DALMANUTHA WEF (RF) (PTY) LTD

DALMANUTHA WIND ENERGY FACILITY (UP TO 300MW)

DRAFT ENVIRONMENTAL SCOPING REPORT

12 DECEMBER 2022

DRAFT

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DALMANUTHA WEF (RF) (PTY) LTD

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APPLICANT

Dalmanutha WEF (RF) Pty Ltd

PROJECT NAME

Dalmanutha Wind Energy Facility (up to 300MW)

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WSP

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Noise Specialist	Kirsten Collet
Traffic Specialist	Christo Bredenhann
Agriculture and Soils Specialist	Karen King
Geotechnical	Heather Davis
Surface water	Eugeshin Naidoo
Terrestrial Biodiversity Specialist	Aisling Dower
Aquatic Biodiversity Specialist	Bradley Graves
Social Specialist	Stephen Horak

SPECIALISTS

Heritage and Palaeontological Specialist	Jaco van der Walt (Beyond Heritage)
Avifauna Specialist	Jon Smallie (WildSkies Ecological Services (Pty) Ltd)
Bat Specialist	Dr Low de Vries (Volant Environmental (PTY) LTD)
Visual Specialist	Lourens du Plessis (LoGIS)

Risk Specialist	Debra Mitchell (Ishecon cc)

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1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This Draft Scoping Report (DSR) documents the process and findings of the scoping phase of the Scoping and Environmental Impact Reporting (S&EIR) process for the proposed Dalmanutha Wind Energy Facility (WEF), located approximately 7km south-east of Belfast in the Mpumalanga Province of South Africa.

The DSR 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

The proponent is proposing the development of the Dalmanutha Wind Energy Complex in Mpumalanga. The facility consists of five distinct projects referred to as:

- Dalmanutha Wind Energy Facility (up to 300MW)
- Dalmanutha WEF Grid Connection Infrastructure (up to 132kV)
- Dalmanutha West Wind Energy Facility (up to, but not including, 20MW)
- Dalmanutha West WEF Grid Connection Infrastructure (up to 132kV)
- Common Collector Substation and Powerline (up to 132kV)

The focus of this Scoping Report is the proposed Dalmanutha WEF (up to 300MW) project.

The proposed project will be applied for under a Special Purpose Vehicle (SPV), and the Project Applicant is therefore Dalmanutha WEF (RF) (Pty) Ltd. The Dalmanutha WEF is located approximately 7km southeast of the Belfast town within Emakhazeni Local Municipality, Mpumalanga Province. Site access is via the N4, which is approximately 220 meters from the proposed development area. Dalmanutha WEF will be located over eighteen farm portions (**Figure 1-1**).

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)).

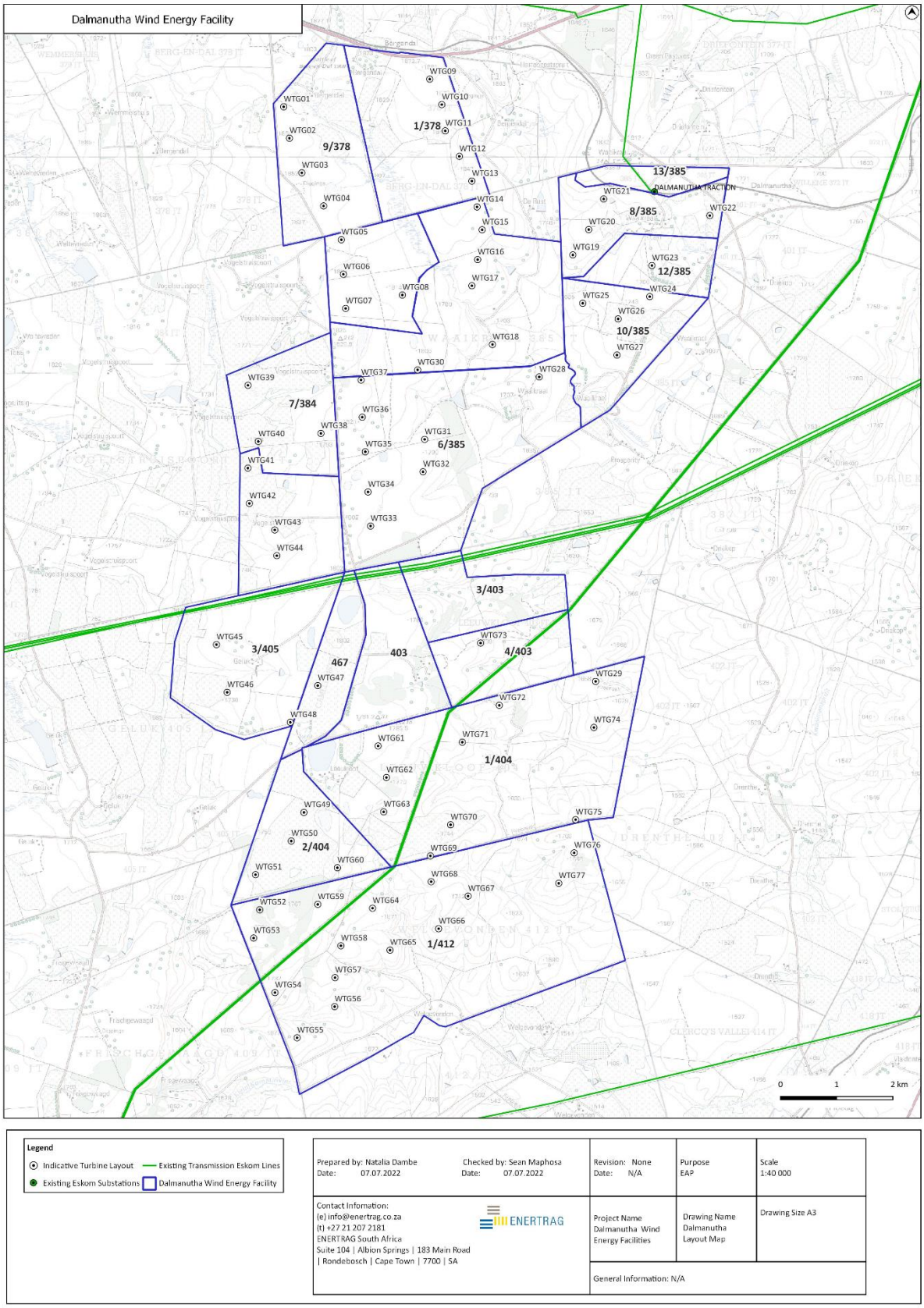


Figure 1-1: Proposed Dalmanutha WEF and associated infrastructure (pre-optimised 77 Turbine Layout)

1.3 KEY ROLE PLAYERS

1.3.1 PROJECT PROPONENT

Dalmanutha WEF (RF) (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:	**DALMANUTHA WEF (RF) (PTY) LTD**
Contact Person:	Mercia Grimbeek / Mmakoena Mmola
Postal Address	Suite 104, Albion Springs, 183 Main Road, Rondebosch, Cape Town, South Africa 7700
Telephone:	+27 78 152 1022 / +27 71 875 0193
Email:	Mercia.Grimbeek@enertrag.com / Mmakoena.Mmola@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 to the Integrated Resource Plan (IRP) 2010 – 2030.

The CA (i.e., DFFE) was confirmed during the Pre-Application Meeting held on **14 June 2022**.

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: Trisha Pillay tpillay@dffe.gov.za Integrated Environmental Authorisations

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);
- DFFE: Biodiversity and Conservation;
- DFFE: Protected areas;
- 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;
- Nkangala District Municipality;
- Emakhazeni Local Municipality; and
- Chief Albert Luthuli 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** 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
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 was 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	Karen King	WSP Group Africa (Pty) Ltd	**Section 5.1.5** **Section 6.1** **Section 7.4** **Section 8.6.1** **Appendix M**
Avifauna	Jon Smallie	Wild Skies Ecological Services (Pty) Ltd	**Section 5.2.14** **Section 6.6** **Section 7.11** **Section 8.6.5** **Appendix I**
Bats	Dr Low de Vries	Volant Environmental (Pty) Ltd	**Section 5.2.15** **Section 6.5** **Section 7.12** **Section 8.6.6** **Appendix J**
Terrestrial and Aquatic Biodiversity (including Animal and Plant species themes)	Aisling Dower and Bradley Graves	WSP Group Africa (Pty) Ltd	**Section 5.2** **Section 6.2, 6.3, 6.11 & 6.12** **Section 7.9** **Section 8.6.2** **Appendix H**
Geotechnical	Heather Davis	WSP Group Africa (Pty) Ltd	**Section 5.1.4** **Section 7.3** **Appendix G**
Surface water	Eugeshin Naidoo	WSP Group Africa (Pty) Ltd	**Section 5.1.6** **Section 7.5** **Appendix N**
Heritage and Palaeontology	Jaco van der Walt	Beyond Heritage	**Section 5.3.4** **Section 6.4** **Section 7.14 & 7.15** **Section 8.6.8** **Appendix R**
Socio-economic	Stephen Horak	WSP Group Africa (Pty) Ltd	**Section 5.3.6** **Section 7.17 & 8.6.11** **Section 7.5.10** **Appendix S**
Traffic	Christo Bredenhann	WSP Group Africa (Pty) Ltd	**Section 5.3.3** **Section 7.16** **Section 8.6.9** **Appendix O**

ASSESSMENT	NAME OF SPECIALIST	COMPANY	SECTIONS IN REPORT
Visual	Lourens du Plessis	LoGIS	**Section 5.3.5** **Section 6.7 & 6.8** **Section 7.13** **Section 8.6.10** **Appendix K**
Noise	Kirsten Collett	WSP Group Africa (Pty) Ltd	**Section 5.3.2** **Section 6.10** **Section 7.2** **Section 8.6.7** **Appendix P**
Risk	Debra Mitchell	ISHECON cc	**Section 5.3.7** **Section 7.19** **Section 8.6.12** **Appendix Q**

1.4 SCOPING TERMS OF REFERENCE

The 2014 Environmental Impact Assessment (EIA) Regulations (GNR 982), as amended, identifies the proposed Dalmanutha WEF development 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).

As defined in Appendix 2 of GNR 982, as amended, the objective of the scoping process is to, through a consultative process:

- Identify the relevant policies and legislation relevant to the activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Public participation is a requirement of scoping; it consists of a series of inclusive 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 DRAFT SCOPING REPORT STRUCTURE

Table 2 cross-references the sections within the DSR 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 and **Appendix A**
	the expertise of the EAP, including a Curriculum Vitae	**Appendix A**
(b)	The location of the activity, including-	
	The 21-digit Surveyor code for each cadastral land parcel;	Section 2.1
	Where available, the physical address and farm name	Section 2.1
	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	N/A
	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 3.1
	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 3

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
(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 2.5
(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;	Section 2.4
	Details of the public participation undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 4.6
	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;	To be included in the Final Scoping Report (FSR)
	the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 5 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 6
	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 4.5
	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 6
	the possible mitigation measures that could be applied and level of residual risk;	Section 6
	the outcome of the site selection matrix;	Section 2.4
	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 2.4
(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 7.3
	a description of the aspects to be assessed as part of the environmental impact assessment process;	Section 7.4
	aspects to be assessed by specialists;	Section 7.5
	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 7.6

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
	a description of the proposed method of assessing duration and significance;	Section 7.7
	an indication of the stages at which the competent authority will be consulted;	Section 7.9
	particulars of the public participation process that be conducted during the environmental impact assessment process; and	Section 7.9
	a description of the tasks that will be undertaken as part of the environmental impact assessment process;	Section 7
	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 6 Section 7.7
(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 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.

Terrestrial and Aquatic Ecology:

The following assumptions, limitations, uncertainties are listed regarding the terrestrial and aquatic ecological assessment of the Dalmanutha site:

- The baseline description is qualitative and based on the available desktop information supplemented by preliminary scoping-level data gathered during the site visits.

- The preliminary identification of potential impacts and mitigation measures focus on fauna and flora species of concern with potential to occur in the study area.
- The selection of species of concern for the scoping level screening of impacts was based on the level of knowledge (that is, ecology and conservation status) of the species to act as surrogates for all species in the area and adopts the hypothesis that conditions which support vertebrates and/or vascular plant species of concern are likely to also support species of concern from other taxonomic groups.
- Due to unseasonal high rainfall, flows within the watercourses associated with the proposed project were representative of high flow conditions at the time of the June 2022 survey. A follow-up seasonal low flow assessment was done for September/October 2022.
- The information provided in the study and that obtained in the follow-up assessment will be consolidated into a single report whereby the ecological category, ecological importance and sensitivity, functional buffers, impact assessment, and recommendations, will be provided.

Avifauna:

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

- Certain biases and challenges are inherent in the methods that have been employed to collect data in this programme. It is not possible to discuss all of them here, and some will only become evident with time and operational phase data, but the following are some of the key points:
- The presence of the observers on site is certain to have an effect on the birds itself. For example, during walked transects, certain bird species will flush more easily than others (and therefore be detected), certain species may sit undetected, certain species may flee, and yet others may be inquisitive and approach the observers. Likewise, with the vantage point counts, it is extremely unlikely that two observers sitting in position for hours at a time will have no effect on bird flight. Some species may avoid the vantage point position because there are people present, and others may approach out of curiosity.
- In almost all data collection methods large bird species will be more easily detected, and their position in the landscape more easily estimated. This is particularly relevant at the vantage points where a large eagle may be visible several kilometres away, but a smaller kestrel perhaps only within 800 metres. A particularly important challenge is that of estimating the height at which birds fly above the ground. With no reference points against which to judge, it is exceptionally difficult and subjective. It is for this reason that the flight height data has been treated cautiously by this report, and much of the analysis conducted using flights of all height.
- The questions that one can ask of the data collected by this programme are almost endless. Most of these questions however become far more informative once post construction data has been collected and effects can be observed. For this reason, some of the analysis in this report is relatively crude. The raw data has however been collected and will be stored until such time as more detailed analysis is possible and necessary.
- Spotting and identifying birds whilst walking is a significant challenge, particularly when only fleeting glimpses of birds are obtained. As such, there is variability between observers' ability and hence the data obtained. The above data is therefore by necessity subjective to some extent. To control for this subjectivity, the same pairs of observers have been used for the full duration of the project, and it is hoped this can be maintained for the post construction phase. Despite this subjectivity, and several assumptions that line transects rely on (for more details see Bibby et al, 2000), this field method returns the greatest amount of data per unit effort (Bibby et al, 2000) and was therefore deemed appropriate for the purposes of this programme. Further, to maximise the returns from available resources, the walked transects were located close to each Vantage Point. This systematic selection may result in some as yet unknown bias in the data, but it has numerous logistical benefits.
- No thresholds for fatality rates for priority species have been established in South Africa to date. This means that impact assessments such as this one need to make subjective judgements on the acceptability of the estimated predicted fatalities for each species.

Bats:

As with any environmental study, there are certain assumptions and limitations that exist around the current knowledge we possess regarding bats and their behaviour, movements, and distribution. Some important points are discussed briefly below:

- The microphones located on the met mast at 55m and 120m malfunctioned and did not record between the 13th of September and the 1st of October. The mics were replaced on the 1st of October and are in working condition.
- The batteries were stolen from the DAL1 during August and no recordings were made between the 10th and 23rd of August. The issue has been addressed and no further problems are anticipated.
- The SD card at DAL1 malfunctioned during October, and no data were collected during this time.
- Not all farms could be accessed during the survey, and as such transects could not be driven cross the entire area. Enough roads were, however, driven to cover all habitat types and travers the majority of the property.
- Distribution records of bats in southern African are still poorly reported and limited for many species. In addition, migratory patterns of bats are largely unknown in South Africa. Studies have reported that bats do migrate, but the exact routes followed are not known (Pretorius et al., 2020).
- The same is true for breeding behaviour and the formation of maternity colonies for many species. WEF pre-construction monitoring reports on bats are reliant on reporting echolocation calls (if no bat mortality data from adjacent facilities are available), but without echolocation call libraries accurate identification of calls is not always possible. Published libraries created from release and handheld calls from captured bats are available for southern Africa but are geographically limited.
- The echolocation calls of a particular species from different regions in South Africa are known to vary to some degree (Monadjem et al., 2020), and as such call libraries created in different regions are not always comparable.

Social:

There were no assumptions and limitations associated with this study

Visual:

The visual assessment is based on a desktop-level assessment. The following activities have not been undertaken as part of the scoping study, but will be included in the EIA phase VIA:

- Viewer incidence/viewer perception (identify potentially affected sensitive visual receptors)
- Determine the visual absorption capacity of the environment surrounding the infrastructure and activities
- Identify potential cumulative visual impacts
- Undertake a site visit
- Recommend mitigation measures and/or infrastructure placement alternatives

Heritage:

- The study area was not subjected to a field survey, and this will be conducted in the EIA phase.
- It is assumed that information obtained for the wider area is applicable to the study area and the authors acknowledge that the brief literature review is not exhaustive on the literature of the area.
- Due to the subsurface nature of cultural deposits, the possibility exists that some features or artefacts may only be discovered/recorded during the survey, similarly the possible occurrence of graves not recorded here, and other cultural material cannot be excluded.
- This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would 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 scoping report.

Noise:

For this Environmental Acoustic Impact Assessment, various assumptions will be made that may impact the results obtained. These include:

- The turbine specifications provided are assumed to be representative of what will be installed in reality.
- The turbine locations provided are assumed to be an accurate representation of where these will be located in reality.
- Identification of sensitive receptors is based on a desktop assessment, and it is assumed that all key receptors have been included.

Soil Land and Agricultural:

- A significant portion of the site has been disturbed, by existing agricultural activity making classification of the soil forms difficult.
- Site access was difficult owing to the terrain, a lack of access roads and inclement weather.
- The site could not be traversed such that an even grid matrix of classification points could be set up. As a result, some extrapolation of findings will be necessary.
- A third site visit will be required to auger soil classification points in various areas on the remainder of the study site
- The area demarcated as an Exclusion Area in the underlying images was not included in the study at the landowner's request.

Risk:

The following assumptions and limitations are associated with this study:

- No detailed site visit was undertaken, although a general visit to the area was undertaken. The level of detail required for assessment of SHE impacts of the BESS SHE RA does not necessitate a detailed inspection of the exact area.
- Only lithium-ion or vanadium redox flow type batteries will be considered.
- As they have been more widely used there is more information readily available in the literature on lithium type batteries as opposed to vanadium redox flow batteries.
- Lithium BESS facilities are assumed to be containerized.
- The Vanadium redox batteries may be containerized (in which case the issues will be similar to lithium containers), but the more significant case is if the battery is installed a one large, centralized utility scale facility.

Geotech:

- The scope and the period of Golder's Services are as described in Golder's proposal and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the report. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regard to it.
- Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been considered in the report. Accordingly, additional studies and actions may be required.
- In addition, it is recognised that the passage of time affects the information and assessment provided in the report. Golder's opinions are based upon information that existed at the time of the production of the report. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.
- Any assessments made in the report are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in the report.
- Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

Traffic:

The following assumptions were made to estimate the expected trip generation of the construction phase.

- It is assumed that masts will be manufactured of steel, and not hybrid masts with concrete sections.
- Each mast will consist of 7 x 29 m steel segments.
- One mast segment can be delivered per vehicle trip.
- One rotor blade can be transported on an abnormal size vehicle.
- Concrete foundations of approximately of 25m diameter x 3.0m deep are required, reinforced with 100 tons of steel.

- Approximately +/- 1500m³ concrete per foundation (higher conservative volume used).
- The foundation dimensions may vary as required by the geotechnical conditions.
- Concrete foundation will be constructed to support a mounting ring.
- Excavation of approximately 1000m^2 per foundation will be required in sandy soils due to access requirements and safe slop stability requirements.
- Concrete will be batched on-site at a temporary plant. Gravel, sand and cement will be transported to site via the local road network, in 45-ton loads per truck, and then stored on site until required.
- Steel is transported in 40-ton loads on standard flatbed vehicles.
- Component and material deliveries will take place over a period of 24 months. It is assumed that deliveries will take place on 80% of all working days for a conservative trip generation estimate.

Surface Water:

- The scope and the period of Golder's Services are as described in Golder's proposal and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the report. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regard to it.
- Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the report. Accordingly, additional studies and actions may be required.
- In addition, it is recognised that the passage of time affects the information and assessment provided in the report. Golder's opinions are based upon information that existed at the time of the production of the report. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.
- Any assessments made in the report are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in the report.
- Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

Notwithstanding these assumptions and limitations, it is the view of WSP that this DSR provides a good description of the issues associated with the project, and a reasonable plan of study for the EIA phase.

2 PROJECT DESCRIPTION

2.1 SITE LOCATION

The proposed Dalmanutha WEF will have a project area of approximately 9400 hectares (ha). Within this project area the extent of the buildable area will be approximately 400 ha subject to finalization based on technical and environmental requirements.

