Low**	**(-)**	**Low**	**(-)**
	The night time visual environment could be altered as a result of operational and security lighting at the proposed substation.	Operation	**Low**	**(-)**	**Low**	**(-)**
	Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.	Decommissioning	**Low**	**(-)**	**Low**	**(-)**

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Decommissioning activities may be perceived as an unwelcome visual intrusion.		**Low**	**(-)**	**Low**	**(-)**
	Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.		**Low**	**(-)**	**Low**	**(-)**
	Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.		**Low**	**(-)**	**Low**	**(-)**
	Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.		**Low**	**(-)**	**Low**	**(-)**
Heritage	Damage to Heritage Resources	Construction	**Low**	**(-)**	**Very Low**	**(-)**
Palaeontology	Loss of Fossils	Construction	**Low**	**(-)**	**Very Low**	**(-)**
Socio-economic	employment, skills development, and business creation opportunities	Construction	**Low**	**(+)**	**Low**	**(+)**
	Potential impacts on family structures and social networks associated with the presence of construction workers	Construction	**Low**	**(-)**	**Low**	**(-)**

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site	Construction	**Moderate**	(-)	**Low**	(-)
	Potential loss of livestock and grazing and damage to farm infrastructure associated with increased incidence of grass fires	Construction	**Moderate**	(-)	**Low**	(-)
	Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site.	Construction	**Low**	(-)	**Low**	(-)
	Potential impact on productive farmland due to construction related activities and movement of traffic on the site	Construction	**Moderate**	(-)	**Low**	(-)
	Development of infrastructure to improve energy security and reduce reliance on coal	Operation	**Moderate**	(+)	**Moderate**	(+)
	Creation of employment, skills development and business opportunities associated with the operational phase	Operation	**Low**	(+)	**Low**	(+)
	visual impact and impact on sense of place	Operation	**Low**	(-)	**Low**	(-)
	Risks posed to farming activities by maintenance workers.	Operation	**Moderate**	(-)	**Low**	(-)
Noise	Noise generated during construction	Construction	**Low**	(-)	**Very Low**	(-)

10.5 ALTERNATIVES ASSESSMENT

Based on the detailed specialist studies undertaken for the proposed project it is evident that the site alternative 2 and powerline alignment 2 are the overall preferred options for the proposed Camden I 400kV grid connection and common collector substation. **It must be noted that the Applicant seeks authorisation for the full assessment corridor (250m either side of centre line) to enable micro-siting post final design.**

The **Figure 10.9** below shows the preferred substation location.

Figure 10.9: Preferred site alternative 2

Site alternative 2 is the preferred option for the substation, with the following coordinates:

- A2-1 - 26°38'44.08"S 30° 4'10.50"E
- A2-2 - 26°38'47.63"S 30° 4'14.25"E
- A2-3 - 26°38'57.67"S 30° 4'3.08"E
- A2- 26°38'54.03"S 30° 3'59.66"E

The **Figure 10.10** below shows the preferred 400kV powerline alignment, which is approximately 4.5km long.

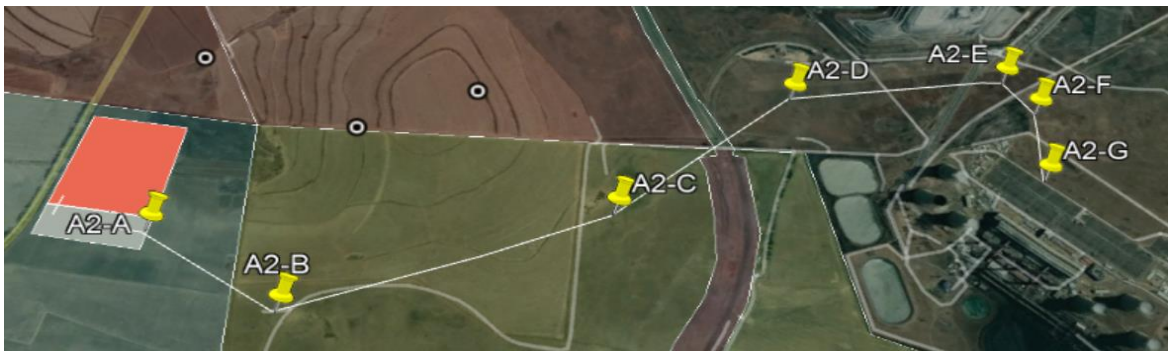

Figure 10.10: Preferred alternative 2 400kV powerline alignment

The coordinates below are for the preferred alternative 2 alignment for the 400kV powerline, approximately 4.5km

- A2-A - 26°38'43.11"S 30° 4'10.20"E
- A2-B - 26°38'35.81"S 30° 4'32.43"E
- A2-C - 26°37'53.90"S 30° 4'45.82"E
- A2-D- 26°37'24.41"S 30° 4'43.72"E
- A2-E- 26°36'59.67"S 30° 4'59.51"E
- A2-F - 26°36'58.98"S 30° 5'6.73"E
- A2-G - 26°37'5.84"S 30° 5'16.50"E

The **Figure 10.11** below shows the associated line in line out connection for the preferred alignment of the LILO connection powerline.