The proposed Dalmanutha WEF is located south-east of Belfast in Mpumalanga and falls within the jurisdiction of the Emakhazeni and Albert Luthuli Local Municipalities, Nkangala and Gert Sibande District municipalities. The Dalmanutha WEF and Dalmanutha West WEF are located adjacent each other and as such, the overall locality of the Dalmanutha Wind Energy Complex is included in **Figure 2-1**. The Dalmanutha WEF (*project under consideration for this DSR*) project site, including associated alternatives, is indicated in **Figure 2-2**. The details of the properties associated with the proposed Dalmanutha WEF, including the 21-digit Surveyor General (SG) codes for the cadastral land parcels are outlined in **Table 2-1.**

Table 2-1: Dalmanutha WEF Affected Farm Portions

FARM PORTION AND NAME	21 DIGIT SURVEYOR GENERAL CODE OF EACH CADASTRAL LAND PARCEL
Portion 1 of Farm Berg-en-Dal 378 JT	T0JT00000000037800001
Portion 9 of Farm Berg-en-Dal 378 JT	T0JT00000000037800009
Portion 7 of Farm Vogelstruispoort 384 JT	T0JT00000000038400007
Portion 6 of Farm Waaikraal 385 JT	T0JT00000000038500006
Portion 7 of Farm Waaikraal 385 JT	T0JT00000000038500007
Portion 8 of Farm Waaikraal 385 JT	T0JT00000000038500008
Portion 10 of Farm Waaikraal 385 JT	T0JT00000000038500010
Portion 12 of Farm Waaikraal 385 JT	T0JT00000000038500012
Portion 13 of Farm Waaikraal 385 JT	T0JT00000000038500013
Poriton 5 of Farm Vogelstruispoort 384 JT	T0JT00000000038400005
Portion 24 of Farm Waaikraal 385 JT	T0JT00000000038500024
Portion 3 of Farm Leeuwkloof 403 JT	T0JT00000000040300003
Portion 4 of Farm Leeuwkloof 403 JT	T0JT00000000040300004
Portion 1 of Farm Leeuwkloof 404 JT	T0JT00000000040400001
Portion 2 of Farm Leeuwkloof 404 JT	T0JT00000000040400002
Portion 3 of Farm Geluk 405 JT	T0JT00000000040500003
Portion 1 of Farm Welgevonden 412	T0JT00000000041200001
Portion 0 of Farm Camelia 467 JT	T0JT00000000046700000

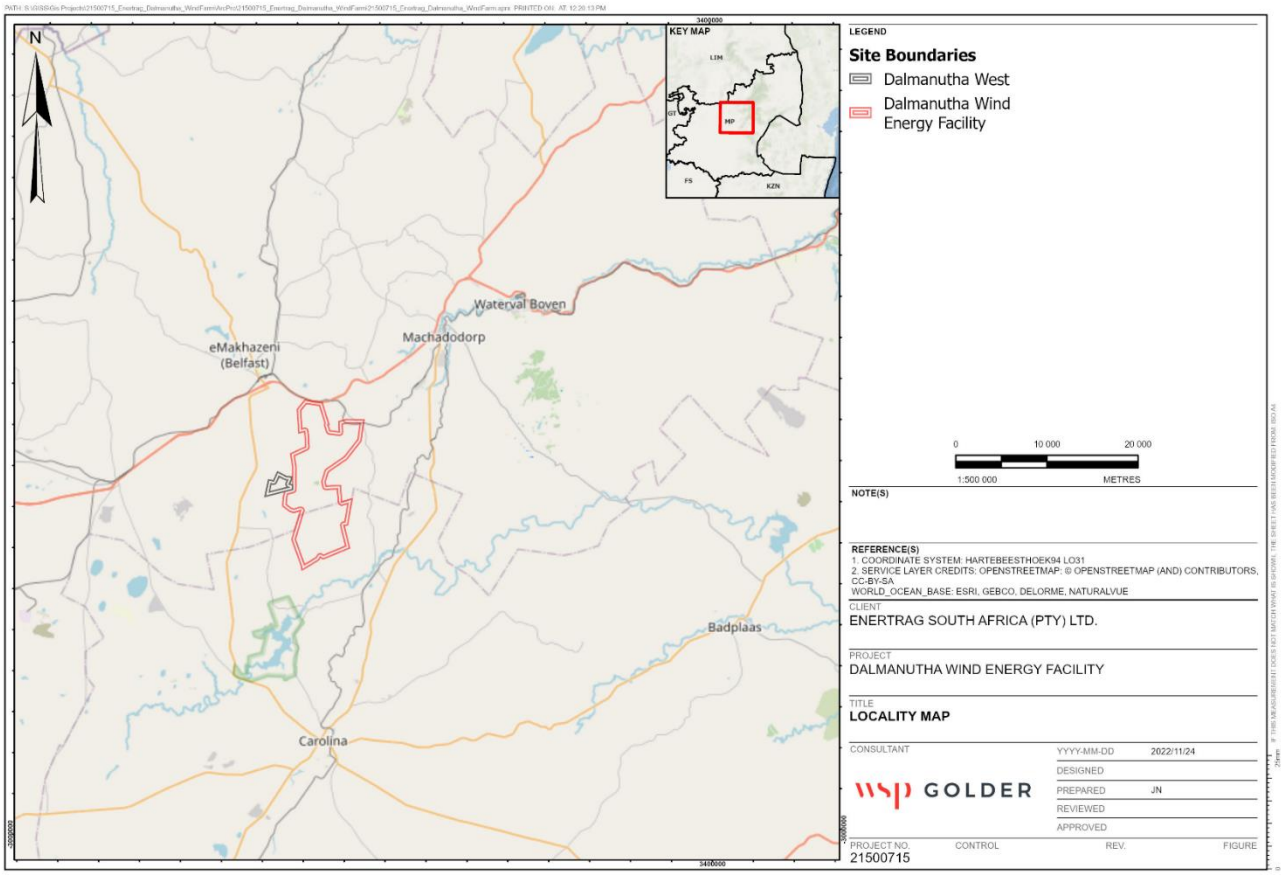


Figure 2-1: Locality map for the proposed Dalmanutha Wind Energy Complex, near Belfast in the Mpumalanga Province

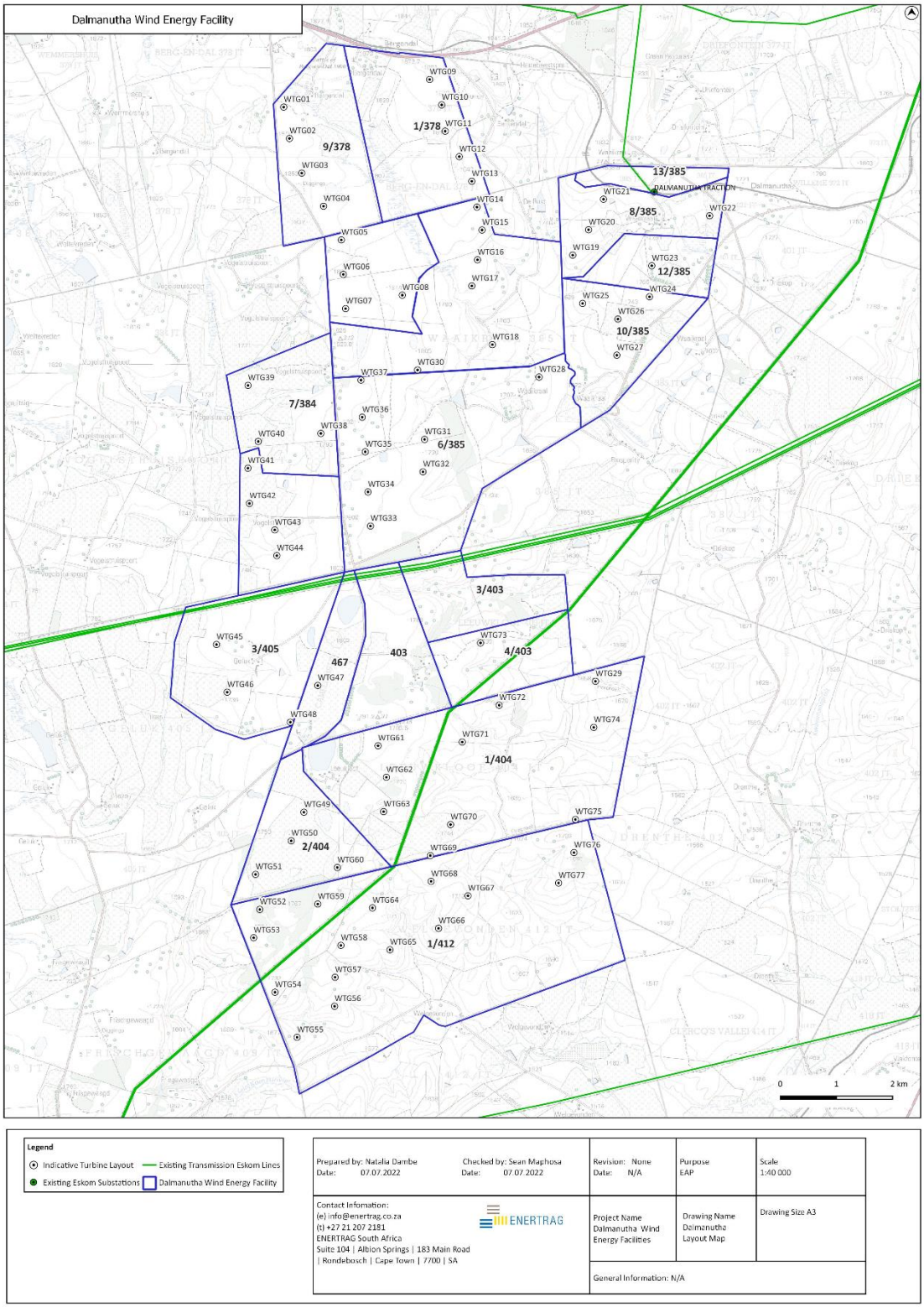


Figure 2-2: Proposed Dalmanutha WEF (up to 300MW) with pre-optimised 77 turbine layout

2.2 WIND ENERGY POWER GENERATION PROCESS

Wind power is the conversion of wind energy into a useful form of energy, such as electricity, using modern and highly reliable wind turbines. Wind Power is non-dispatchable, meaning that for economic operation, all the available output must be taken when it is available.

Wind turbines, like windmills, are mounted on a tower to harness wind energy at an increased level above the ground where wind is faster and less turbulent. The kinetic energy of the wind is used to turn the blades of the turbine to generate electricity. Wind turbines can operate at varying wind speeds, with the amount of energy the wind transfers to the rotor depending on the density of the air, the rotor area and the wind speed.

The electricity generated by the wind turbines is passed through the step-up transformer and then transmitted via either underground or overhead cables to a central substation, which connects the wind energy facility to a high voltage network. Wind turbines are designed to operate automatically with minimal maintenance for approximately 20-25 years.

Figure 2-3 illustrates the following main components of a wind turbine:

- The **rotor** consists of three **blades** which are attached to a **hub**. The blades collect energy from the wind and converts the wind energy into rotational shaft motion/energy to turn the generator;
- The **nacelle** houses the equipment at the top of the tower as well as a gearbox, a generator that converts the turning motion/mechanical energy of the blades into electricity and coupling and brake;
- The **tower** supports the nacelle and rotor and allows the blades to be distanced safely off the ground so as to reach the stronger winds found at higher elevations;
- Turbine **step-up transformer** which can be indoor or outdoor, depending on the turbine model whose function is to increase the voltage capacity of the electricity generated by the turbine to a higher, grid-equivalent.
- The **foundation** unit ensures the stability of the turbine structure.

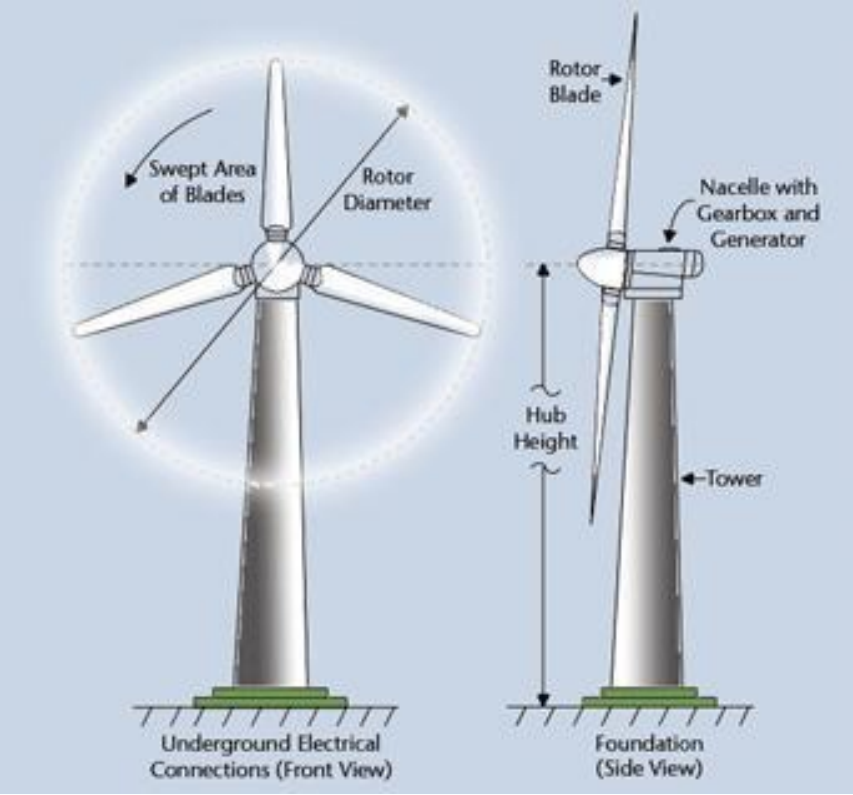


Figure 2-3: Illustration of the main components of a wind turbine

2.3 PROJECT INFRASTRUCTURE

The proposed Dalmanutha WEF will be developed with a capacity of up to 300 megawatts (MW), and will comprise the following key components::

WIND TURBINES

- Up to 77 turbines[1], each with a foundation of approximately 25m^2 in diameter (500m^2 area and requiring ~2 500m^3 concrete each) and approximately 3m depth;
- Turbine hub height of up to 200m;
- Rotor diameter up to 200m; and
- Permanent hard standing area for each wind turbine (approximately 4ha). **Figure 2-4** illustrates the typical hardstanding requirements for the construction of each turbine (it should be noted that the figure below is for illustration purposes only – the exact layout and specification of the hardstanding will be determined once the design phase has been completed).

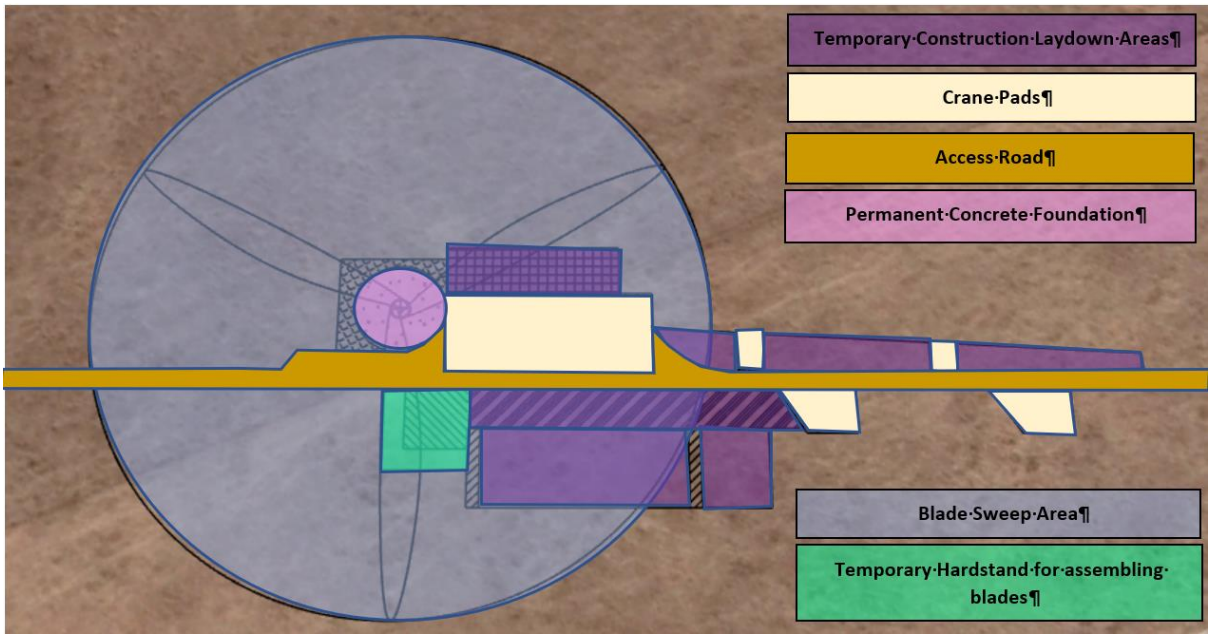


Figure 2-4: Typical Turbine Hard Standing Requirements (illustration purposes only)

IPP PORTION ONSITE SUBSTATION AND BATTERY ENERGY STORAGE SYSTEM (BESS)

- IPP portion onsite substation of up to 4ha. The substation will consist of a high voltage substation yard to allow for multiple up to 132kV feeder bays and transformers, control building, telecommunication infrastructure, access road, etc.; and
- The Battery Energy Storage System (BESS) storage capacity will be up to 300MW/1200 megawatt-hour (MWh) with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology; however, the specific technology will only be determined

[1] An up to 77 turbine layout was considered during the scoping phase however as a result of the avifauna specialist input the turbine layout has been optimised to include up to 70 turbines. The optimised up to 70 turbine layout will be assessed in the EIA phase

following Engineering, Procurement, and Construction (EPC) procurement. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers.

OPERATION AND MAINTENANCE BUILDING INFRASTRUCTURE

- Operations and maintenance (O&M) building infrastructure will be required to support the functioning of the WEF and for services required by operations and maintenance staff. The O&M building infrastructure will be near the onsite substation and will include:
  - Operations building of approximately 200m^2;
  - Workshop and stores area of approximately 150m^2 each;
  - Stores area of approximately 150m^2; and
  - Septic/conservancy tanks with portable toilets to service ablution facilities.

CONSTRUCTION CAMP LAYDOWN

- Temporary laydown or staging area -Typical area 220m x 100m = 22000m^2.
- Laydown area could increase to 30000m^2 for concrete towers, should they be required.
- Sewage: septic and/or conservancy tanks and portable toilets.
- Temporary cement batching plant, wind tower factory & yard of approximately 7ha, comprising amongst others, a concrete storage area, batching plant, electrical infrastructure and substation, generators and fuel stores, gantries and loading facilities, offices, material stores (rebar, concrete, aggregate and associated materials), mess rooms, workshops, laydown and storage areas, sewage and toilet facilities, offices and boardrooms, labour mess and changerooms, mixers, moulds and casting areas, water and settling tanks, pumps, silos and hoppers, a laboratory, parking areas, internal and access roads - Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. The maximum height of the silo will be 20m.

ACCESS ROADS

- The Project site can be accessed easily via either the tarred R33 or the N4 national road which run along the northern and western boundaries of the site.
- There is an existing road that goes through the land parcels to allow for direct access to the project development area.
- Internal and access roads with a width of between 8m and 10m, which can be increased to approximately 12m on bends. The roads will be positioned within a 20m wide corridor to accommodate cable trenches, stormwater channels and bypass /circles of up to 20m during construction. Length of the internal roads will be approximately 60km.

ASSOCIATED INFRASTRUCTURE

- The medium voltage collector system will comprise of cables up to and including 33kV that run underground, except where a technical assessment suggest that overhead lines are required, within the facility connecting the turbines to the onsite substation.
- Fencing of up to 4m high around the construction camp and lighting.
- Lightning protection.
- Telecommunication infrastructure.
- Stormwater channels.
- Water pipelines.
- Offices.
- Operational control centre.
- Operation and Maintenance Area / Warehouse/workshop.
- Ablution facilities.
- A gatehouse.

- Control centre, offices, warehouses.
- Security building.
- A visitor's centre.
- Substation building.

The proposed development footprint (buildable area) is approximately 400ha (subject to finalisation based on technical and environmental requirements), and the extent of the project area is approximately 9400 ha. The development footprint includes the turbine positions and all associated infrastructure as outlined above.

2.4 GENERAL CONSTRUCTION ACTIVITIES

The construction process will follow industry standard methods and techniques. Key activities associated with the construction phase are described in **Table 2-2.**

Table 2-2: Construction Activities

ACTIVITY	DESCRIPTION
Site preparation and establishment	Site establishment will include clearing of vegetation and topsoil at the footprint of each turbine, for laydown area and access routes. The temporary laydown area will be constructed, including establishment of the construction camp (temporary offices, storage containers, concrete batching plant etc). Site establishment will also entail the installation and/or connection of services (sanitation, electricity etc).
Transport of components and equipment to site	Bulk materials (aggregate, steel etc.), infrastructure components (blades, tower sections etc), lifting and construction equipment (excavators, trucks, compaction equipment etc.) will be sourced and transported to site via suitable National and provincial routes and designated access roads. The infrastructure components may be defined as abnormal loads in terms of the Road Traffic Act (Act 29 of 1989) due to their large size and abnormal lengths and loads for transportation. A permit may be required for the transportation of these loads on public roads.
Excavation and earthworks	Subject to the determination of founding specifications, earthworks will be required. This is likely to entail: – Excavation of foundation holes to a depth of approximately 3m and pouring of concrete foundations of approximately 500 – 650m^3 from the batching plant. Concrete foundations will be constructed at each turbine location – Levelling of the construction camp area, substation area, and O&M building area, and excavation of foundations prior to construction. – Excavation of trenches for the installation of underground cables.
Construction of wind turbines, onsite substation and BESS	A large lifting crane(s) will be required to lift the turbine sections (nacelle, blades) into place. The lifting crane/s will be brought on site and will be required to move between the turbine site. Cranes of varying sizes may be required depending on the size of the components. An IPP onsite substation will be constructed on the site. The wind turbines will be connected to the IPP onsite substation via underground or overhead (if required) up to 33kV electrical cables. The BESS will typically require the placement of multiple containers to house the BESS components, which will be brought to sight pre-assembled.
Establishment of ancillary infrastructure	Ancillary infrastructure will include construction site office, temporary laydown area and workshop area for contractor's equipment.
Rehabilitation	Once all construction is completed on site and all equipment and machinery has been removed from the site, the site will be rehabilitated.

2.5 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 alternative; 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).

2.5.1 SITE ALTERNATIVES

The selection of the Dalmanutha WEF site is the outcome of 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 Dalmanutha WEF site was selected because it is strategically located due to the following factors:

1) **Proximity to the Eskom grid** – The proposed wind energy facility requires connection to the Eskom grid to transmit the generated electricity. The Project site was selected after the investigation of several power stations in Mpumalanga. The Project site was selected due to its proximity to Gumeni MTS which will have sufficient capacity to allow the Project to connect to it. Thus, this Project site has ideal grid connection potential as the Project will connect to the existing Gumeni MTS, which is located approximately 17.5km from the proposed Project site.

2) **Land Availability and Landowner Support** – The availability of land is a key feasibility criterion in the site selection process. The project site is of a suitable land size for the proposed development. The land available for the development of the Dalmanutha WEF extends approximately 9400ha, providing a substantial amount of land for the development of an up to 300MW wind energy facility. The proponent has secured sufficient land for the development of the proposed WEF with landowners within the respective cadastral portions comprising the development footprint, indicating their support and willingness for the project to proceed to development via entering into agreement with the developer. After intensive studies around the province, through analysing the aforementioned factors, it was determined that this site has the most ideal conditions for the Project.

3) **Strategic Approach** – Four of Eskom's coal-fired power stations are targeted for decommissioning in the short term. These include the Komati, Camden, Grootvlei, and Hendrina power stations. These power stations range between 50 - 60 years of age. According to the 2019 IRP, over a 11-year period Eskom are expected to decommission over 11GW of its coal fired capacity. Power generated from the WEF can therefore be used to replace a portion of the generation capacity lost from the decommissioned power stations, and also help replace the some of the jobs that would have been potentially lost due to the decommissioning of the power plants.

4) **Road and labour pool accessibility** – The Project site can be accessed easily via either the tarred R33 or the N4 national road which run along the northern and western boundaries of the site. The Geluk road runs through the land parcels to allow for direct access to the project development area.

5) **Topography**- The surrounding landscape has a rolling hill topography which is suitable for the development of a wind project. The Project site itself is located on a flat high lying landscape that has the highest wind resource within the immediate area.

6) **Competition** With regards to renewable energy facilities, there is minimal competition in the area. Should the project proceed, it will be the second WEF in and around the Belfast area and will act as one of the pioneering developments and open opportunities for other renewable developments. It will also serve as a large scale case study for wind resource in the province, showing that commercially viable wind energy facilities are suitable for certain parts of Mpumalanga Province.

7) **BESS location -** There are three options for the location of the BESS at Dalmanuntha WEF, i.e., north, central, and south. From **Figure 5-41** there are numerous farmstead facilities in proximity to the northern location. This location would therefore not be the preferred options form the SHE RA point of view. The

central and southern locations are suitable, although the southern location is very remote possibly making it difficult to access the BESS to deal with emergencies. This may exacerbate the situation. Overall, the central location is probably the most suitable from a SHE RA point of view.

The site is considered suitable for the reasons provided. The investigation of an alternative site is not currently proposed within this Scoping Report.

There is no Site alternative for the Dalmanutha WEF.

2.5.2 TECHNOLOGY ALTERNATIVES

The Dalmanutha WEF will utilize wind technology to generate power. Therefore, no technology alternatives are being considered for this project. The motivation for the use of wind technology for this project is provided below:

WIND RESOURCE

The Project site was also selected on the availability of wind resources in the Mpumalanga region. The availability of wind resources is the main driver of project viability. The Project site was identified by the developer through a desktop pre-feasibility analysis based on the estimation of the Wind energy resource. The average annual wind speed ranges between 6 m/s to 7 m/s which is a sufficient resource to ensure the economic viability of a wind energy farm. This viable resource ensures the best value for money is gained for the economy of South Africa. Furthermore, near the proposed Project site ESA has also identified a suitable area to develop a complementary wind facility that will assist to balance the supply of electricity.

BESS TECHNOLOGY

Two types of battery energy storage system technologies are being investigated. One of the types of battery technology being considered for the BESS would be Vanadium Redox Flow batteries (VRF). The project will employ utility scale batteries. These energy storage systems can be supplied either as containerized units or as a fixed installation within a building etc. Due to the proposed size of the facility (up to 300MW) the Dalmanutha WEF is currently envisioned as having units housed within a large battery building.

The other type of battery technology being considered for the BESS would be a Solid-State Lithium-ion Battery system which consists of multiple battery cells that are assembled to form modules. Each cell contains a positive electrode, a negative electrode, and an electrolyte. The BESS will comprise multiple battery units or modules housed in shipping containers and/or an applicable housing structure which is delivered pre-assembled to the project site. Containers are usually raised slightly off the ground and laid out in rows. They can be stacked if required although this may increase the risk of events in one container spreading to another container. Supplementary infrastructure and equipment may include substations, power cables, transformers, power converters, substation buildings & offices, HV/MV switch gear, inverters and temperature control equipment that may be positioned between the battery containers. Layout Alternatives

A conceptual layout of the turbines on the landscape has been developed for the Dalmanutha WEF and is included in **Figure 2-2.** The layout indicates up to 70 turbine positions and associated main WEF components. The layout and alignments are likely to be updated and refined as the project engineering progresses, as well depending on sensitivities and technical inputs during the EIA phase studies.

The development of the Dalmanutha WEF layout is not yet final.

2.5.3 'NO PROJECT' ALTERNATIVE

In the "no project" alternative, the Dalmanutha WEF project will not be developed. In this scenario, there could be a missed opportunity to address the need for increase in renewable energy generation to mitigate against concerns of climate change and exploitation of non-renewable resources. The no-go alternative would not assist in responding to the growing electricity demand in South Africa and would not contribute to the reliability of electricity supply at a national scale. Conversely, negative environmental impacts of the project (as outlined in **Section 6**) associated with the development of the Dalmanutha WEF would be avoided.

The “no project” alternative will be considered in the EIA phase as a baseline against which the impacts of the Dalmanutha WEF project will be assessed.

2.6 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 the proposed Dalmanutha WEF has been considered from an international, national, and regional perspective.

2.6.1 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 Dalmanutha 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 access to affordable, reliable and sustainable energy which is crucial to achieving many of the Sustainable Development Goals, therefore SDG 7 among the other goals specifically aligns with this project. The proposed WEF qualifies as a clean technology that will generate up to 300MW 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. This project will aid in the efforts towards a just energy transition in accordance to recently signed Political Declaration between SA, USA, UK, EU, Ireland etc.

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.

2.6.2 NATIONAL PERSPECTIVE

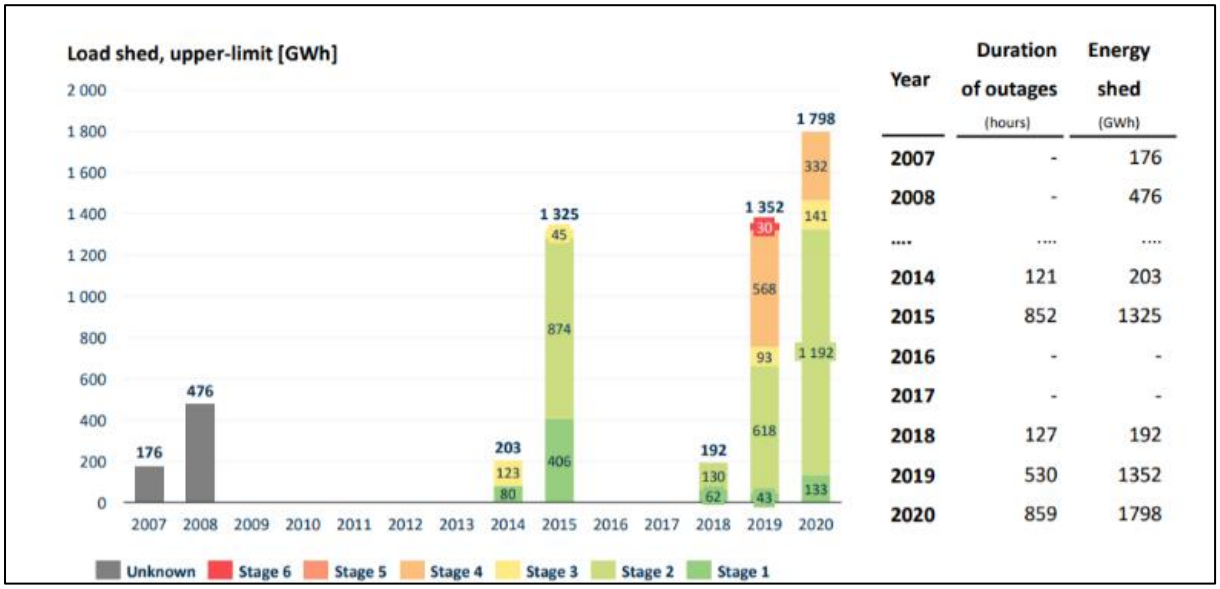
The South African Government, through the IRP, has set a target to secure 17 800 MW of renewable energy by 2030. This is an effort to diversify the country’s energy mix in response to the growing electricity demand and promote access to clean sources of energy.

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 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 Dalmanutha WEF will further align with South Africa's National Climate Response White Paper which outlines the country's 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 Dalmanutha Wind Energy Complex, which includes the Dalmanutha WEF, will pave the way for the Just Energy Transition (JET)[2] in South Africa and promote the transition from a fossil fuel-based economy to a low carbon economy. The proposed Dalmanutha WEF aims towards the aforementioned national energy targets of diversification of energy supply and the promotion of clean energy. Wind and solar energy developments contribute to reduced emissions and subsequently climate change whilst promoting industrial development and job creation.

The proposed Dalmanutha WEF 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 2-5**. 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 2-5: 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.

2.6.3 REGIONAL AND LOCAL PERSPECTIVE

JUST ENERGY TRANSITION

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.

[2] 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.

The project will pave the way for the Just Energy Transition in South Africa and promote the transition from a fossil fuel-based economy to a low carbon economy. South Africa is the seventh-largest coal consumer in the world and the leading African carbon emitter, with 471.6 million metric tons of carbon emitted in 2019. South Africa heavily relies on coal to fire up 30 000 MW of electricity, which serves an estimated 80% of the country's energy needs.

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 Emakhazeni Local Municipality. The Emakhazeni Local Municipality recorded an unemployment rate of 26.9% in 2017, with the majority of its employed in the mining and transport sectors. The Project will aid in solving two of the leading challenges faced by most municipalities in the country, namely the cost of electricity and lack of adequate employment opportunities. The Project will be one of the first large-scale wind energy facilities being developed in Mpumalanga. The developer foresees this project as being one of main the catalysts to realizing a true Just Energy Transition for Mpumalanga. As various career opportunities are presented by the wind industry, these are divided into four pillars that are aligned with the value chain. These four pillars are project development, component manufacturing, construction, and operation and maintenance as shown in **Figure 2-6**.

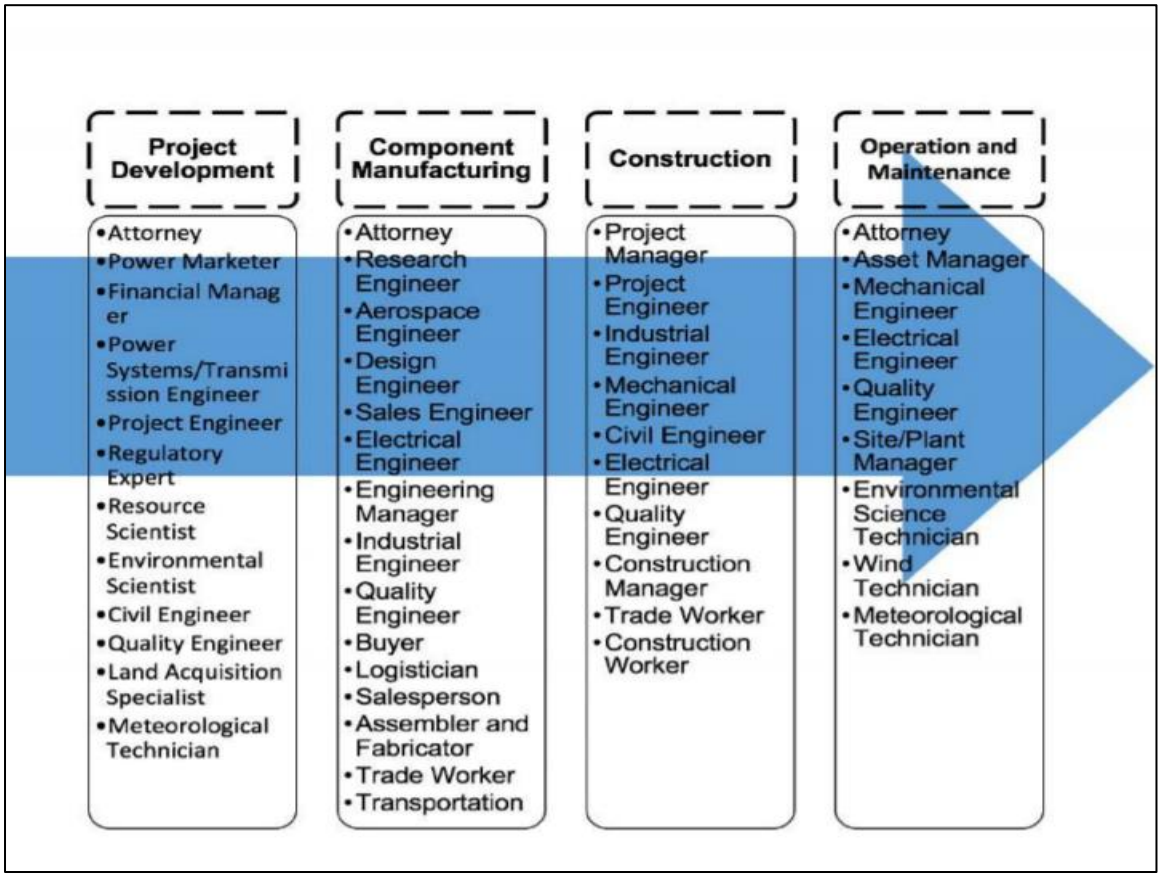


Figure 2-6: Career Opportunities presented by the Wind Industry (Source: https://www.res4africa.org/wp-content/uploads/2020/09/RES4Africa-Foundation-A-Just-Energy-Transition-in-South-Africa.pdf)

Figure 2-6 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.

MULTIPLE LAND USE

Unlike opencast coal mining, the Project facilitates multiple land use functions within the development area. As wind turbines are spread out across the development area this allows multiple land use functions such as operating the wind farm 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. Furthermore, the multiple land use allows for the creation of multiple streams of income which assures landowners economic security.

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 Dalmanutha Renewable Energy Complex, inclusive of the Dalmanutha WEF, is ideally located to help Eskom achieve its diversification goal.

3 GOVERNANCE FRAMEWORK

3.1 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 3-1**.

Table 3-1: Applicable National Legislation

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 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(i)*** *- The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.* **Description:** This activity will be triggered as the project is located outside of an urban area and includes internal grid infrastructure with a capacity of up to 33kV, and an onsite IPP substation including a 33/132kV step-up transformer as part of the infrastructure.
Listing Notice 1: GNR 983	***Activity 12(ii)(a)(c)*** *- 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.* **Description:** The Facility will require the development of internal roads and/or access roads around the site. The physical footprint of internal access roads and electrical cabling required to connect the

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	various components of the Facility will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site.
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:** The Facility will require storage and handling of dangerous goods, including fuel, cement, and chemical storage onsite, that will be greater than 80m3 but not exceeding 500m^3. This activity will also be applicable in the event that Redox Flow Battery technology is considered preferred.
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:** Internal access roads and stormwater control infrastructure, as well as electrical cabling required to connect the various components of the Facility will collectively require the excavation, infilling or removal of soil exceeding 10m3 from delineated watercourses on site. The exact values will be confirmed once final designs have been provided.
Listing Notice 1: GNR 983	***Activity 24(ii)*** *- The development of a road:* *(ii) A road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres* **Description:** Internal access roads required by the Facility will be between 8m and 10m wide this can be increased to 12m on bends. The total length of the roads will be approximately 60km.
Listing Notice 1: GNR 983	***Activity 28(ii)*** *- Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.* **Description:** The Facility is considered a commercial and/or industrial development, and is located on several farm portions outside an urban area, used for agricultural purposes. The total area to be developed for the Facility (buildable area) is approximately 400ha (i.e. greater than 1 hectare).
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 Facility infrastructure is located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland. This ecosystem is 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 this ecosystem is 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. Considering this, Activity 30 is considered applicable.
Listing Notice 1: GNR 983	***Activity 48(i)(a)(c)*** *-The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	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 facility 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.
Listing Notice 1: GNR 983	***Activity 56(i)(ii)-*** *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—* *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* **Description:** 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.
Listing Notice 2: GNR 984	***Activity 1(a)****- The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,* **Description:** This activity will be triggered by the Dalmanutha WEF as the proposed energy generation technologies will generate more than 20MW of electricity output from a renewable resource. The proposed facility is located outside of an urban area.
Listing Notice 2: GNR 984	***Activity 15(i)-*** *The clearance of an area of 20 hectares or more of indigenous vegetation,* **Description:** This activity will be triggered by the Dalmanutha WEF as it will result in the clearance of at least 20 hectares or more of indigenous vegetation.
Listing Notice 3: GNR 985	***Activity 4 (f)(i)(aa)(bb)(cc)(ee)(ff)(gg)*** *- 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;* *(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; or* **Description:**

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Internal access roads required by the Facility will be between 8m and 10m wide, and approximately 60km in length. Where required for turning circle/bypass areas, however, access or internal roads may be up to 12m to allow for larger component transport. The exact values will be confirmed once final designs have been provided. In addition, the Facility is located in the Mpumalanga Province outside urban areas, and partly on Portion 1 of Farm No. 378 (Berg-en-Dal), which is a declared Heritage site under the National Heritage Resources Act No 25 of 1999 (section 35). The facility is therefore both located within the extent, and within 5km of the abovementioned heritage site. This site is noted as having farming activity present and is currently managed and actively utilised for agriculture. The landowner further is 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. Furthermore, roads required for the Facility will be located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland, this ecosystem of which is listed in the National List of Ecosystems That Are Threated 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). Similarly, roads required for the Facility will be located within, and will require vegetation clearance or disturbance within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA).
Listing Notice 3: GNR 985	***Activity 10 (f)(i)(aa)(bb)(cc)(ee)(gg)(hh)*** *- 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;* **Description:** The Facility will require storage and handling of dangerous goods, including fuel, cement, and chemical storage onsite, that will be greater than 80m3 but not exceeding 500m3. The storage contemplated is located within the extent, and within 5km of a private nature reserve. This reserve is noted as having farming activity present and is currently managed and actively utilised for agriculture. The landowner further is 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. Furthermore, storage contemplated above will be located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland, this ecosystem of which is listed in the National List of Ecosystems that are Threated and in need of Protection (GNR 1002 of 9

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). 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) as well as being located within delineated watercourses on site, or within 100m of the outer extent of the delineated watercourses on site.
Listing Notice 3: GNR 985	***Activity 12(f)(i)(ii)*** *- 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;* **Description:** The clearance required for the Facility will be approximately 400ha of indigenous vegetation. Such clearance will be in excess of 300m^2 and be partly located within Eastern Highveld Grassland, this ecosystem of which is listed in the National List of Ecosystems That Are Threated 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). Similarly, vegetation clearance required for the Facility will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA), in excess of 300m^2.
Listing Notice 3: GNR 985	***Activity 14(ii)(a)(c)(f)*** *- 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;* *(cc) World Heritage Sites;* *(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 or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation* **Description:** The Facility will require the development of internal roads and/or access roads around the site. The physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site. In addition, the Facility is located in the Mpumalanga Province outside urban areas, and partly on Portion 1 of Farm No. 378 (Berg-en-Dal), which is a declared Heritage site under the National Heritage Resources Act No 25 of 1999 (section 35)

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	The facility is therefore both located within the extent, and within 5km of the abovementioned heritage site. This site is noted as having farming activity present, and is currently managed and actively utilised for agriculture. The landowner further is 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. Furthermore, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility 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, this ecosystem of which is listed in the National List of Ecosystems that are Threated 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). Finally, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility 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).
Listing Notice 3: GNR 985	***Activity 15(d)(ii)****- 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* *i. Inside urban areas; or* *ii. A protected area identified in terms of NEMPAA, excluding conservancies* **Description:** The Facility is considered a commercial and/or industrial development, and will require the transformation of a footprint of approximately 400ha (within several farm portions outside an urban area zoned for agriculture, while being partly located on Portion 1 of Farm No. 378 (Berg-en-Dal), which is a declared Heritage site under the National Heritage Resources Act No 25 of 1999 (section 35). The facility is therefore both located within the extent, and within 5km of the abovementioned heritage site. This site is noted as having farming activity present, and is currently managed and actively utilised for agriculture. The landowner further is not aware of any protected area on these properties and intends to utilise any suitable legal avenues available to continue the operation of the properties for the current land use of agriculture, in conjunction with the planned Renewable Energy land use subject to this application.
Listing Notice 3: GNR 985	***Activity 18 (f)(i)(aa)(bb)(cc)(ee)(gg)*** *- 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;*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Description: Transport of large infrastructure components related to the facility will require the widening of existing access and/or internal roads whereby more than 4 metres or in excess of 1km within the Mpumalanga Province and outside urban areas. Such widening may occur partly on Portion 1 of Farm No. 378 (Berg-en-Dal), which is a declared Heritage site under the National Heritage Resources Act No 25 of 1999 (section 35). The facility is therefore both located within the extent, and within 5km of the abovementioned heritage site. This site is noted as having farming activity present, and is currently managed and actively utilised for agriculture. The landowner further is 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. Furthermore, such widening will occur within Eastern Highveld Grassland, this ecosystem of which is listed in the National List of Ecosystems that are Threated 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). Finally, such widening will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA).
Listing Notice 3: GNR 985	***Activity 23(ii)(a)(c)(f)(i)(aa)(bb)(cc)(ee)(gg)*** *- 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 Facility will require the development of internal roads and/or access roads around the site. The physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site. In addition, the Facility is located in the Mpumalanga Province outside urban areas, and partly on Portion 1 of Farm No. 327 (Berg-en-Dal), which are a declared Heritage site under the National Heritage Resources Act No 25 of 1999 (section 35). This portion is noted as having farming activity present, and is currently managed and actively utilised for agriculture. The landowner further is 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.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Furthermore, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility 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, this ecosystem of which is listed in the National List of Ecosystems that are Threated 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). Finally, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility 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).
Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes (GNR 320, 20 March 2020 and GNR 1150, 30 October 2020)	The protocols provide the criteria for specialist assessment and minimum report content requirements for impacts for various environmental themes for activities requiring environmental authorisation. The protocols replace the requirements of Appendix 6 of the EIA Regulations, 2014, as amended. The assessment and reporting requirements of the protocols are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The Screening Report was generated for the project on 24/11/2022 (**Appendix D**). The following environmental themes were applicable to the Dalmanutha WEF: — Agricultural Theme — Animal Species Theme — Aquatic Biodiversity Theme — Archaeological and Cultural Heritage Theme — Avian (Wind) theme — Bats (Wind) Theme — Civil Aviation Theme — Defence Theme — Flicker Theme — Palaeontology Theme — Plant Species Theme — Noise Theme — Landscape (Wind theme) — Terrestrial Biodiversity Theme
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 Scoping 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

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	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). 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 will be included in the Environmental Management Programme (EMPr).
National Biodiversity Offset Guideline **(Issued Under Section 24j Of The National Environmental Management Act)** **(First Edition (October 2021)**	The purpose of this guideline is to indicate when biodiversity offsets are likely to be required as mitigation by any competent authority (CA), to lay down basic principles for biodiversity offsetting and to guide offset practice in the environmental authorisation (EA) application context. This guideline is therefore applicable to applications for EA in terms of section 24 of NEMA. However, it can also be used to inform other administrative processes that may involve biodiversity offsetting, including applications for EA in terms of section 24G of NEMA, emergency directives contemplated in section 30A of NEMA, applications for licences under the National Water Act, 1998, the National Forests Act, 1998 and the National Environmental Management: Waste Act, 2008, applications for development rights in terms of the Spatial Planning and Land Use Management Act, 2013 and requests for the de-proclamation, or the withdrawal of declarations, of protected areas in terms of provincial legislation or NEMPAA. Biodiversity is fundamental to the health and well-being of people, as well as economic activity and socio-economic upliftment. The National Biodiversity Assessment (2018) (NBA 2018) states that South Africa's biodiversity assets and ecological infrastructure contribute significantly towards meeting national development priorities. Biodiversity offsetting, if done correctly, can advance the environmental right in the Constitution of the Republic of South Africa, 1996 (Constitution). Section 24 of the Constitution provides that everyone has the right to, amongst other things, have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that, amongst other things, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. Biodiversity offsetting is one of the ways in which South Africa's protected and conservation areas can be expanded, thereby promoting conservation. It may well also help to secure ecologically

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	sustainable development as it mitigates the adverse impact of economic and social development on biodiversity, which, in turn, underpins such development. The biodiversity offsetting process, which only applies when a biodiversity offset is required involves the following steps: — Identifying the need for a biodiversity offset. — Determining the requirements of a biodiversity offset and compilation of a Biodiversity Offset Report. — Selecting a biodiversity offset site. — Securing the biodiversity offset site. — Preparing a Biodiversity Offset Management Plan. — Preparing biodiversity offset conditions for an EA. — Concluding a Biodiversity Offset Implementation Agreement.
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*." There are no protected areas within the study area. According to the National Protected 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 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 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: *a) Taking water from a water resource;* *c) Impeding or diverting the flow of water in a watercourse;* *g) Disposing of waste in a manner which may detrimentally impact on a water resource;* *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

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	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 Dalmanutha WEF, 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 R**) 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. — 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 the provincial Heritage Resource Agency.
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.