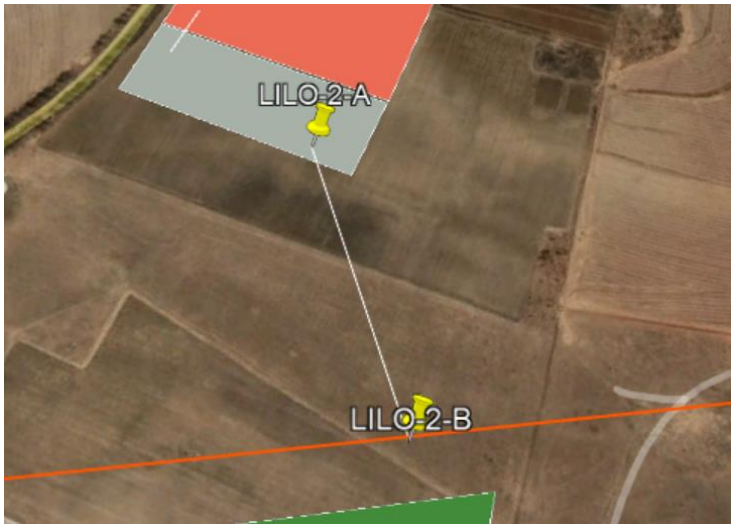

Figure 10.11: Alternative 1 LILO connection

- LILO-2-A - 26°38'46.28"S 30° 4'9.82"E
- LILO-2 - B26°38'47.93"S 30° 4'29.21"E

A total corridor of 500m was assessed (250m either side of the centre line), and a servitude of 55m wide will be authorised with 27.5m on either side of the line, to be placed within the assessed corridor based on technical and environmental constraints, where possible. This will allow for micro-sitting and the selection of the preferred tower designs at the design phase.

10.5.1 NO-GO ALTERNATIVE

The no-go alternative will mean none of the negative and positive impacts described above will come into effect.

The no-go alternative will result in the current status quo being maintained at the proposed development site as far as the environmental impacts are concerned.

This assessment found no fatal flaws in the proposed project with regard to heritage resources that would require the implementation of the No-Go option in respect of the proposed construction of the OHPL.

The proposed power line is essential to enable the proposed Camden renewable energy complex to connect to the national electricity grid to address the current energy supply constraints and reduce South Africa's reliance on coal generated energy. As indicated above, energy supply constraints and associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions.

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement is current energy needs with renewable energy. Given South Africa's current energy security challenges and its position as one of the highest per capita producer of carbon emissions in the world, this would represent a negative social cost

10.6 IMPACT STATEMENT

The overall objective of the EIA is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

It is the opinion of WSP that the information contained in this document (read in conjunction the final scoping report) is sufficient for the DFFE to make an informed decision for the environmental authorisation being applied for in respect of this project.

Mitigation measures have been developed where applicable for the above aspects and are presented within the EMPr (**Appendix H**). It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

Considering the findings of the respective studies, no fatal flaws were identified for the proposed Project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the environmental aspects is expected to be low. It is thus the opinion of the EAP that the Project can proceed, and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

EA AUTHORISATION PERIOD

Appendix 1(3)(1)(q) of the NEMA EIA Regulations 2014, as amended requires "where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised" must be included in the EIA Report.

The EA is required to be valid for a period of 10 years from the date of issuance of the EA. This is considered a reasonable period to allow the Applicant time to conduct relevant internal processes which can only begin after issuance of the EA.

FINALISATION OF THE EMPR AND LAYOUT

It is important to note that the EMPr (**Appendix H**) and project layout included in this EIR are not final and although included in this EIR, these are not submitted for approval at this stage. Subsequent to the decision-making phase, if environmental authorisation is granted for the Camden I 400kV, the EMPr will have to be amended to include measures as dictated by the final layout map and micro-siting, including the requirements of the EA. The amended EMPr and final layout subjected to micro-siting will be submitted to the DFFE for review and approval following detailed design.