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	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.* Under NEMAQA, the Noise Control Regulations were updated and are to be applied to all provinces in South Africa. The Noise Control Regulations give all the responsibilities of enforcement to the Local Provincial Authority, where location specific by-laws can be created and applied to the locations with approval of Provincial Government. Where province-specific regulations have not been promulgated, acoustic impact assessments must follow the Noise Control Regulations. Furthermore, NEMAQA prescribes that the Minister must publish maximum allowable noise levels for different districts and national noise standards. These have not yet been accomplished and as a result all monitoring and assessments are done in accordance with the South African National Standards (SANS) 10103:2008 and 10328:2008.
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.
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

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). 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. The DFFE Screening Tool Report identified Civil Aviation as having low sensitivity for the proposed Dalmanutha WEF, and as being located between 8 and 15km of other civil aviation aerodrome. An Application for the Approval of Obstacles will also be submitted to ATNS. SACAA 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.

3.2 POLICIES AND PLANS

Table 5 summarised key policies and plans as an outline of the governance framework for the project.

Table 3-2: 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 several 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 supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted.

APPLICABLE POLICY	DESCRIPTION OF POLICY
	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.
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.
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.
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 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.

APPLICABLE POLICY	DESCRIPTION OF POLICY
	— 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 consider 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, considering 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 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

APPLICABLE POLICY	DESCRIPTION OF POLICY
	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**.

3.3 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

Table 3-3: 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.
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

APPLICABLE PLAN	DESCRIPTION OF PLAN
	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.
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.
Mpumalanga Biodiversity Sector Plan (MBSP) (2015)	The Mpumalanga Biodiversity Sector Plan updates, revises and replaces the older Mpumalanga Biodiversity Conservation Plan and all of its products (Lötter & Ferrar, 2006; Ferrar & Lötter, 2007). The MBSP comprises two spatial components: maps of terrestrial and freshwater critical biodiversity areas (CBAs); and a set of land-use guidelines that are important for maintaining and supporting the inherent biodiversity values of these critical biodiversity areas. Terrestrial biodiversity priority areas were identified using a Systematic Biodiversity Planning approach (also called Systematic Conservation Planning in international literature; Margules & Pressey, 2000), whilst identification of freshwater biodiversity priority areas relied heavily on the recent National Freshwater Ecosystem Priority Areas assessment (NFEPA; Driver et al., 2011).

Table 3-4: District and Local Municipality Plans

APPLICABLE PLAN	DESCRIPTION OF PLAN
Nkangala District Municipality Integrated Development Plan (IDP) (2020/ 2021)	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 Nkangala District Municipality IDP Review (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. One of the key issues raised by the community of GSM is the need to have steady electricity provision. Consequently, the proposed Dalmanutha WEF will contribute to the

APPLICABLE PLAN	DESCRIPTION OF PLAN
	required clean energy and electricity provision, in line with the MGDP and District's IDP, respectively.
Emakhazeni Local Municipality IDP (2020/ 2021)	The 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 Dalmanutha WEF will therefore supplement electricity supply, identified as one of the top community priority needs within the Municipality.
Albert Luthuli Local Municipality IDP (2020/ 2021)	The Albert Luthuli Local Municipality Revised IDP (2020/2021) has identified the following key Municipal priorities: — Economic growth is the prerequisite for the achievement of other policy objectives such as poverty eradication and equitable development. — Government infrastructure investment- beyond basic service delivery- will be in areas of high development potential or economic growth. These are areas of development potential identified into corridors and/or nodes. The focus is to reverse the settlement patterns of the previous dispensation where settlements were established far outside of the places of work. — Efforts to address inequalities should focus on people and not places. — Areas with high levels of poverty and high development potential should receive investment beyond basic services to exploit this potential. — Areas with high levels of poverty and low development potential should receive investment to provide basic services as well as social transfers, HRD, and labour market information.
Emakhazeni Spatial Development Framework (SDF) (2015)	The Emakhazeni SDF (2015) is informed by a number of spatial objectives, including: — Consolidating the urban and rural structure of the District around urban and rural nodal points the District in a sustainable manner — Optimally utilise all resources associated with the space economy of with specific focus on Tourism in the Emakhazeni area. — Focus service delivery and infrastructure investment around the concentrations nodal structure which represent the highest population upgrading and areas requiring urban renewal. — Target intervention programmes around areas in need of service — Implement comprehensive Environmental Management mechanisms and procedures.

3.4 INTERNATIONAL ENVIRONMENTAL AND SOCIAL STANDARDS

3.4.1 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. The 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, generally site specific, largely reversible, and readily addressed through mitigation measures.

The objectives and applicability of the eight PSs are outlined in **Table 3-5.**

Table 3-5: 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		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
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 will be compiled during the EIA phase of the 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. — 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	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

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		— Human Resources Policy and Management — Working Conditions and terms of Engagement — Workers organisation — Non- Discrimination and Equal Opportunity — Retrenchment — Grievance Mechanism	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 at the 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 will incorporate 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 6** of this report. There are no material resource efficiency issues associated with the Project. The EMPr will include general resource efficiency measures. 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 Dalmanutha WEF seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase will be addressed in the EMPr. The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures will be included in the EMPr. Land contamination of the site from historical land use (i.e. low intensity agricultural / grazing) is not considered to be a cause for concern.
	3.2	— Pollution Prevention — Air Emissions — Stormwater — Waste Management — Hazardous Materials Management — Pesticide use and Management	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
			The waste generation profile of the project is not complex. Waste mitigation and management measures will be included in EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. The EMPr will take these anticipated hazardous materials into account and recommend relevant mitigation and management measures.
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 will be addressed in the S&EIA process and the development of the EMPr. During the construction phase there will be an increase in vehicular traffic along public roads, largely due to the need for importation of construction material. Pedestrian and road safety risks will be qualitatively evaluated in the S&EIA process and the clients' standard safety and security measures, as well as potential additional measures recommended by WSP, will be detailed in the EMPr.
	4.2	Security Personnel	
Performance Standard 5: Land Acquisition and Involuntary Resettlement			
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	PS5 is not applicable to the proposed Dalmanutha WEF as no physical or economic displacement or livelihood restoration will be required. The proposed Dalmanutha WEF is located on privately owned land that is utilised for agriculture by the landowners. The

		Government Managed Resettlement	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 significant part of the Project Area falls within CBAs (Irreplaceable and Optimal). A Biodiversity Impact Assessment as well as an Avifaunal Impact Assessment and Freshwater Ecology Impact Assessment have been included in the proposed scope for the EIA phase. 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 scoping and baseline 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 will be included in the EMPr.
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	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		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 desktop Heritage Scoping Report (**Appendix R**) 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 will be included in the EMPr during the EIA phase of the project.

3.4.2 WORLD BANK GROUP ENVIRONMENTAL HEALTH AND SAFETY GUIDELINES

In support of the Performance Standards, the World Bank Group (WBG) has published several 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:

— *Wind Energy (August 2015)* - The EHS Guidelines for wind energy include information relevant to environmental, health, and safety aspects of onshore and offshore wind energy facilities. It should be

applied to wind energy facilities from the earliest feasibility assessments, as well as the environmental impact assessment, and continue to be applied throughout the construction and operation phases

The guidelines list issues associated with wind energy facilities which need to be considered. These include:

- Environmental impacts associated with the construction, operation, and decommissioning of wind energy facilities activities may include, among others, impacts on the physical environment (such as noise or visual impact) and biodiversity (affecting birds and bats, for instance).
- Due to the typically remote location of wind energy facilities, the transport of equipment and materials during construction and decommissioning may present logistical challenges (e.g., transportation of long, rigid structures such as blades, and heavy tower sections).
- Environmental issues specific to the construction, operation, and decommissioning of wind energy projects and facilities include the following:
  - Landscape, Seascape, and Visual impacts;
  - Noise;
  - Shadow Flicker; and
  - Water Quality.

- *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.

3.4.3 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 3-6**.

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 3-6: 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 first draft deliverable (i.e., Draft Scoping Report) from the S&EIA process undertaken for the proposed Project. The impact assessment will be undertaken during the next phase of the S&EIA process. The assessment will comprehensively assess the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr will also be compiled.
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).
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 outlines in the EMPr 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 4.6.**

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	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 will include a *Grievance Mechanism Process for Public Complaints and Issues*. 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.

4 SCOPING METHODOLOGY

The scoping process was initiated in accordance with Appendix 2 of GNR 982, as amended, pertaining to applications subject to an S&EIR process.

4.1 S&EIR PROCESS AND PHASING

The S&EIR process consists of various phases with associated timelines as defined in GNR 982. The process can generally be divided into four main phases, namely; (i) a Pre-application Phase, (ii) an Application and Scoping Phase (current phase), (iii) an Impact Assessment Phase and (iv) Authorisation and Appeal Phase. The S&EIR process is shown in **Figure 4-1**.

The main objectives of the phases can be described as follows:

- Pre-Application Phase:
  - Undertake consultation meetings with the relevant authorities to confirm the required process, the general approach to be undertaken and to agree on the public participation plan;
  - Identify stakeholders, including neighbouring landowners/residents and relevant authorities;
- Application and Scoping Phase:
  - Compile and submit application forms to the CA and pay the relevant application fees;
  - Compile a Draft Scoping Report (DSR) describing the affected environment and present an analysis of the potential environmental issues and benefits arising from the proposed project that may require further investigation in the Impact Assessment Phase;
  - Develop draft terms of reference for the specialist studies to be undertaken in the Impact Assessment Phase; and
  - Inform stakeholders of the proposed project, feasible alternatives and the S&EIR process and afford them the opportunity to register and participate in the process and identify any issues and concerns associated with the proposed project.
  - Incorporate comments received from stakeholders during the DSR comment period;
  - Should significant amendments be required, release the updated DSR for a 30-day comment period to provide stakeholders with the opportunity to review the amendments as well as provide additional input if required; and
  - Submit the Final Scoping Report (FSR), following the consultation period, to the relevant authorities, in this case the DFFE, for acceptance/rejection.
- Impact Assessment Phase:
  - Continue to inform and obtain contributions from stakeholders, including relevant authorities, stakeholders, and the public and address their relevant issues and concerns;
  - Assess in detail the potential environmental and socio-economic impacts of the project as defined in the DSR;
  - Identify environmental and social mitigation measures to avoid and/or address the identified impacts;
  - Develop and/or amend environmental and social management plans based on the mitigation measures developed in the Environmental Impact Assessment Report (EIAR);
  - Submit the EIAR and the associated EMPr to the CA to undertake the decision making process;
  - Authorisation and Appeal Phase;
  - The DFEE to provide written notification of the decision to either grant or refuse EA for the proposed project; and
  - Notify all registered stakeholders of the decision and right to appeal.

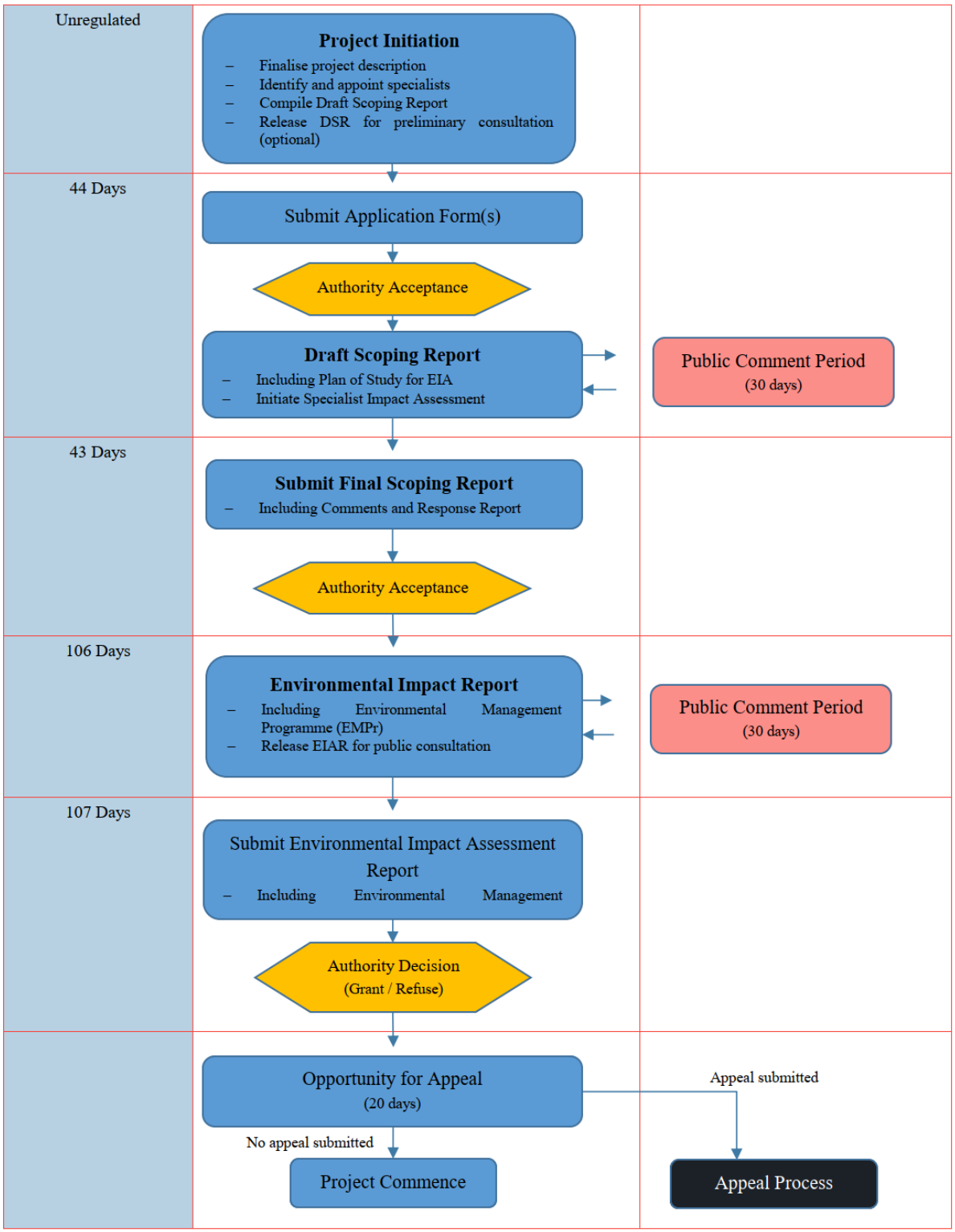


Figure 4-1: S&EIR Process

4.2 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 Dalmanutha WEF was generated on 24 November 2022 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 the BA 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 4-1 below provides a summary of the sensitivities identified for the development footprint.

Table 4-1: 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	✓			
Avian Theme				✓
Bats Theme		✓		
Civil Aviation Theme		✓		
Defence Theme				✓
Flicker Theme	✓			
Landscape	✓			

THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVIY
Palaeontology Theme	✓			
Noise Theme	✓			
Plant Species Theme			✓	
RFI 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 4.2.1 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
- Bat Impact Assessment
- Social Impact Assessment
- Defence Assessment
- Noise Impact Assessment
- Traffic Impact Assessment
- Flicker Assessment
- A Geotechnical Assessment
- Civil Aviation Impact Assessment
- RFI Assessment
- Plant Species Assessment
- Animal Species Assessment

4.2.1 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 1-4** 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[3] ;
- Biodiversity Impact Assessment (inclusive of terrestrial biodiversity, plant species and animal species);
- Surface water Assessment;
- Avifauna Impact Assessment;
- Bat Impact Assessment;
- Environmental Acoustic (Noise) Impact Assessment;
- Social Impact Assessment;
- Qualitative Risk Assessment (specific to the BESS);
- 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 Dalmanutha WEF. 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 the DSR. 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 Radio Frequency Interference (RFI) Study will not be undertaken. The proposed development area is not located within any Astronomy Advantage Area. Square Kilometre Array (SKA) South Africa as well as the South African Radio Astronomy Observatory (SARAO) 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 will be 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. An Application for the Approval of Obstacles will also be submitted to ATNS. The South African Civil Aviation Authority (SACAA) 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.

- **Defence**

  The Department of Defence 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.

4.3 APPLICATION

The application phase consists of the completion of the appropriate application form by the EAP and the Proponent as well as the subsequent submission and registration of the application for EA with DFFE.

A request for a pre-application meeting was submitted to DFFE on 20 May 2022. DFFE responded with the allocation of an assessing officer and reference number (2022-05-0020). A virtual pre-application meeting was held on **15 June 2022** with the DFFE to discuss the proposed Dalmanutha Renewable Energy Complex (inclusive of this Dalmanutha WEF project). The minutes of the meeting and the public participation plan were approved on **03 August 2022** respectively and are included in **Appendix E**.

[3] The Visual Impact Assessment will consider the impact of flicker associated with the Dalmanutha WEF development.

4.4 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the baseline environment has been compiled through a combination of site investigations, desktop reviews, georeferenced data and information obtained from the specialist assessments. An understanding of the receiving environment is critical in order to identify aspects that may be affect by the project and in turn how the surrounding environment may affect project design considerations.

4.5 IDENTIFICATION AND EVALUATION OF POTENTIALLY SIGNIFICANT IMPACTS

The potential impacts associated with the proposed development were determined at both a desktop level based on existing information, as well as the field assessment. The following methodology was used:

- Identify potential sensitive environments and receptors that may be impacted on by the proposed development;
- Identify the type of impacts that are most likely to occur (including cumulative impacts);
- Determine the nature and extent of the potential impacts during the various developmental phases, including, construction, operation and decommissioning;
- Identify potential No-Go areas (if applicable); and
- Summarise the potential impacts that will be considered further in the EIA phase through detailed specialist studies.

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability; and consequence (**Table 4-4**), where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability and consequence are detailed in **Table 4-2** and **Table 4-3** respectively.

Table 4-2: Significance Screening Tool

		CONSEQUENCE SCALE			
PROBABILITY SCALE		**1**	**2**	**3**	**4**
	1	**Very Low**	**Very Low**	**Low**	**Medium**
	2	**Very Low**	**Low**	**Medium**	**Medium**
	3	**Low**	**Medium**	**Medium**	**High**
	4	**Medium**	**Medium**	**High**	**High**

Table 4-3: Probability Scores and Descriptors

SCORE	DESCRIPTOR
4	**Definite**: The impact will occur regardless of any prevention measures
3	**Highly Probable**: It is most likely that the impact will occur
2	**Probable**: There is a good possibility that the impact will occur
1	**Improbable:** The possibility of the impact occurring is very low

Table 4-4: Consequence Score Descriptions

SCORE	NEGATIVE	POSITIVE
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e. beneficial) or negative (-ve) (i.e. harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (**Table 4-5**) has been applied according to the nature and significance of the identified impacts.

Table 4-5: Impact Significance Colour Reference System to Indicate the Nature of the Impact

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	Negligible
Very Low	Very Low
Low	Low
Medium	Medium
High	High

4.6 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 Dalmanutha Renewable Energy Complex, subject to a S&EIA Process, are located within the same geographical area, an integrated stakeholder engagement process (public participation) will be undertaken for these projects. A Stakeholder Engagement Report (SER) will be compiled and included in the FSR detailing the projects' compliance with Chapter 6 of the NEMA EIA Regulations 2014, as amended.

4.6.1 PUBLIC PARTICIPATION PLAN

As part of the pre-application consultation meeting held with DFFE on 15 June 2022, the proposed plan for public participation was discussed. A public participation plan was subsequently submitted to DFFE, along with the meeting minutes, for approval. The public participation plan was approved by DFFE on **03 August 2022**. The approved public participation plan is included in **Appendix E**.

4.6.2 STAKEHOLDER IDENTIFICATION

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 F-1.**

4.6.3 STAKEHOLDER NOTIFICATION

DIRECT NOTIFICATION

Notification of the proposed Project will be issued to potential Stakeholders, via direct correspondence (i.e., site notices and e-mail) on **12 December 2022**. The notification letter to be circulated is included in **Appendix F-2** of this report. Proof of notification will be included in the FSR.

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 advertisements is included in **Appendix F-3**. The relevant scoping phase advertisement dates are listed in **Table 4-6**.

Table 4-6: Dates on which the Adverts were published

NEWSPAPER	PUBLICATION DATE	LANGUAGE
Highvelder	9 December 2022	English
Middelburg Observer	9 December 2022	Afrikaans

SITE NOTICES

The official site notices will be 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 F-4.**

4.6.4 PUBLIC REVIEW

The DSR will be placed on public review for a period of 30 days from **12 December 2022** to **2 February 2023**, at the following public places:

- Emakhazeni Local Municipality, Belfast Office
- Emakhazeni Public Library
- Carolina Public Library
- WSP website (https://www.wsp.com/en-ZA/services/public-documents).
- Data free website (https://wsp-engage.com/)

4.6.5 COMMENT AND RESPONSE REPORT

All concerns, comments, viewpoints, and questions (collectively referred to as 'issues') received during the comment period will be documented and responded to adequately in a Comment and Response Report (CRR) to be included in the FSR. Where comments are project specific, this will be noted in the Comments and Response Report (CRR). The CRR 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.

4.6.6 WAY FORWARD

FINAL SCOPING REPORT SUBMISSION

All issues raised during the scoping phase of the proposed project will be incorporated into the FSR and will be addressed during the EIR Phase.

The DFFE will be allocated 43 days to review the FSR. The FSR will be placed on stakeholder review for a reasonable time period during the DFFE's final review and decision-making process. The delegated CA must within this specified timeframe issue a decision on whether to proceed onto the next phase, the EIR phase

ONGOING CONSULTATION AND ENGAGEMENT

In addition to the public documents distributed to stakeholders, there will be ongoing communication between the proponent, the WSP and stakeholders throughout the S&EIR process. These interactions include the following:

- In addition to the project announcement letters, a letter will be sent out to all registered stakeholders providing them with an update of the proposed project once the FSR has been approved;
- Interactions with stakeholders will take place in English and Afrikaans
- Feedback to stakeholders, individually and collectively;
- Written responses (email, faxes or letters) will be provided to stakeholders acknowledging issues and providing information requested (dependent on availability); and
- As per the GNR 982, as amended, particular attention will be paid to landowners, and neighbouring communities, specifically where literacy levels and language barriers may be an issue.

5 DESCRIPTION OF BASELINE ENVIRONMENT

5.1 PHYSICAL ENVIRONMENT

5.1.1 CLIMATE AND METEOROLOGY

LOCAL METEOROLOGY OVERVIEW

The climate of the Dalmanutha region can be described as a subtropical highland climate or a temperate oceanic climate with dry winters and falls into Köppen climate type: Cwb. The average temperature for the year in nearby Belfast is 14.4°C and the warmest month on average is January with an average temperature of 18.2°C. The coolest month on average is June with an average temperature of 8.8°C. The mean annual precipitation for Belfast is 838.2mm. The month with the most precipitation on average is January with 162.6mm and the month with the least precipitation on average is July with an average of 5.1mm. These climatic conditions give rise to chemically weathered red and yellow soils that are typical of subtropical upland areas, as was widely seen on site

TEMPERATURE AND RAINFALL

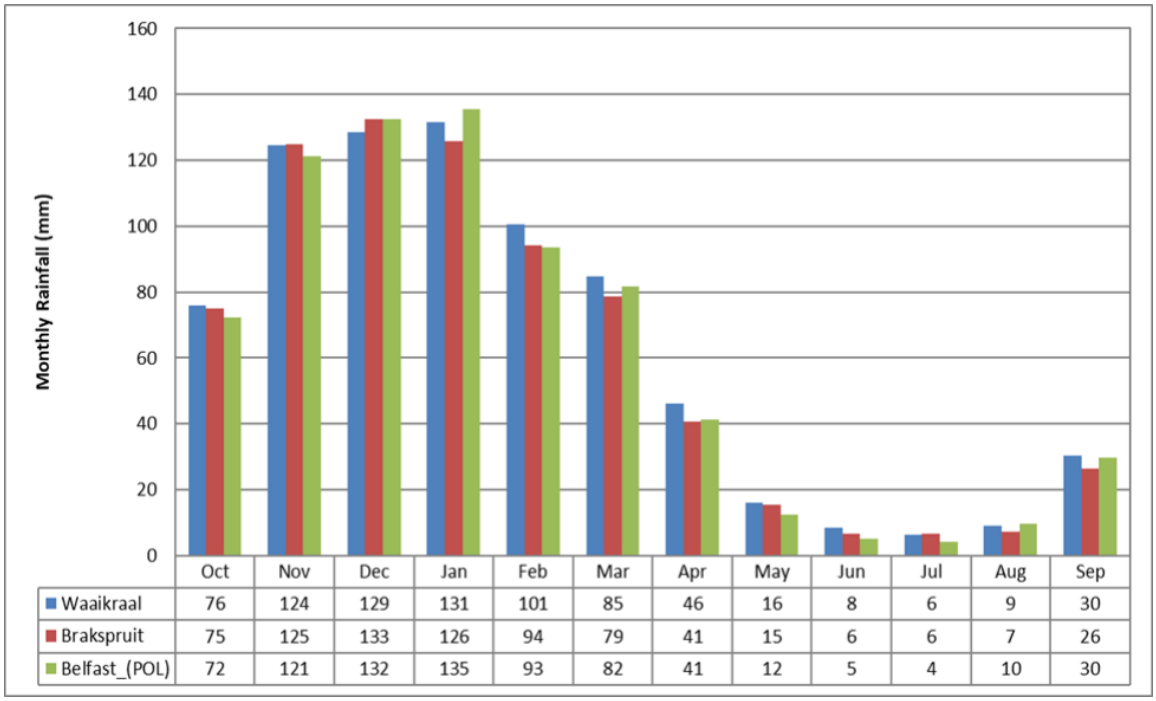
As is typical throughout South Africa, there is a distinct seasonal variation in temperature. The mean monthly temperatures are highest between November and February, which are summer months. Temperatures gradually drop with the lowest temperatures being recorded during June and July, which are winter months in South Africa. Temperatures, wind velocities and evaporation are linked. The higher the temperature and the wind velocity, the more likely it is for the evaporation rates to be high. The mean maximum annual temperature for the project area is 25°C and the mean minimum annual temperature is 0°C to 2°C.

The rainfall data was generated using a rainfall simulator which was sourced through the Design Rainfall Estimation Program (Smithers & Schulze, 2002) and the Daily Rainfall Extraction Utility (Kunz, 2004). Data was sourced for rainfall stations that are within close proximity to the study area. The rainfall stations presented in **Table 5-1** summarizes the rainfall data used in the analysis.

Table 5-1: Metadata for the rainfall stations

STATION NUMBER	NAME	DISTANCE (KM)	RECORD PERIOD (YEARS)	PERIOD OF RECORDS	RELIABILITY (%)	MAP(MM)
0517257 W	Waaikraal	6.2	81	1919-2000	15.8	762
0517235 W	Brakspruit	12.2	80	1920-2000	50	733
0517072 W	Belfast (Pol)	13.9	80	1920-2000	39.5	739

The average monthly plot was used to compare the rainfall records as shown in **Figure 5-1**. The rainfall records cover the same time periods, and the average monthly rainfall depths for the different stations have a similar pattern. During the wet season, the highest average rainfall was recorded in the months of December and January. The driest months on average was recorded in June and July.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Waaikraal	76	124	129	131	101	85	46	16	8	6	9	30
Brakspruit	75	125	133	126	94	79	41	15	6	6	7	26
Belfast_(POL)	72	121	132	135	93	82	41	12	5	4	10	30

Figure 5-1: Average monthly rainfall for the stations

The Waaikraal, Brakspruit and Belfast (POL) rainfall stations show a similar increasing trend as shown in **Figure 5-2**. The trends are consistent throughout, with no significant changes in slope. The Waaikraal rainfall station curve overlaps the Brakspruit and Belfast (POL) curves over time, indicating that slightly more rainfall was recorded for the station. However, Waaikraal rainfall station also has the least reliability (more patched data) amongst the three weather stations. **Figure 5-2** shows the total cumulative rainfall over time.

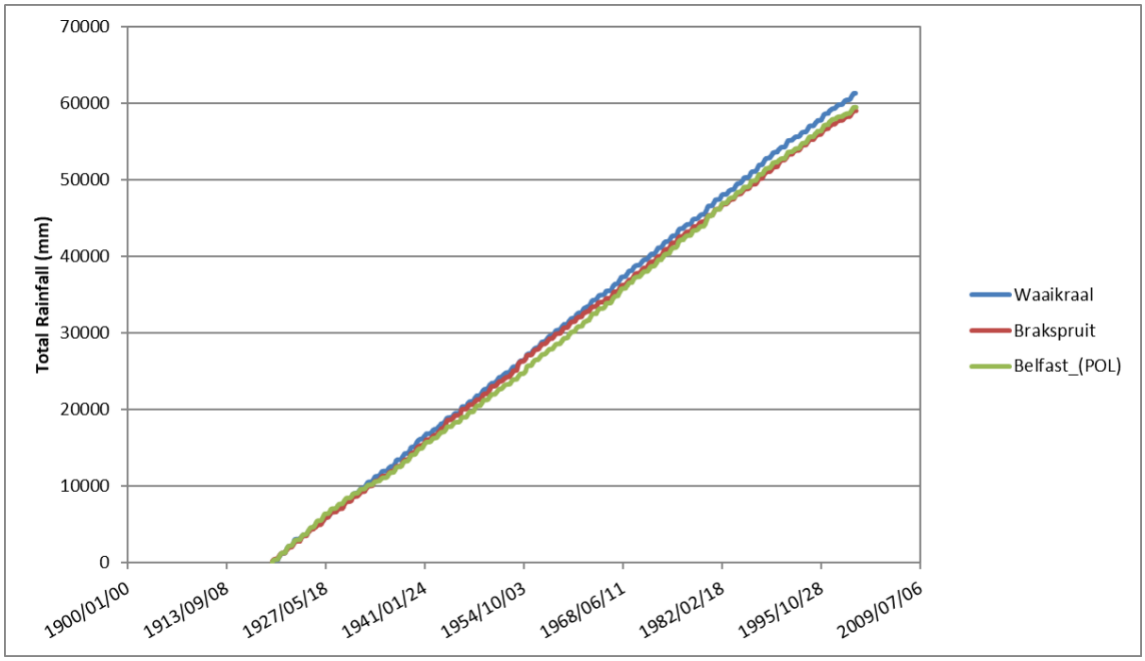


Figure 5-2: Cumulative rainfall for the stations analysed

The station 0517235 W Brakspruit was chosen as the station used in the study for the following reasons:

- The station is within proximity of the site.
- The station has the highest reliability of the datasets available (having the lowest percentage of patched or missing data).

Brakspruit rainfall station is situated approximately 12 kilometres from the site with 80-years of recorded data. It has the highest reliability (less patched data) of the analysed stations. The maximum recorded 24-hour rainfall depth is 140 mm, recorded on the 16th of December 1953, as shown in **Figure 5-3**.

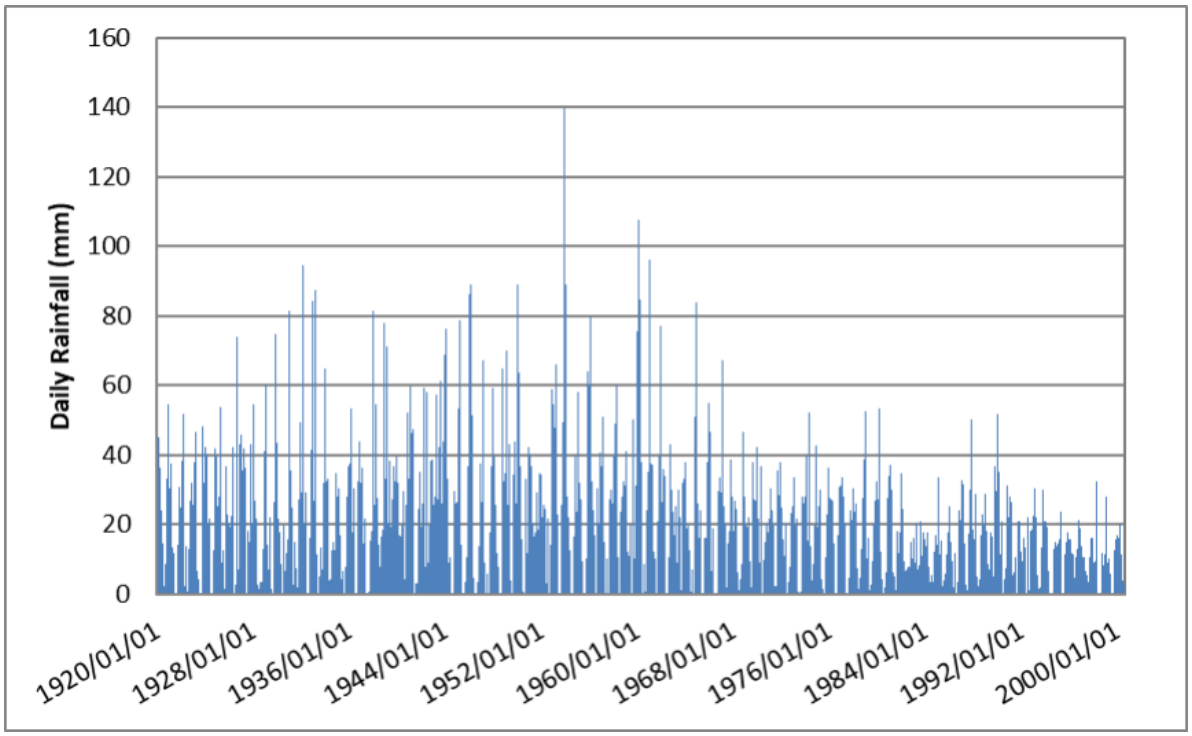


Figure 5-3: Brakspruit weather station daily rainfall

Figure 5-4 shows the annual rainfall depths. The mean annual precipitation for the station is 733 mm.

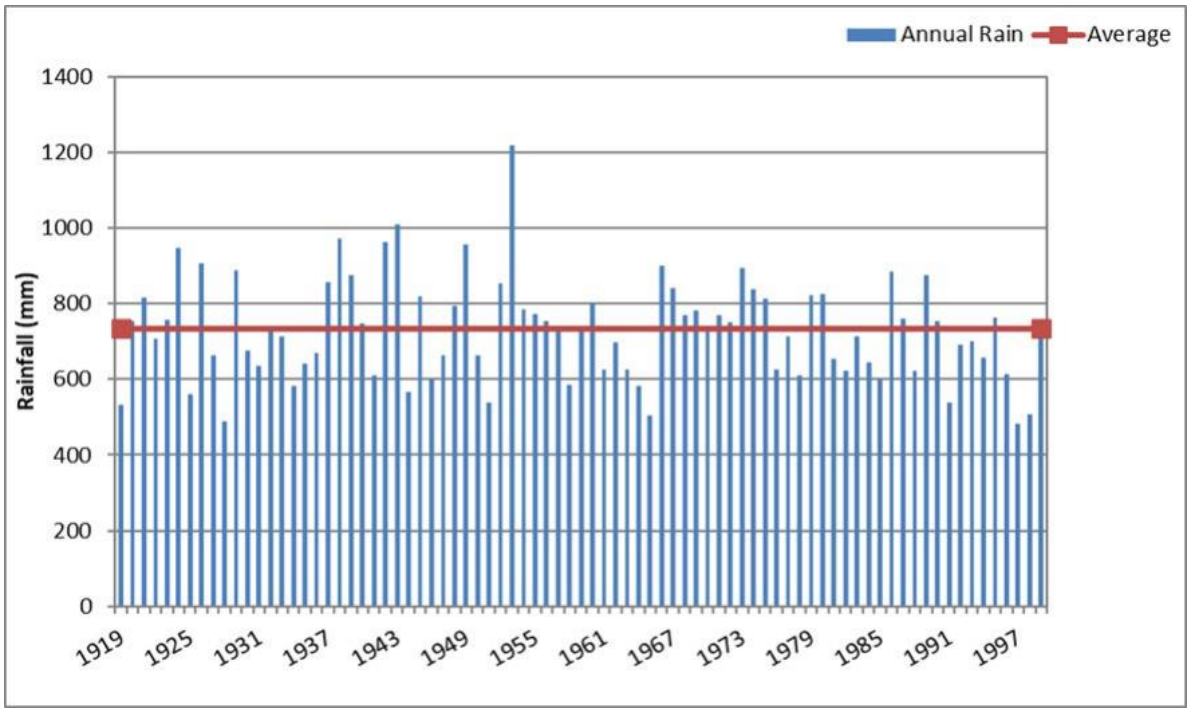


Figure 5-4: Brakspruit weather station annual rainfall readings and mean annual precipitation (MAP)

The 24-hour rainfall depths for several recurrence intervals at the Brakspruit station were calculated from the data available. To determine the likely magnitude of storm events, a statistical approach, using chi square statistics method (NIST/SEMATECH e-Handbook of Statistical Methods), was applied to the available recorded daily rainfall depths. This method statistically analyses the maximum daily rainfall depths for each year to determine the different recurrence intervals. The probability distribution with the best fit (R2=0.988) was found to be the Log Pearson III distribution (**Figure 5-5**), this was used to estimate the 24-hour storm rainfall depths associated with the various recurrence intervals as summarised in Table 2.

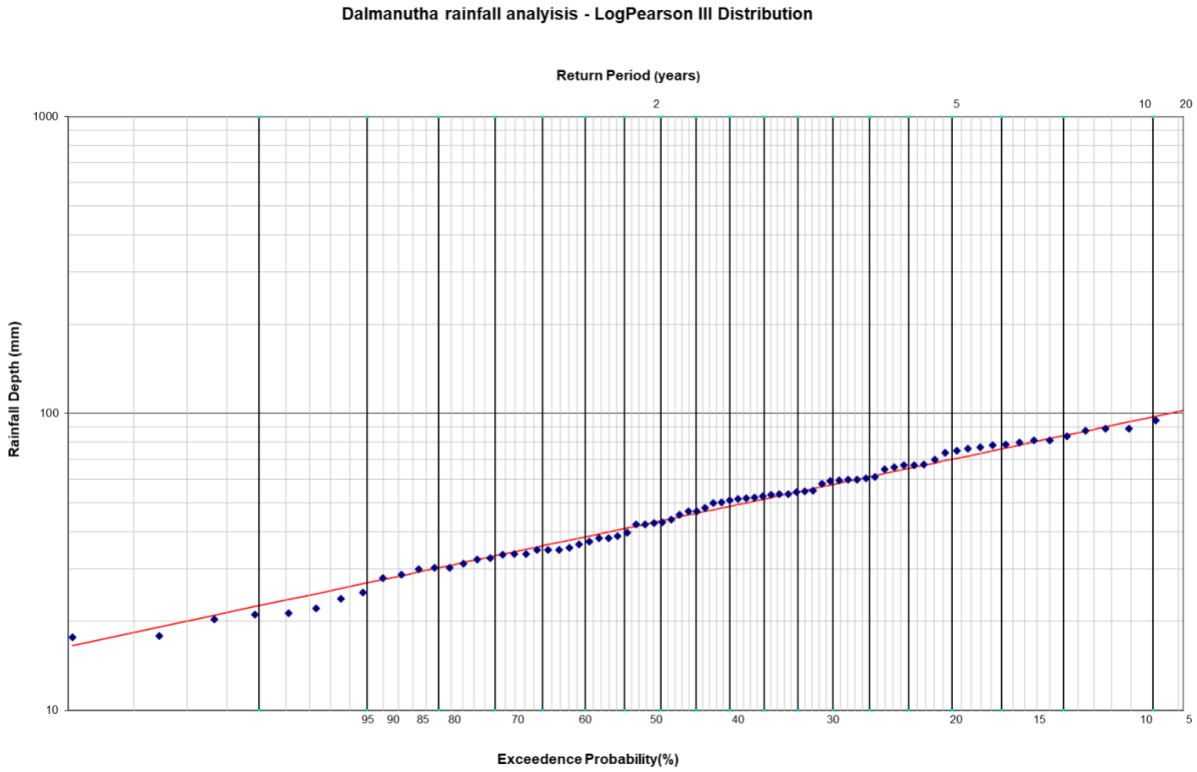


Figure 5-5: Rainfall analysis from Brakspruit station

EVAPORATION

The average S-Class pan evaporation is 1268.3 mm/year measured at X2E002 station. The station is approximately 14 km away from the site area. The highest average monthly evaporation occurs in December, as shown below in **Figure 5-6** which also plots the monthly average evaporation and the monthly average rainfall readings for the Dalmanutha project area. From the figure, it is observed that the mean annual evaporation is generally higher than the rainfall throughout the year, except for the month of November.

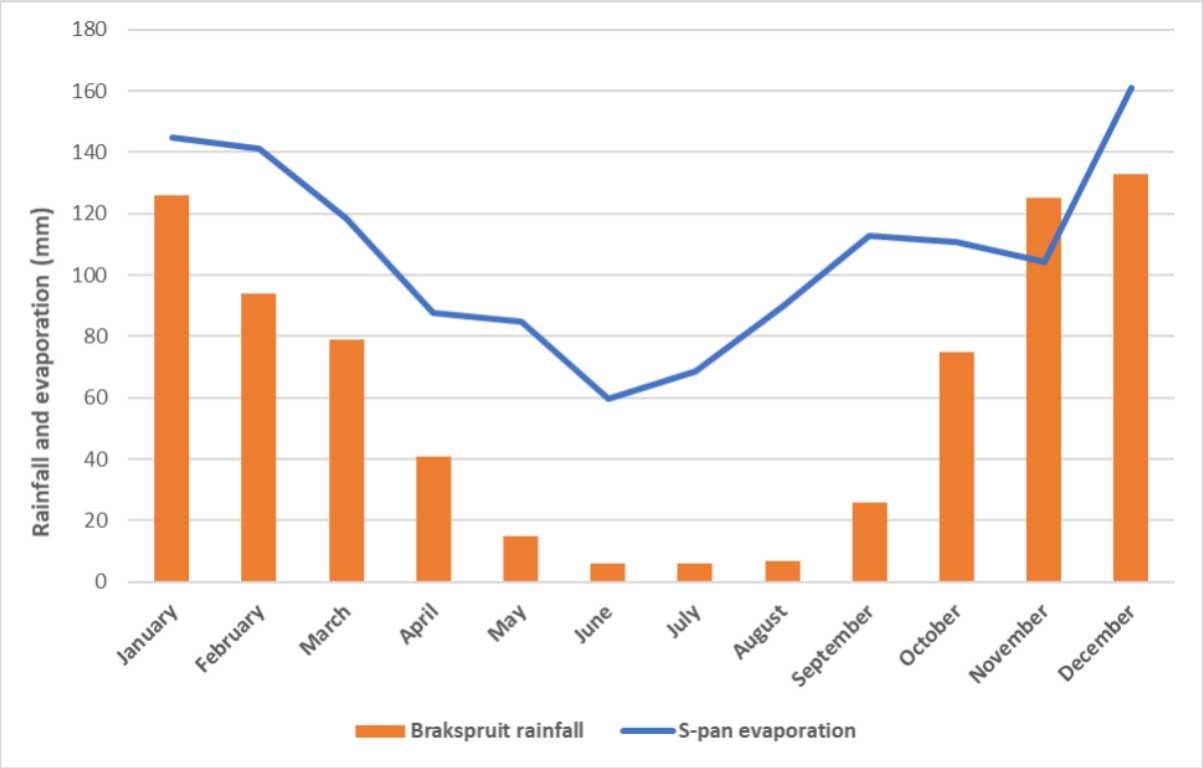


Figure 5-6: Rainfall and evaporation

WIND

The average hourly wind speed in Belfast experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 3.9 months, from July 26 to November 23, with average wind speeds of more than 11.8 kilometres per hour. The windiest month of the year in Belfast is September, with an average hourly wind speed of 13.6 kilometres per hour. The calmer time of year lasts for 8.1 months, from November 23 to July 26. The calmest month of the year in Belfast is March, with an average hourly wind speed of 10.1 kilometres per hour. The **Figure 5-7** below outlines the average wind speeds in Belfast throughout the year.

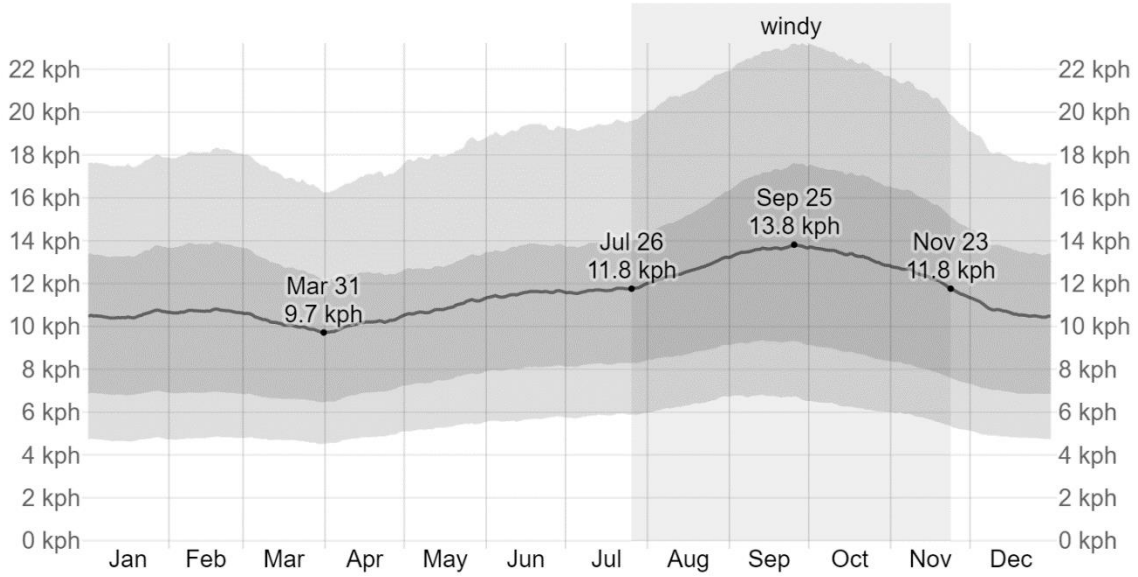


Figure 5-7: Average wind speed in Belfast

The wind is most often from the west for 4.5 months, from April 17 to September 1, with a peak percentage of 43% on June 11. The wind is most often from the north for 2.9 months, from September 1 to November 29, with a peak percentage of 38% on September 24. The wind is most often from the east for 4.6 months, from November 29 to April 17, with a peak percentage of 43% on January 1. The **Figure 5-8** below outlines the wind direction in Belfast throughout the year.