ASPECTS TO BE INCLUDED AS CONDITIONS IN THE EA

The following key aspects are recommended to be included as conditions of authorisation:

- The layouts submitted in the EIR are not final. The final layouts are to be submitted to the DFFE for approval prior to construction;
- The EMPr submitted in the EIR is not final. The final EMPr is to be submitted to the DFFE for approval prior to construction;
- Construction must only commence once the Protected Area status has been changed for the directly affected properties (i.e. Portion 1 & 2 of Farm No. 322 (Welgelegen));
- The EMPr and EIR mitigation measures must be adhered to;
- Recommendations for the layout as provided by the relevant specialists must be implemented as far as possible;

- The final EMPr must form part of all contractual documents with contractors during construction and operational phases of the project. Furthermore, a dedicated Environmental Control Officer (ECO) must be appointed to ensure compliance to all EA conditions and EMPr commitments throughout the construction phase;
- Applications for all relevant and required permits must be submitted prior to construction; and
- Where required, water use authorisation under NWA is to be obtained from the Department of Water and Sanitation prior to construction.

11 CONCLUSION

ENERTRAG is proposing the development of a Camden Renewable Energy Complex within the vicinity of the Camden Power Station in Mpumalanga. **This report is specific to the Camden Grid Connection and Collector substation (up to 400kV)**. The proposed project is located south-west of Ermelo, in Mpumalanga and falls within the Msukaligwa Local Municipality and the Dr Pixley Ka Seme Local Municipality of the Gert Sibande District Municipality.

This S&EIA process considered the biophysical location of the proposed development, as well as a feasibility assessment by the proponent, which *inter alia* served to identify site options that would be optimal for energy production and grid interconnection. The anticipated environmental and social impacts associated with the proposed project have been identified and assessed by the various specialists. Based on the findings of the Specialists, the current layout avoids sensitivities as much as possible.

Based on the Specialist findings, a revised layout was developed to avoid sensitive features and buffer areas, and mitigate against overall impact. Based on the findings of the Specialists, the current layout avoids sensitivities as much as possible. Furthermore, in terms of the assessed terrestrial impacts, the extent of the impact on the loss of indigenous natural vegetation is negligible.

It is also important to note that although there is a proclaimed conservation area on Portion 1 of Farm No. 322 (Welgelegen), which is a declared Private Nature Reserve (Langcarel Private Nature Reserve), the area is not being managed as a nature reserve and a separate process is underway to have it deproclaimed (or partially deproclaimed) as part of ongoing province-wide reserve verification efforts by the provincial authorities. Furthermore, no evidence was observed on site of any conservation management activities during the Terrestrial Biodiversity field assessment. Following assessment, the Biodiversity Specialist is of the opinion that the impacts associated with the project can be mitigated to acceptable levels provided the recommended mitigation measures identified are implemented, and that on the basis of the current land use and levels of modification, that the private nature reserve status does not align with the objective and purpose of the protected area status.

Based on the findings of the impact assessment and specialist studies, the proposed project is considered to have an overall **Low** to **Moderate** negative environmental impact and an overall **Low** to **Moderate** positive socio-economic impact, with the implementation of the relative mitigation measures. All of the specialists have recommended that the proposed project receive EA if the recommended mitigation measures are implemented.

In consideration of the findings of the S&EIA Process, as well as the national, provincial and local strategic requirements to support sustainable development whilst promoting socio-economic development, it is the opinion of the EAP that the proposed project will make a positive contribution towards socio-economic development in the Gert Sibande District Municipality in addition to national benefits in terms of renewable energy generation. It is recommended that the project receive EA in terms of the EIA Regulations (as amended), provided that the outlined mitigation measures of this S&EIA process are implemented effectively.

This draft EIAR is available for public review from **07 September 2022 to 10 October 2022.**

All issues and comments submitted to WSP during the scoping phase have been incorporated in the CRR (**Appendix F** of the EIR (i.e. SER)). The Final EIR will be submitted to the DFFE, as the competent authority

If you have any further enquiries, please feel free to contact:

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APPENDIX

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APPENDIX

B EAP DECLARATION

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C SPECIALIST DECLARATIONS

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D DFFE SCREENING REPORT

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E PRE-APPLICATION MEETING MINUTES

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G-2 AVIFAUNAL IMPACT ASSESSMENT

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G-3 PLANT SPECIES ASSESSMENT

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G-4 ANIMAL SPECIES ASSESSMENT

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G-5 TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

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G-6 AQUATIC IMPACT ASSESSMENT

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G-7 HERITAGE IMPACT ASSESSMENT

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G-8 PALAEONTOLOGICAL IMPACT ASSESSMENT

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G-9 SOCIO-ECONOMIC IMPACT ASSESSMENT

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G-10 VISUAL IMPACT ASSESSMENT

APPENDIX

H EMPR

APPENDIX

I MAPS

APPENDIX

J SCOPING PHASE APPROVAL

APPENDIX

K DFFE ACCEPTANCE OF APPLICATION