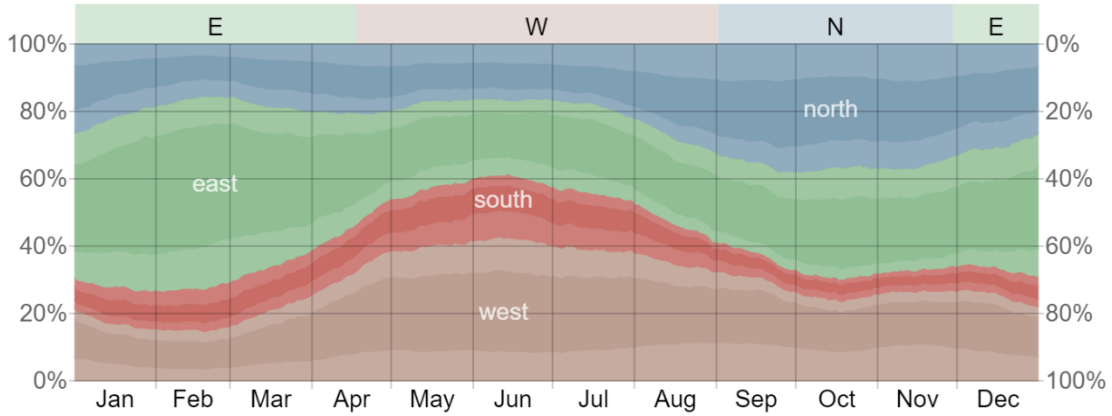


Figure 5-8: Wind direction in Belfast

5.1.2 BACKGROUND AIR QUALITY

An evaluation of the existing air pollution situation provides an understanding of the potential risk for health impacts. The DFFE has identified District and Metropolitan Municipalities of concern with respect to air quality based on the prevalence of sources of emissions for each source category[4]. The National Framework for Air Quality Management in the Republic of South Africa[5] (hereafter referred to as '*The National Framework*') has rated the Gert Sibande and Nkangala District Municipalities, as having "poor" air quality. The District area is thus identified as being in either the upper range of prevalence for one or more emission source categories[6] or middle range in two or more categories relative to other Districts. Municipalities that are classified as having poor air quality require priority attention in terms of air quality management planning.

The development site falls within one of South Africa's key air quality regions known as the Highveld Priority Area (HPA). The Highveld area is associated with poor air quality and elevated concentrations of criteria pollutants due to the high volume of both industrial and non-industrial emission sources. The HPA was declared on 23 November 2007, covers an area of 31,106 km2 and encompasses multiple municipal jurisdictions including a single metropolitan municipality and nine local municipalities across the Gauteng and Mpumalanga provinces.

The Air Quality Management Plan (AQMP) for the HPA[7] identifies the Gert Sibande District Municipality as one of the HPA's nine air quality hot spot areas. This classification is based on atmospheric dispersion modelling outputs verified by ambient air quality monitoring data. It is highlighted that the HPA AQMP's assessment is limited to criteria pollutants (specifically, SO_2, NO_2, PM10 and O_3) none of which are relevant to the proposed Dalmanutha Renewable Energy Complex.

The nearest AAQM station to the study site is the Carolina station owned and managed by Eskom, approximately 22km to the southern boundary of the proposed site. Pollutants measured by this station include PM10, PM2.5, CO, NO_2, SO_2 and O_3. None of these pollutants are relevant to the proposed renewable energy complex.

[4] Source categories include listed activities, domestic fuel burning, vehicle emissions and mining emissions
[5] Department of Environmental Affairs (2018): The 2017 National Framework for Air Quality Management in the Republic of South Africa (No.R.1144 of 2018) Government Gazette, 26 October 2018 (No. 41996).
[6] Emission source categories include listed activities, domestic fuel burning, traffic emissions and mining emissions (The National Framework, pg 50)
[7] DEA (2011): Highveld Priority Area Air Quality Management Plan (URL: https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/HIGHVELD_PRIORITY_AREA_AQMP.pdf)

5.1.3 TOPOGRAPHY

The site lies within the Quaternary catchment X11D. Numerous non-perennial rivers drain in an easterly direction into the perennial Waalkraalloop river and in a westerly and southerly direction into the perennial Klein Komati River. Marsh/vlei features are indicated on **Figure 5-9** to the north and south of the site.

The terrain consists of rolling hills with flat hill tops. The proposed WEF lies at an elevation of approximately 1630m in the northern section to 1888m in the southern section. Areas with a relatively high elevation are shown in green on **Figure 5-9**. whilst areas with a relatively low elevation are shown in pink. The majority of the WEF site has a slope of between 4.4 degrees and 10.2 degrees. The central part of the site is generally flat with a range in slope from 0.0 degrees to 4.4 degrees as shown in **Figure 5-10**. The southern portion is characterized by hills leading to steeper slopes of between 10.2 degrees – 34.4 degrees.

The topography of the site and erosion are interrelated. The slope on site, as well as the soil structure will influence the amount of erosion. Land on steeper slopes will be more prone to erosion. It must be noted that no significant erosion channels were encountered during the reconnaissance with the exception of erosion gullies along the farm road cuttings. The proposed turbine locations are covered with grass and sparse trees, and there is therefore a reduced risk of erodibility problems. The possibility of erosion must be mitigated, at each turbine position, by revegetation after construction.

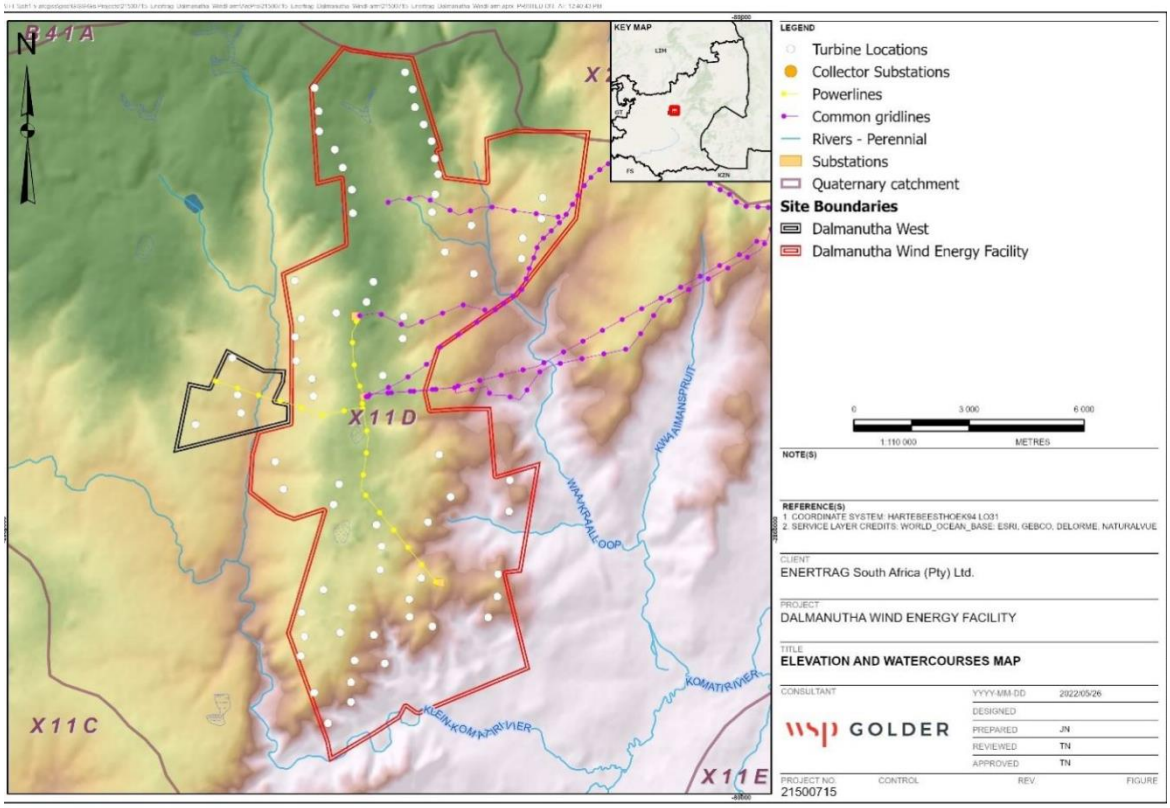


Figure 5-9: Elevation map of project area (pre-optimised 77 turbine layout)

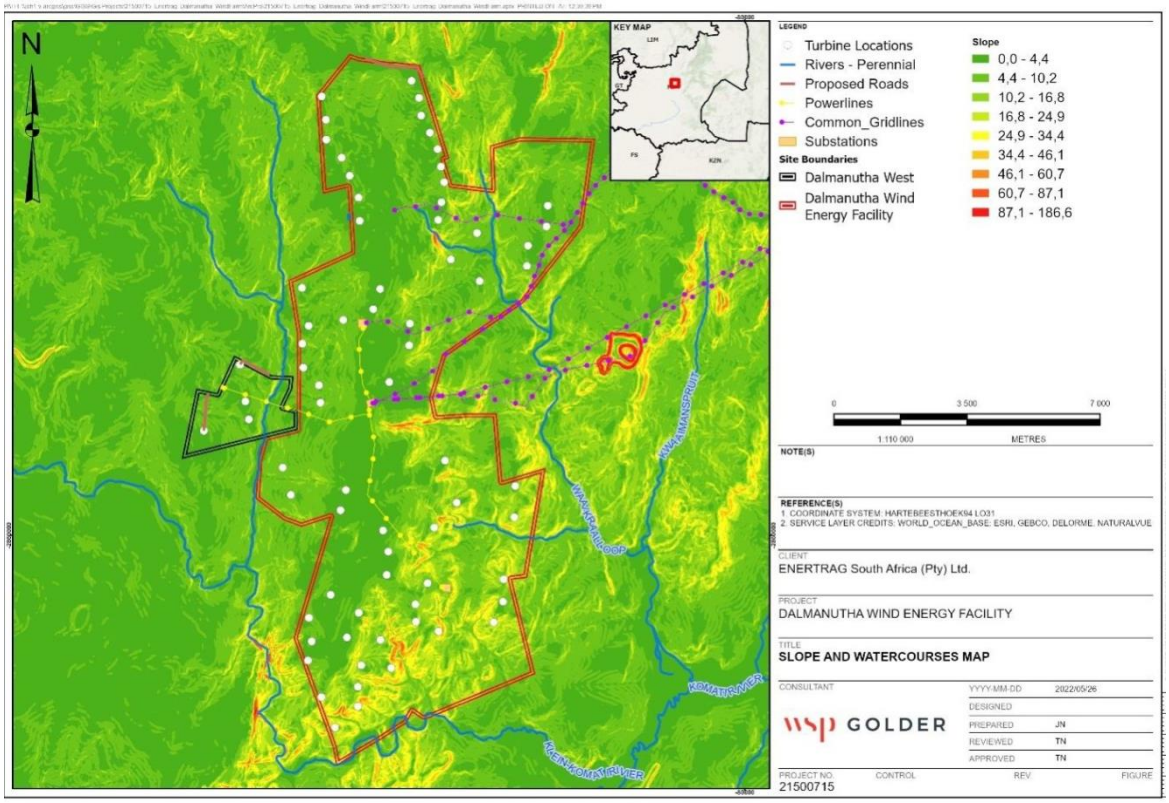


Figure 5-10: Slope classification of Project Area (pre-optimised 77 turbine layout)

However, all the turbines in this area are located on the flat hill tops. A general view of the site is provided in **Figure 5-11**.

Figure 5-11: Proposed WEF Area Characterized by Hilly Terrain

5.1.4 GEOLOGY

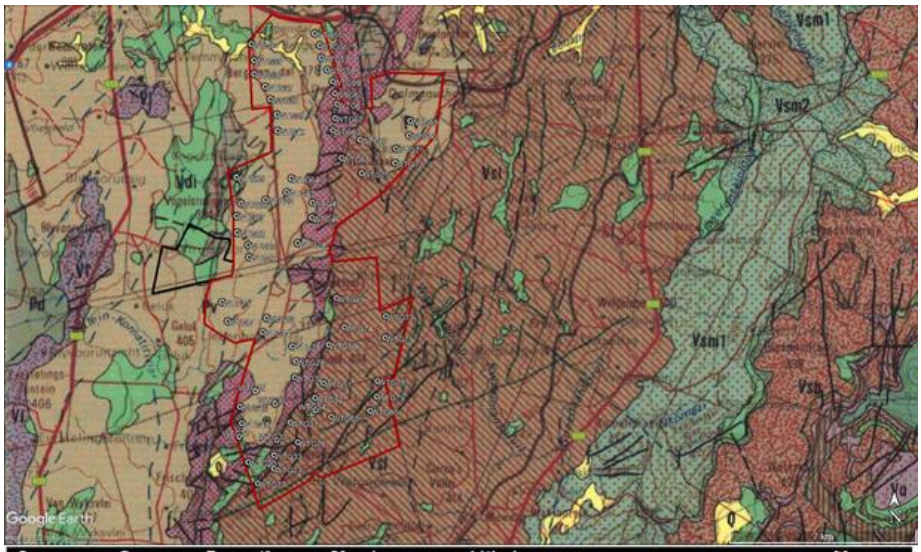
According to the published 1: 250 000 geological map (Sheet 2530 Barberton), the western and north-eastern portions of the study area are underlain by the Vryheid Formation (Pv), Ecca Group, Karoo Supergroup. This comprises quartzitic, cross-bedded sandstone, pebbly near its base, gritty sandstone, and shale. A small portion of the western boundary is underlain by the Vermont Formation (Vv) comprising fine-grained hornfels, with sedimentary structures, near the top and base, layers of silt and sandstone and minor layers of carbonate and calc-silicate rocks, Hornfels was not observed on site during the reconnaissance by the specialist.

However, baked shale was encountered. The central portion of the site is underlain by the Magaliesberg Formation (Vm) which comprises pure, coarse-grained, white quartzite containing sporadic impersistent shale layers in places, upper part comprising interlayered shale, siltstone and quartzite, and lower part shale.

The eastern portion is underlain by the Silverton Formation (Vsl) comprising greenish, fine-grained, laminated shale and subordinate mudstone, interlayered carbonate layers rare, hornfels in places. The Vermont, Magaliesberg and Silverton Formations form part of the Pretoria Group, Transvaal Supergroup. These formations have been intruded by diabase (Vdi). Recent surficial deposits (Q), alluvium and scree blanket a small section of the study area.

It is anticipated that areas of outcrop, shallow rock and relatively thinly developed soil will be present across much of the Dalmanutha site. Rock is expected across much of the site at a depth of less than 3m and, therefore founding in rock is recommended. It is recommended that test pits be excavated at each turbine position during the geotechnical site investigation to determine the depth to rock and the strength characteristics thereof. Some rotary cored boreholes would be required to determine the rock strength with depth in, particularly, the shales. The quartzite is expected to be medium hard to hard from surface or from a shallow depth.

Up to a depth of 3m, all excavations should be excavated at a batter of 1:1 in soil where no water or seepage is evident and to 1:2, or flatter, where water is encountered. Rock can be excavated at a batter of 1:0.5 or vertically in the temporary case up to a depth of 3m. According to the published geological map the regional dip of the shale and quartzite is approximately 8° to the northwest. Instability is, therefore, not expected in rock slopes as the regional dip is less than the expected shear strength parameters of the rock. Depending on the embedment depth, blasting may be required for cable trenches. Alternatively, surface conduits or pole mounted cables may be considered to alleviate the costs of blasting.



Super-group	Group	Formation	Member	Lithology	Map symbol
				Dolerite	Vdi
Karoo	Ecca	Vryheid		Quartzitic, cross bedded, sandstone, gritty sandstone & shale	Pv
Transvaal	Pretoria	Vermont		Fine grained hornfels. Layers of siltstone and sandstone. Minor layers of carbonate and calc-silicate rocks	Vv
		Magaliesberg		Pure, coarse-grained quartzite with some shale layers in places. Upper part comprises interlayered shale, siltstone and quartzite.	Vm
		Silverton	Lydenburg Shale	Greenish, fine grained, laminated shale and subordinate mudstone. Interlayered carbonate layers are rare. Hornfels in places.	Vsl
			Machadadorp	Very fine-grained tuff, coarser grained conglomerate and basic lava. Deeply weathered pillow lava and pale green tuff with pyroclastic layers.	Vsm
			Boven Shale	Greenish fine-grained shale and mudstone with tuff and subordinate carbonate layers. Hornfels in places.	Vsb

Figure 5-12: Geology of the site

Climate

The climatic regime of the present and of the relatively recent times plays a fundamental role in the development of the soil profile. The site falls within the sub-humid part of South Africa where Weinerts climatic N-value is less than 5 which promotes chemical weathering and results in thick deeply weathered residual soils. Pedocretes, where present, are likely to be in the form of ferricrete. However, during the site reconnaissance, surface and subsurface rock was observed. Thicker soil profiles are anticipated in the valleys.

Undermining

Subsidence at surface in undermined areas is caused by collapse and failure of the underground mining void relatively close to the surface (Heath and Engelbrecht, 2011). The Dalmanutha WEF site is located approximately 8km southeast of the North Block Complex Belfast Coal Mine and approximately 10km east of the Exxaro Belfast Mine. Both mines are operating as open cast mines and, hence, there is no undermining at the WEF site, and no mine related subsidence is expected.

Flooding

Flooding affects flat lying areas, areas confined to drained channels and flood plains. All the turbines are located on flat hill tops where water ponding is a possibility. Stormwater management is recommended at all flat areas to facilitate water run-off and to alleviate the possibility of standing water at the positions of foundations.

Seismicity

According to the published seismic hazard map of South Africa (Kijko, et al., 2003), the probability of a seismic event occurring is low with a value for peak ground acceleration at the site being between 0.08 and 0.12m/s as illustrated in **Figure 5-13**. A 10% probability exists that this value will be exceeded in a 50-year period.

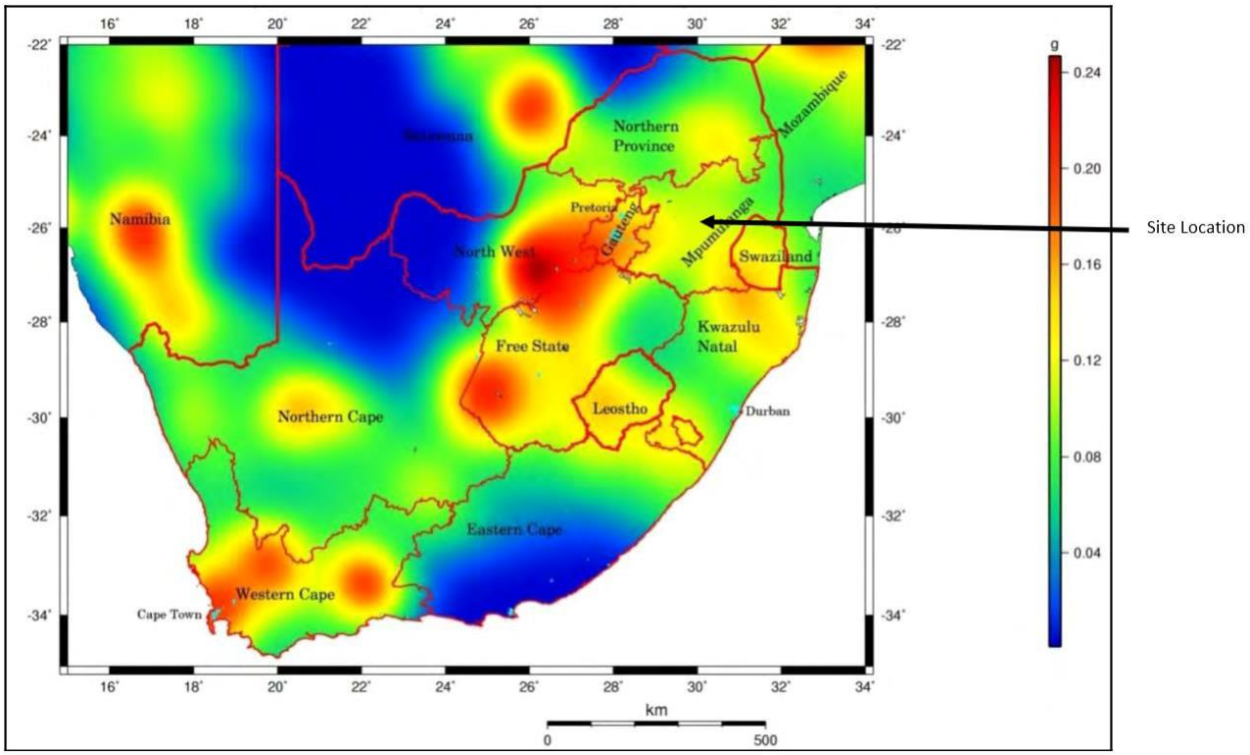


Figure 5-13: Seismic Hazard Map of South Africa

5.1.5 SOILS AND AGRICULTURAL POTENTIAL

The sandstone encountered in the area has given rise to soils that contain kaolinitic clays in the site areas already visited. Where the site areas underlain by quartzite have been visited, rocky areas with very thin soils and minimal vegetation were encountered, also as expected. It is expected that the areas underlain by mudrock will give rise to clay-rich, silty soils. In other areas, thin, rocky soils exist on the hilltops, while deep, red, well-

drained soils occur in the uplands and wet, gleyed soils can be found in the gullies. There is very little evidence of 'intermediate', poorly drained soils showing mottles or other signs of wetness, however red soils (Shortlands form) were evident next to the riverbed in which gleyed soils (Katspruit form) were identified.

Parts of the site are used for cultivation and parts are used for the grazing of both cattle and sheep. Cultivated crops within the study area include maize, soya beans and the fodder crop, weeping love grass, *Eragrostis curvula*. The area exceeds the national average in terms of agricultural productivity. The site contains cultivation lands that make an important contribution to national food security, within the South African context of a considerable scarcity of arable land. Mpumalanga is the province that produces the second highest amount of maize after the Free State. The area produces long term average maize and soya bean yields that, according to verbal information supplied by farmers in the area, are above average for commercial farmers in South Africa. The long-term grazing capacity across the site is 4 - 5 hectares per large stock unit (Department of Agriculture, Forestry and Fisheries, 2018), which is also high in a South African context.

The soils still to be identified in the field will be classified by form in accordance with the South African soil taxonomic system (Soil Classification Working Group, 1991) and the area's land capability will be assessed and mapped based on the results of the classification study. The South African land capability classification system by Scotney et al. (1987) will be used to classify and map land capability (**Figure 5-14**). This system is useful in that it is able to quickly provide an overview of the agricultural capability and limitations of the soils in question information about the soil potential for alternative uses.

Land Capability Group	Land Capability Class	Increased intensity of use									Limitations
Arable	I	W	F	LG	MG	IG	LC	MC	IC	VIC	No or few limitations. Very high arable potential. Very low erosion hazard
	II	W	F	LG	MG	IG	LC	MC	IC	-	Slight limitations. High arable potential. Low erosion hazard
	III	W	F	LG	MG	IG	LC	MC	-	-	Moderate limitations. Some erosion hazards
	IV	W	F	LG	MG	IG	LC	-	-	-	Severe limitations. Low arable potential. High erosion hazard.
Grazing	V	W	-	LG	MG	-	-	-	-	-	Water course and land with wetness limitations
	VI	W	F	LG	MG	-	-	-	-	-	Limitations preclude cultivation. Suitable for perennial vegetation
	VII	W	F	LG	-	-	-	-	-	-	Very severe limitations. Suitable only for natural vegetation
Wildlife	VIII	W	-	-	-	-	-	-	-	-	Extremely severe limitations. Not suitable for grazing or afforestation.

W - Wildlife; F - Forestry; LG - Light grazing
MG – Moderate grazing; IG - Intensive grazing; LC - Light cultivation
MC - Moderate cultivation; IC - Intensive cultivation.; VIC – Very intensive cultivation

Figure 5-14: Land capability classification system (Scotney et al., 1987)

5.1.6 SURFACE WATER

HYDROLOGICAL CACHMENT

Regionally the area is located in the Komati River catchment of Drainage Region X. Locally, the site lies within the quaternary catchment X11D, as shown in **Figure 5-15**. The catchment is situated within the Komati Water Management Area (WMA). The mean annual runoff (MAR) for the X11D catchment is 88mm (WR2012). This catchment receives 744mm rainfall per year and experiences 1413 mm of evaporation annually. Numerous non-perennial rivers drain in an easterly direction into the perennial Waalkraalloop river and in a westerly and southerly direction into the perennial Klein Komati River. The terrain of the proposed WEF lies at an elevation of approximately 1630m in the northern section, to 1888m in the southern section as shown in **Figure 5-16.** Areas with a relatively high elevation are depicted in green, whilst areas with a relatively low elevation are depicted in pink.

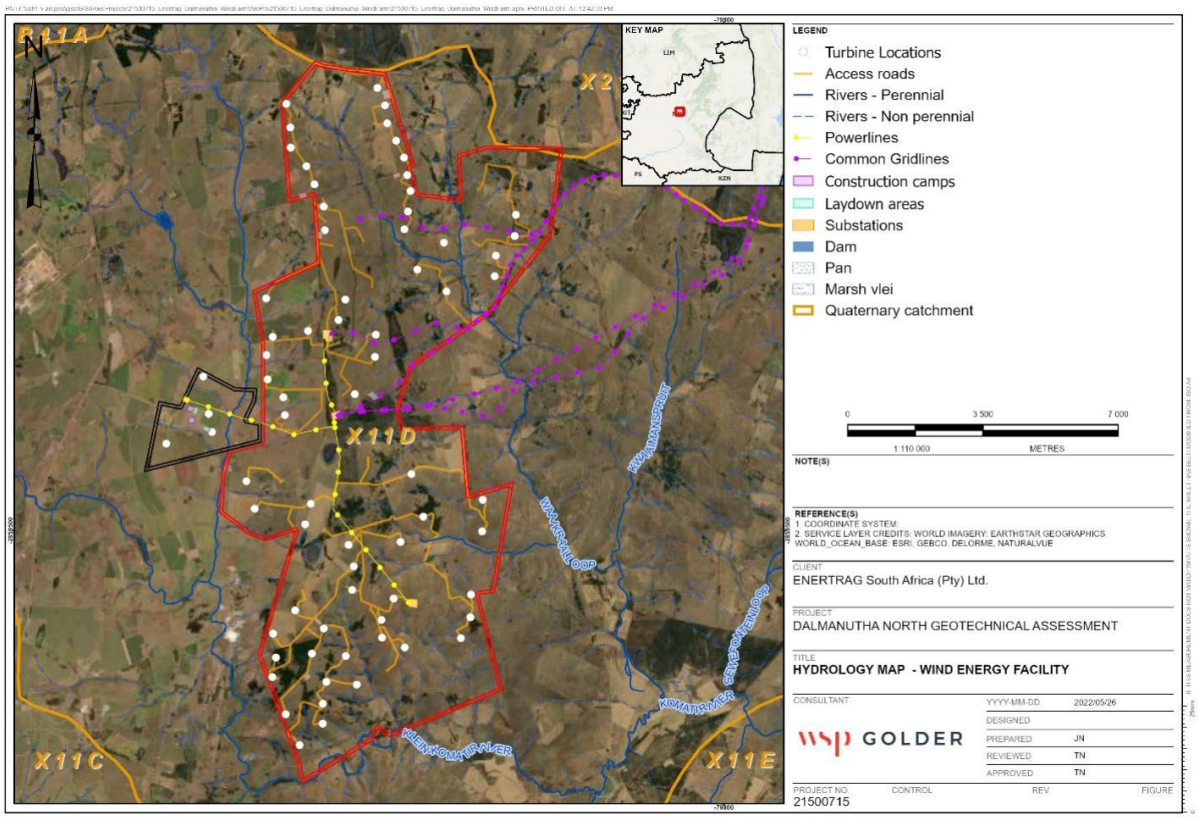


Figure 5-15: Hydrological map (pre-optimised 77 turbine layout)

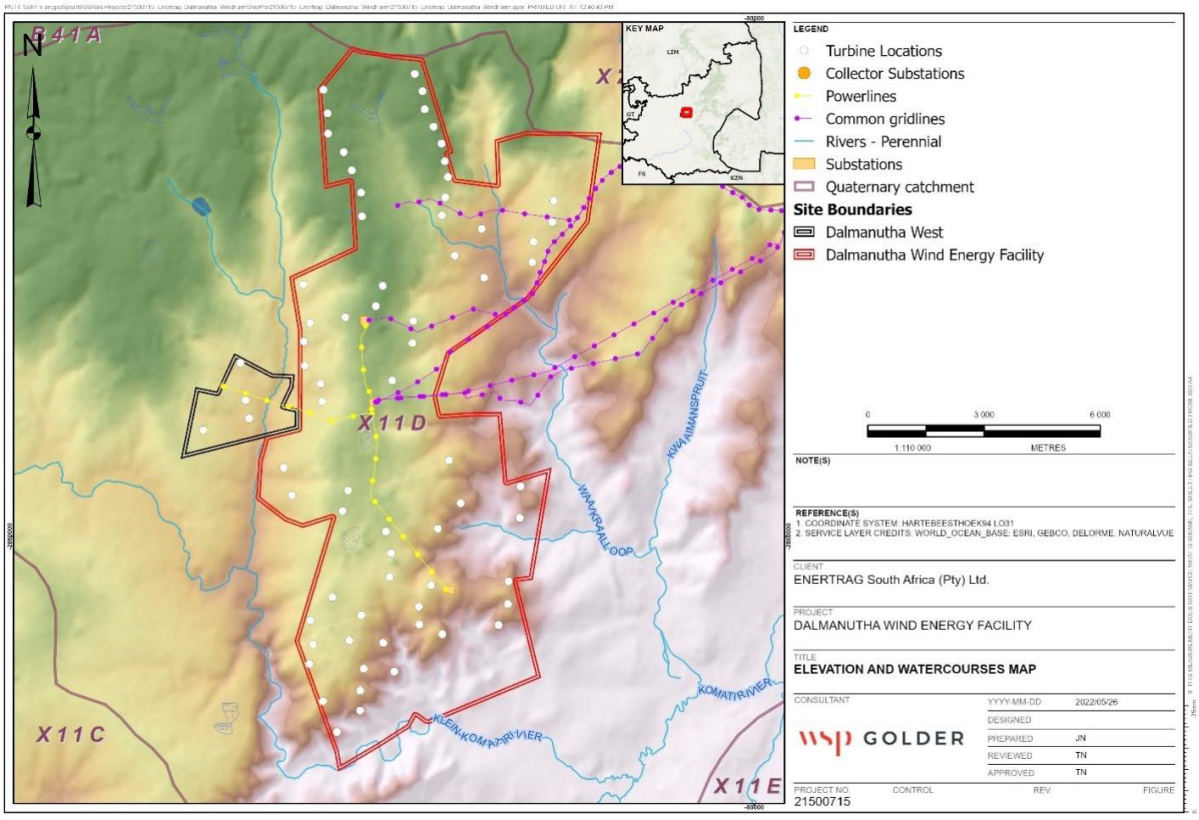


Figure 5-16: Elevation and watercourses map (pre-optimised 77 turbine layout)

5.2 BIOLOGICAL ENVIRONMENT

5.2.1 TERRESTIAL VEGETATION

Three major vegetation types occur across the local study area, these include Eastern Highveld Grassland, Steenkampsberg Montane Grassland, and KaNgwane Montane Grassland (**Figure 5-17**), the latter two of which are considered least concern in terms of ecosystem threat status at a national level (**Figure 5-18**). Due to its assessment as 'Vulnerable', further details are provided for Eastern Highveld Grassland in the section that follows.

5.2.2 VEGETATION FEATURES OF CONCERN

Eastern Highveld Grassland (Gm12) is characterised by short, dense form of grassland, occurring on to moderately undulating plains, low hills and wetland depressions. It is dominated by the typical Highveld grassland flora including *Aristida, Digitaria, Eragrostis, Themeda, Tristachya* etc.); interspersed 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, Protea welwitschii, and Rhus magaliesmontanum*). It is located almost entirely within the Mpumalanga Province, and a small section of the eastern parts of Gauteng. Eastern Highveld Grassland is considered to be Vulnerable nationally (Government notice 1002/2011, in terms of section 52(1)(a) of NEMBA)), as only a very small fraction is conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and approximately 44% has been transformed, primarily by cultivation, plantations, mines, urbanisation and the building of dams.

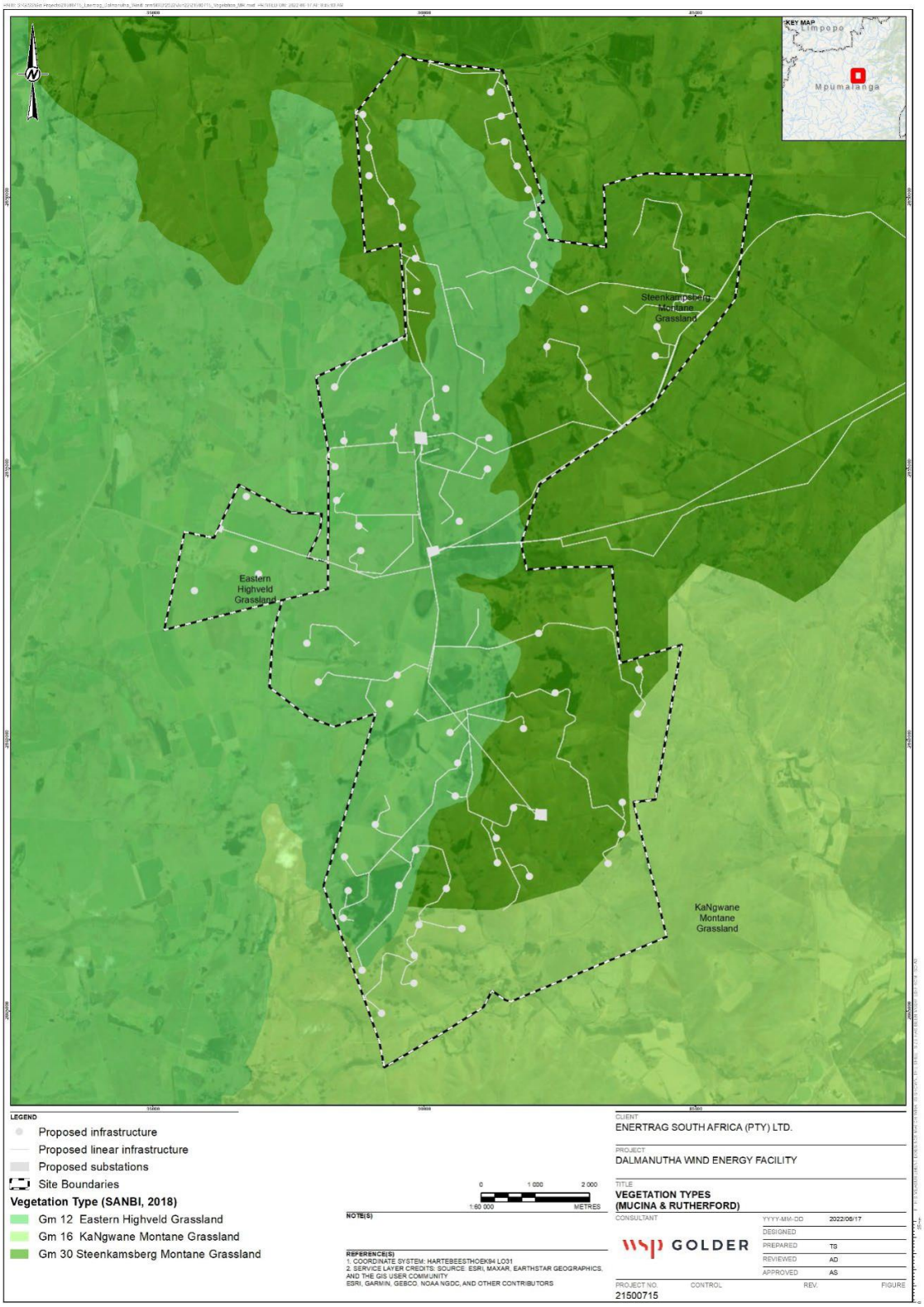


Figure 5-17: Regional Vegetation Types of the Study Area (pre-optimised 77 turbine layout)

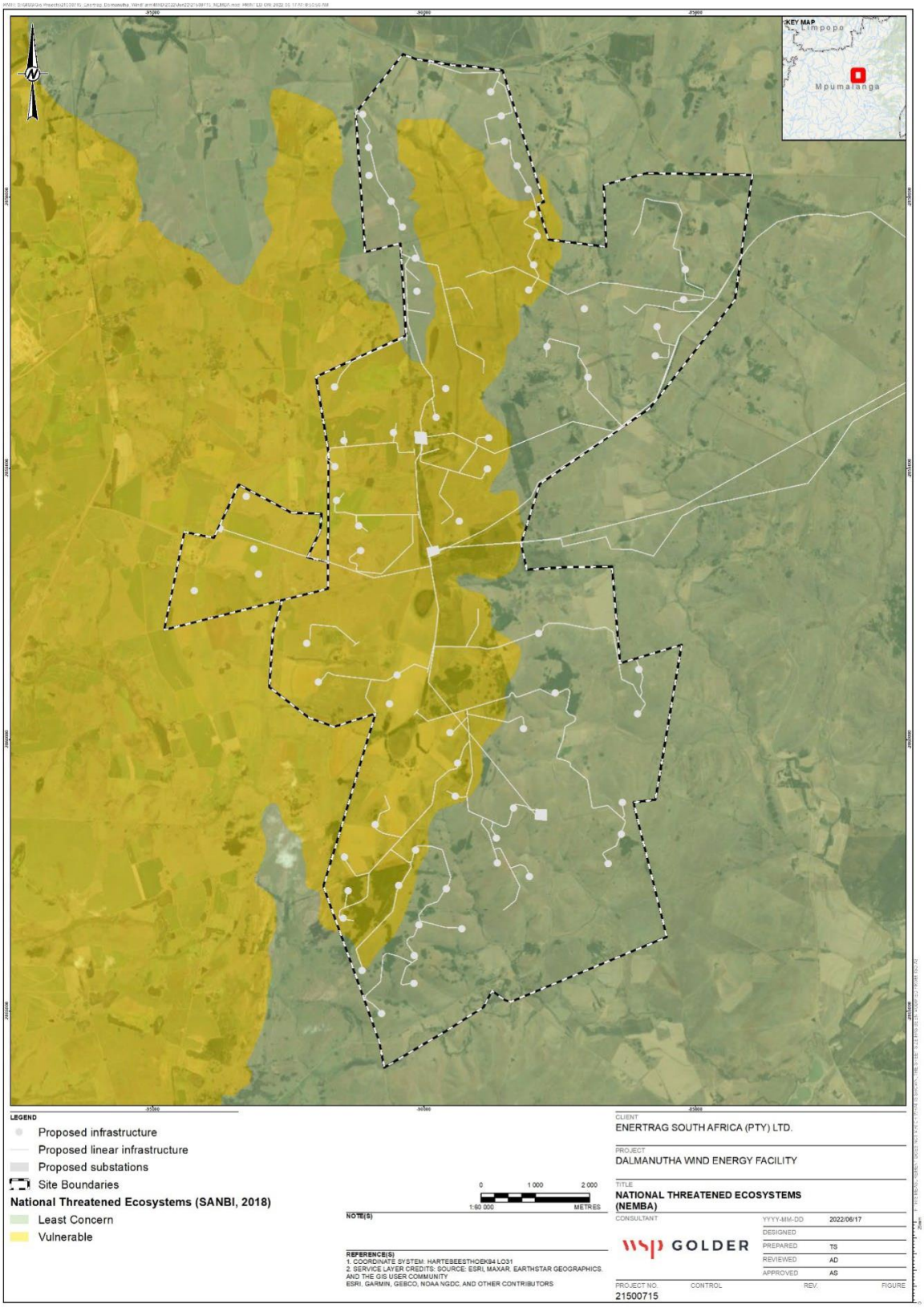


Figure 5-18: National threatened ecosystems relative to the site (pre-optimised 77 turbine layout)

5.2.3 FLORA FEATURES OF CONSERVATION CONCERN

The majority of the study area is considered to be of 'Medium sensitivity' in terms of the Plant Species Theme of the National Screening Tool, on account of the potential presence of at least 19 flora species of conservation concern (e.g., *Khadia carolinensis, Asclepias dissona, Miraglossum davyi*). During a meeting held with one of the Project landowners in April 2022, several areas of importance in terms of support of a diverse range of plant species of interest, including various orchids, were identified.

Although not depicted on maps at this stage, in the interests of protecting the locations of species of interest from potential plant poaching, it is understood that most of the indicated areas of importance do not coincide with the proposed Project layout; nevertheless this will only be confirmed upon completion of the Terrestrial Flora Specialist Assessment report.

5.2.4 BIODIVERSITY CONSERVATION PLANS

The study area was compared to The Mpumalanga Biodiversity Sector Plan (MBSP) (Mpumalanga Parks and Tourism Agency 2014) in order to assess the local and regional biodiversity context of the site.

The Mpumalanga Biodiversity Sector Plan (MBSP) technical report (Lotter, 2015) defines five categories of conservation focus: protected areas, critical biodiversity areas (CBA), ecological support areas (ESA), other natural areas, and modified habitats. Definitions for each are listed below. These areas present risks to the Project in terms of impact, as well as opportunities for contribution to achieving provincially set targets for biodiversity conservation, through focused biodiversity management planning and adherence to the mitigation hierarchy at ESIA stage:

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

Much of the study area is mapped as CBAs and ESAs, which are largely aligned with grassland and wetland layers presented in the national landcover dataset (GTI, 2020) (**Figure 5-20**). These datasets are based on satellite imagery interpretation and as such the data may be aged, or require in-field verification, which will form a key outcome of the forthcoming vegetation and flora Terrestrial Flora Specialist Assessment report.

Figure 5-19 shows the features in the study area within five of the classes listed above:

- Protected Areas: (National Parks and Nature Reserves):
  - Some of the proposed infrastructure coincides with areas that have been identified as Priority Focus Areas as part of the National Protected Area Expansion Strategy (2016) (**Figure 5-21**), which are aligned with the MBSP CBAs and ESAs
  - No nationally protected areas are situated within the area, with the closest feature listed on the National Protected Areas Register (DFFE, 2022) being the Nooitgedacht Dam Nature Reserve, which lies at the southern-most extent of the RSA
  - The northern extent of the study area overlaps with the Steenkampsberg Important Bird Area (IBA), which consists primarily of rolling high-altitude grassland interspersed with rocky outcrops, and encompasses the Lakenvlei wetland which hosts the critically endangered White-winged Flufftail (Sarothrura ayersi) (BirdLife International, 2022). The IBA also has importance due to its support of other threatened wetland birds including corncrake (Crex crex) and various crane species.
- Critical Biodiversity Areas (CBA):
  - Irreplaceable: A significant area of the site is falls under this class.
  - Optimal: There are patches of areas that fall under this class in the northern and sothern areas as well as the middle part of the site footprint.
- Ecological Support Area (ESA):
  - Local Corridor: There is a large area near the southern part of the site that is mapped within this class.

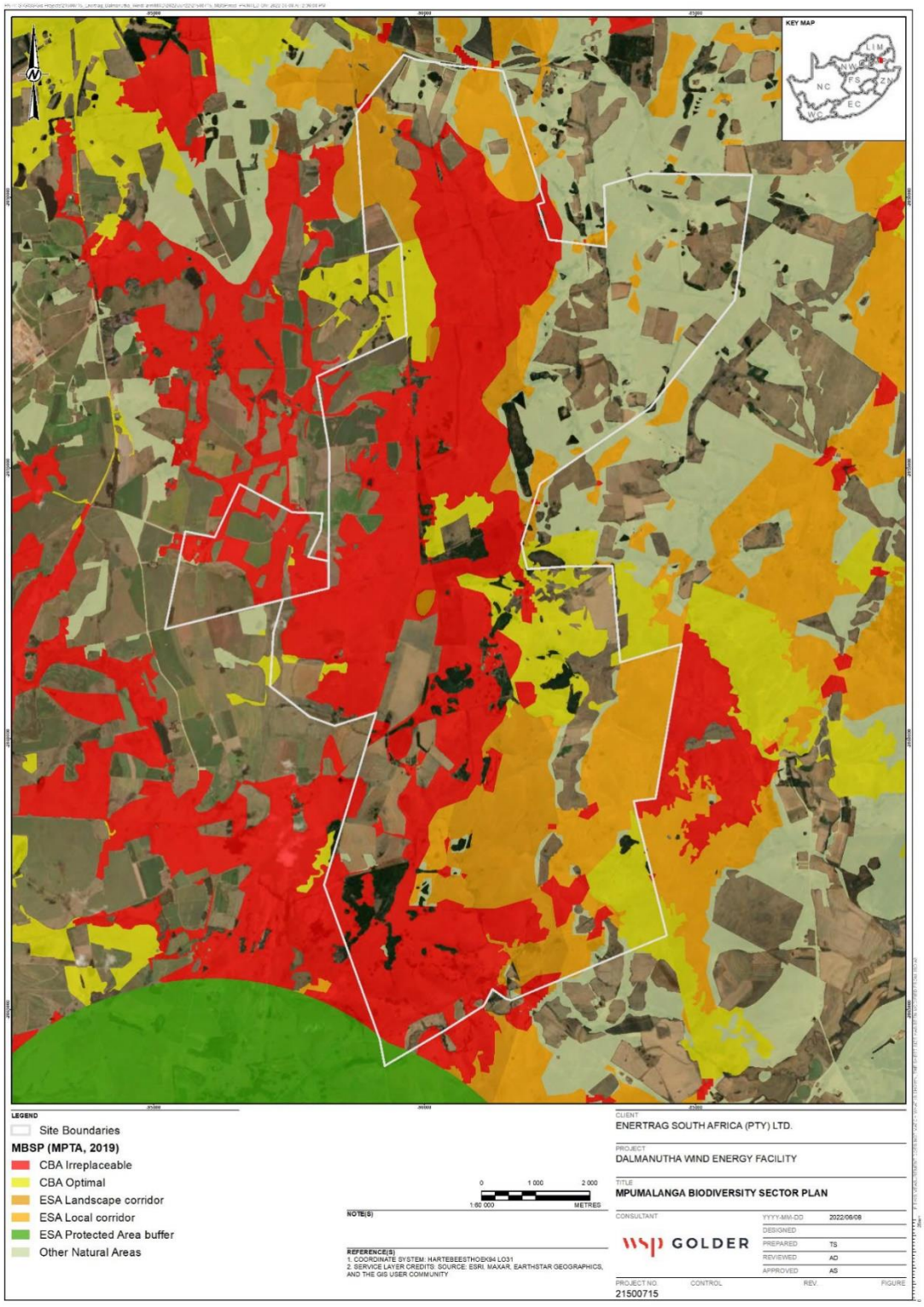


Figure 5-19: Biodiversity Map of the Project Area according to the MBSP

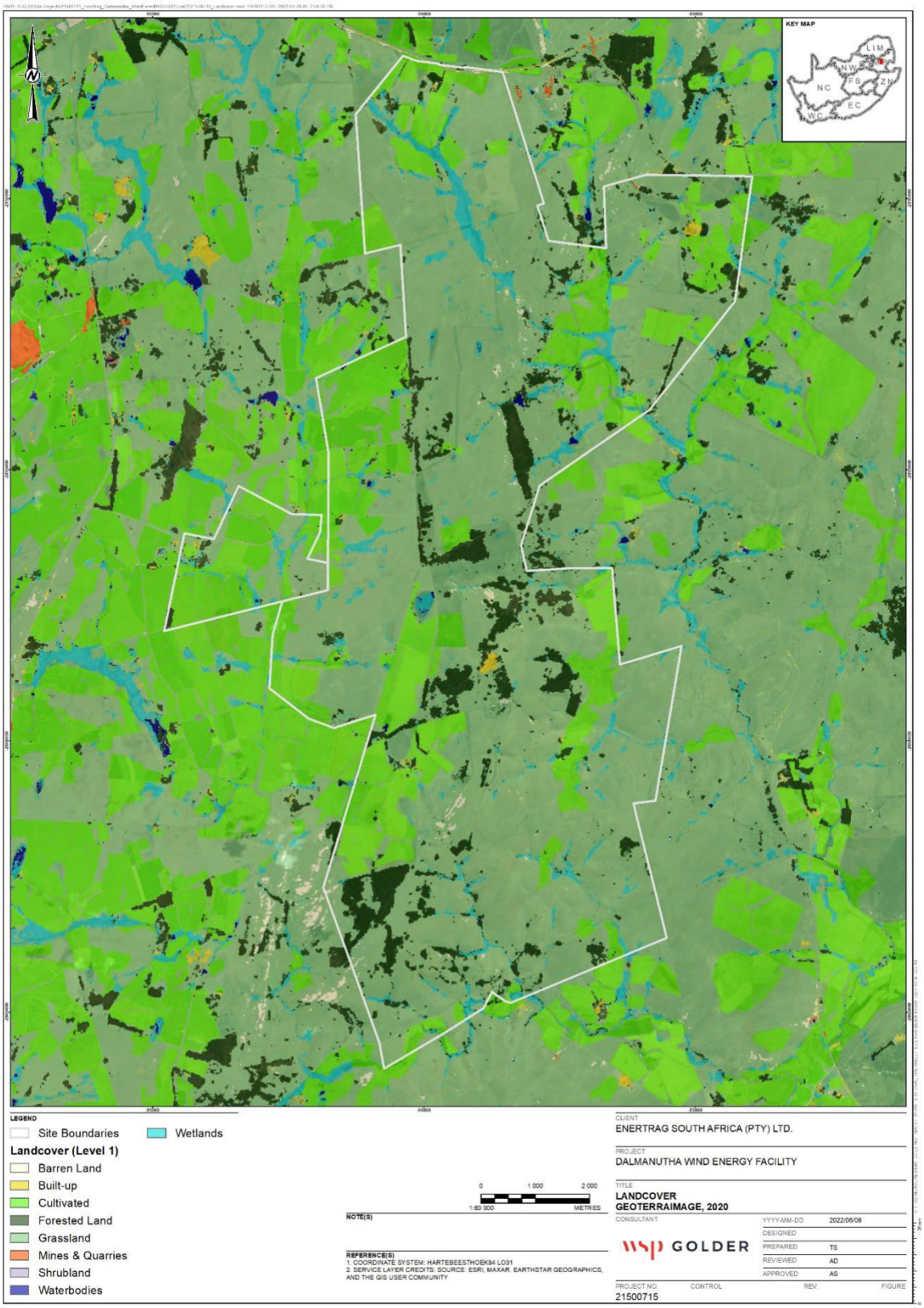


Figure 5-20: Landcover for the study area

Figure 5-21: National Protected Area Expansion Strategy (pre-optimised 77 turbine layout)

5.2.5 TERRESTRIAL FAUNA SPECIES

The proposed infrastructure footprint was assessed at desktop level using the National Web-based Environmental Screening Tool.

The area is considered to be of 'Medium' – 'High' sensitivity in terms of the Animal Species Theme, due to the potential presence of the range-restricted Badplaas Black Millipede (*Doratogonus furculifer*) which is listed as Endangered on the IUCN Red List (Rudolf et al., 2021), and the mammals Robust Golden Mole (*Amblysomus robustus* – VU1 (Rampartab & Bronner, 2016)), Rough-haired Golden Mole (*Chrysospalax villosus* - VU), Maquassie Musk Shrew (*Crocidura maquassiensis* – VU), Spotted-necked Otter (*Hydrictis maculicollis* – VU), and Oribi (*Ourebia ourebi ourebi* - EN).

The fauna biodiversity of the region is relatively well-known. Details of fauna species of conservation concern (SCC) with potential to occur in the study area are summarised in the sections that follow. Birds and bats are excluded, since these are being dealt with in separate studies.

5.2.6 MAMMALS

Four mammal species of conservation concern (SCC) are expected to occur in the RSA, including three mole species, and Cape Molerat (*Georychus capensis*) – these could potentially be present in undisturbed areas of primary grassland and wetland within the area, but are not expected to be present in cultivated lands.

During the dry season survey conducted in June 2022, mammal SCC including the Near-Threatened species grey rhebuck (*Pelea capreolus*) and serval (*Leptailurus serval*), and the nationally Endangered species southern mountain reedbuck (*Redunca fulvorufula fulvorufula*) were confirmed present within the area via direct observation and camera traps.

5.2.7 HERPETOFAUNA

Although the national screening tool indicates no sensitivities in terms of support of amphibian species; one amphibian, *Bufo gariepensis nubicolus*, a sub-species of Karoo Toad, is known to occur in the region and could potentially be present in the wetland habitat of the area up to altitudes of c. 3400 m (FrogMAP, 2022). No reptile SCC are anticipated to occur in the area.

5.2.8 INVERTEBRATES

The national screening tool flags potential presence of the range-restricted invertebrate species Badplaas Black Millipede (*Doratogonus furculifer*) which is listed as Endangered on the IUCN Red List (Rudolf et al., 2021). No other invertebrate SCC have been flagged in the area.

5.2.9 AQUATIC BIODIVERSITY

The proposed infrastructure footprint was assessed at desktop level using the National Web-based Environmental Screening Tool. According to the Tool, the Aquatic Biodiversity Theme for the study area is rated 'Very High Sensitivity' due to its situation within areas defined as FEPA quinary catchments, and the presence of 'Aquatic CBAs' and extensive areas of wetland habitat.

5.2.10 REGIONAL AQUATIC BIODIVERSITY

The study area falls within the upper reaches of the Inkomati Water Management Area, and the quaternary catchment X11D (Komati River) (**Figure 5-22**). The catchment is situated within the Inkomati Water Management Area (WMA). The mean annual runoff (MAR) for the X11D catchment is 88 mm (WR2012). This catchment receives 744 mm rainfall per year and experiences 1,413 mm of evaporation annually. Numerous non-perennial rivers drain in an easterly direction into the perennial Waalkraalloop river and in a westerly and southerly direction into the perennial Klein Komati River. The terrain of the proposed WEF lies at an elevation of approximately 1,630 m in the northern section, to 1,888 m in the southern section. (**Figure 5-16**)

The Komati River catchment is ecologically severely stressed due to the water demands imposed by Eskom and agriculture, with various abstraction weirs creating serious obstructions to fish migrations and return flows from irrigation affecting downstream water quality as a result of input of chemicals such as pesticides, fertilizers and salts (MPTA). Alien invasive fish species that have been introduced into the numerous dams are also present in the rivers (MPTA, 2015). Nevertheless, the ecological status of some sections of the upper Komati River catchment (within which the study area is situated) is still considered to be in a relatively good condition (MPTA, 2015).

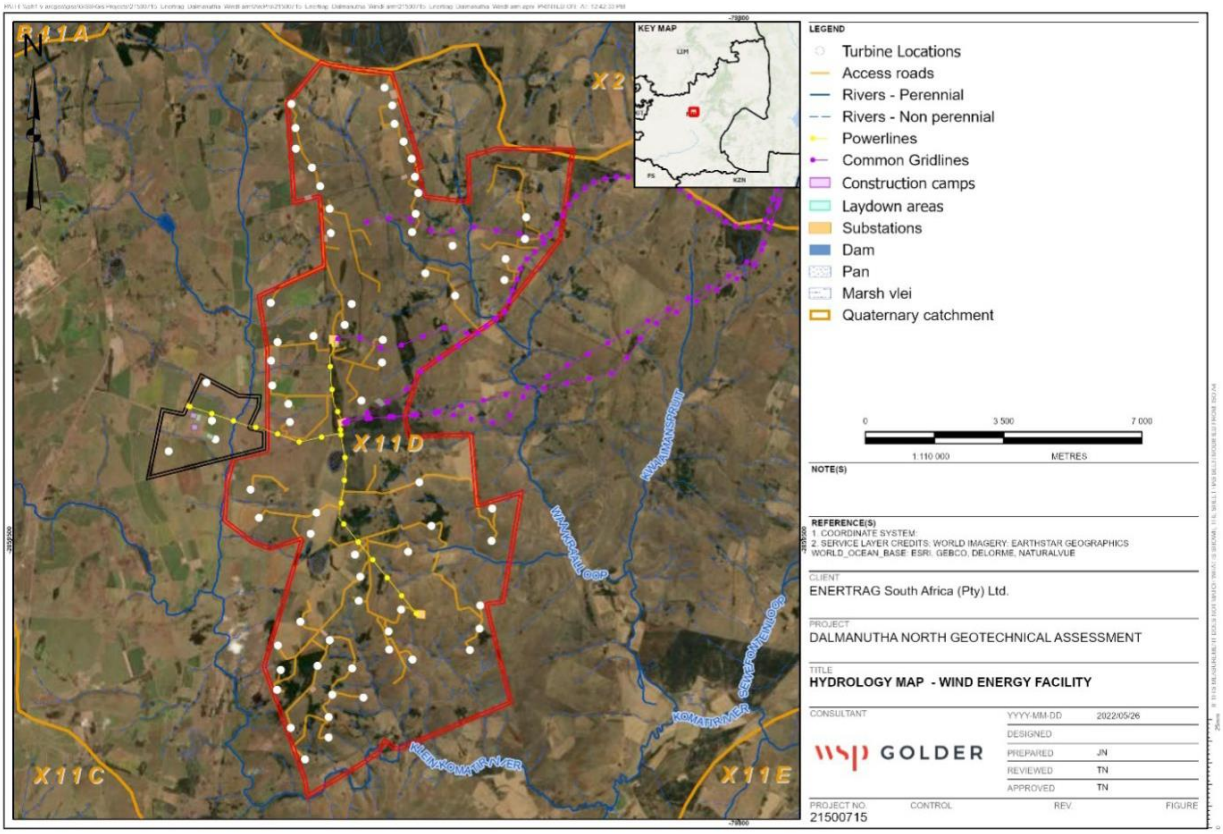


Figure 5-22: Hydrology map (pre-optimised 77 turbine layout)

5.2.11 AQUATIC CBA'S AND ESA'S

The area was compared to relevant available spatial biodiversity planning datasets, i.e., the Mpumalanga Biodiversity Sector Plan freshwater assessment (2017) (**Figure 5-23**), to assess the local and regional biodiversity context of the site.

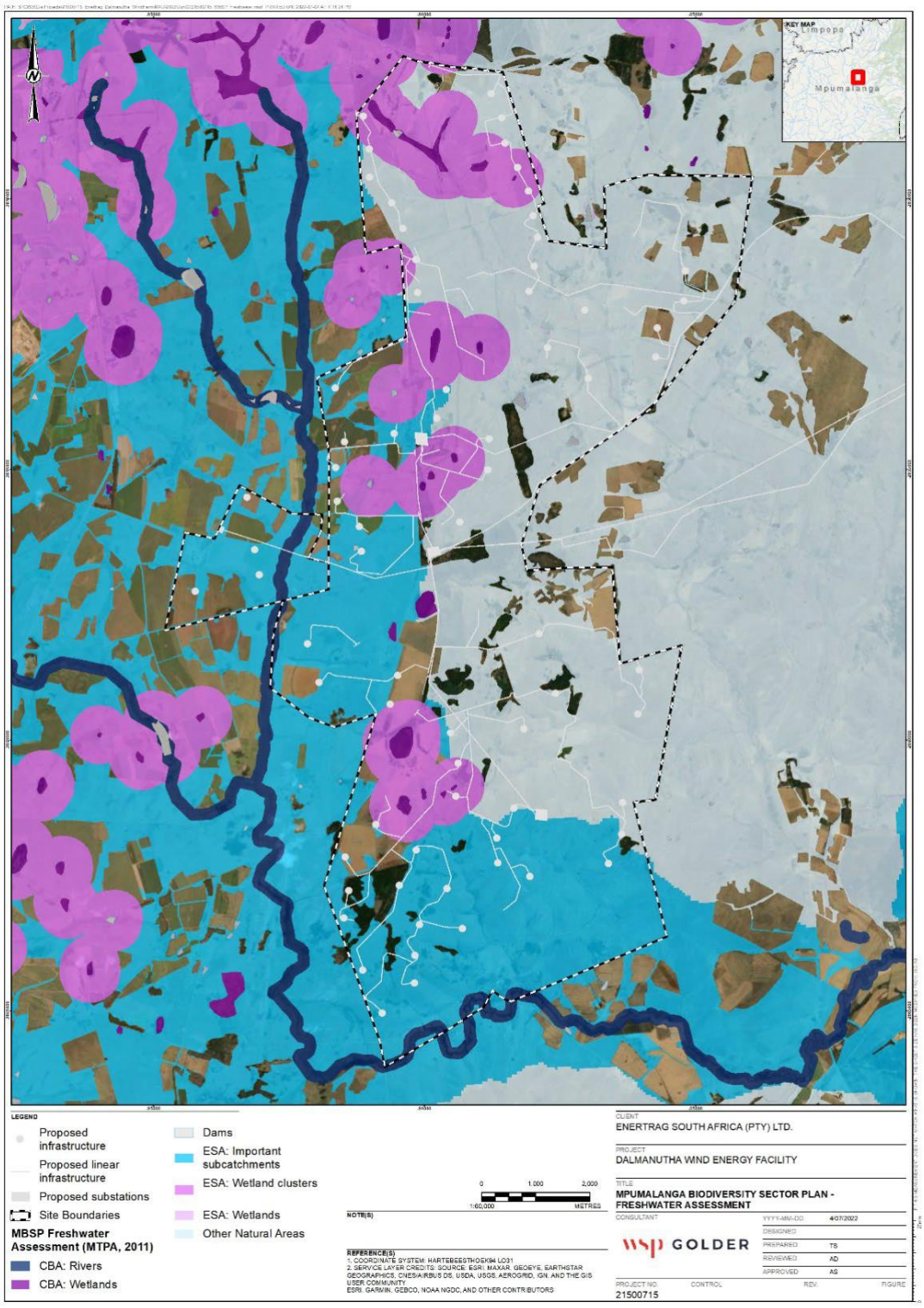


Figure 5-23: Study Area in relation to MBSP freshwater assessment (2011) (Pre-optimised 77 turbine layout)

Depression wetlands that occur throughout the area are mapped as CBAs, while the western extent of the study area, which coincides with the Klein-Komati River FEPA sub-catchment (**Figure 5-24**), is mapped as an ESA. The MBSP (2017) freshwater assessment spatial dataset also shows the majority of the eastern extent of the area mapped as 'other natural areas' as shown above in **Figure 5-23.**

Figure 5-24: Area in relation to FEPA sub-catchments (Pre-optimised 77 turbine layout)

5.2.12 NATIONAL WETLAND MAP

It is noted that the MPSBP freshwater assessment was based largely on remotely sensed satellite imagery, and thus some wetlands are not included (e.g. historic wetlands lost through drainage or ploughing), particularly hillslope seeps which can be difficult to distinguish from grasslands based on satellite imagery alone. Similarly, some features have been mapped as wetlands, which, once examined in the field, are not defined as wetlands. The most up-to-date spatial dataset at the national level is now considered to be the National Wetland Map 5 (NWMM5) (**Figure 5-25**), which displays a more accurate representation of actual wetland conditions on site; however hillslope seep wetlands are assumed to be under-represented, and are a focus point for the ongoing baseline data collection to inform the wetland delineation and classification of hydrogeomorphic units located within the area.

The South African National Wetland Map version 5 portrays the most up-to-date spatial data for the extent and types of estuarine and inland aquatic (freshwater) ecosystems of South Africa (Van Deventer et al., 2019). The proposed development footprint in relation to wetlands mapped as part of the National Wetland Map 5 project is illustrated on **Figure 5-25**. As mentioned, the extent of hillslope seep wetlands within the area are likely to be under-represented in this dataset, as such the key objective of the ongoing wetland baseline data gathering studies is defining the extent and condition of this (and other) wetland habitat in the area.

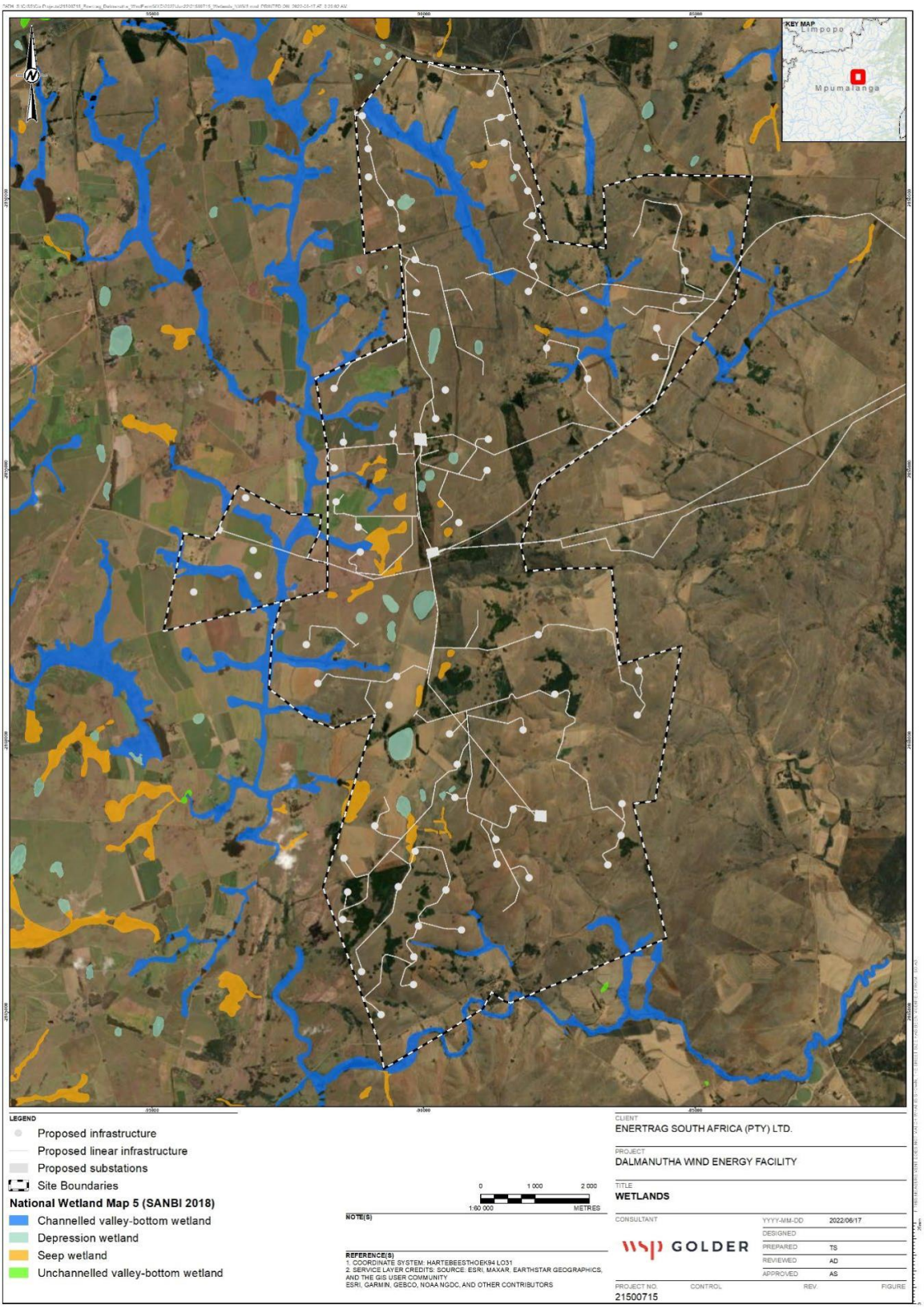


Figure 5-25: Study area in relation to NWM5 wetlands (Pre-optimised 77 turbine layout)

The delineation and classification of wetlands within the study area, that were surveyed during April and May 2022, is shown on **Figure 5-26**. The majority consist of relatively steep-profiled valley bottom wetlands with linked hillslope seepages in their upper catchment; with several depression wetlands situated in the central area of the Dalmanutha Complex.

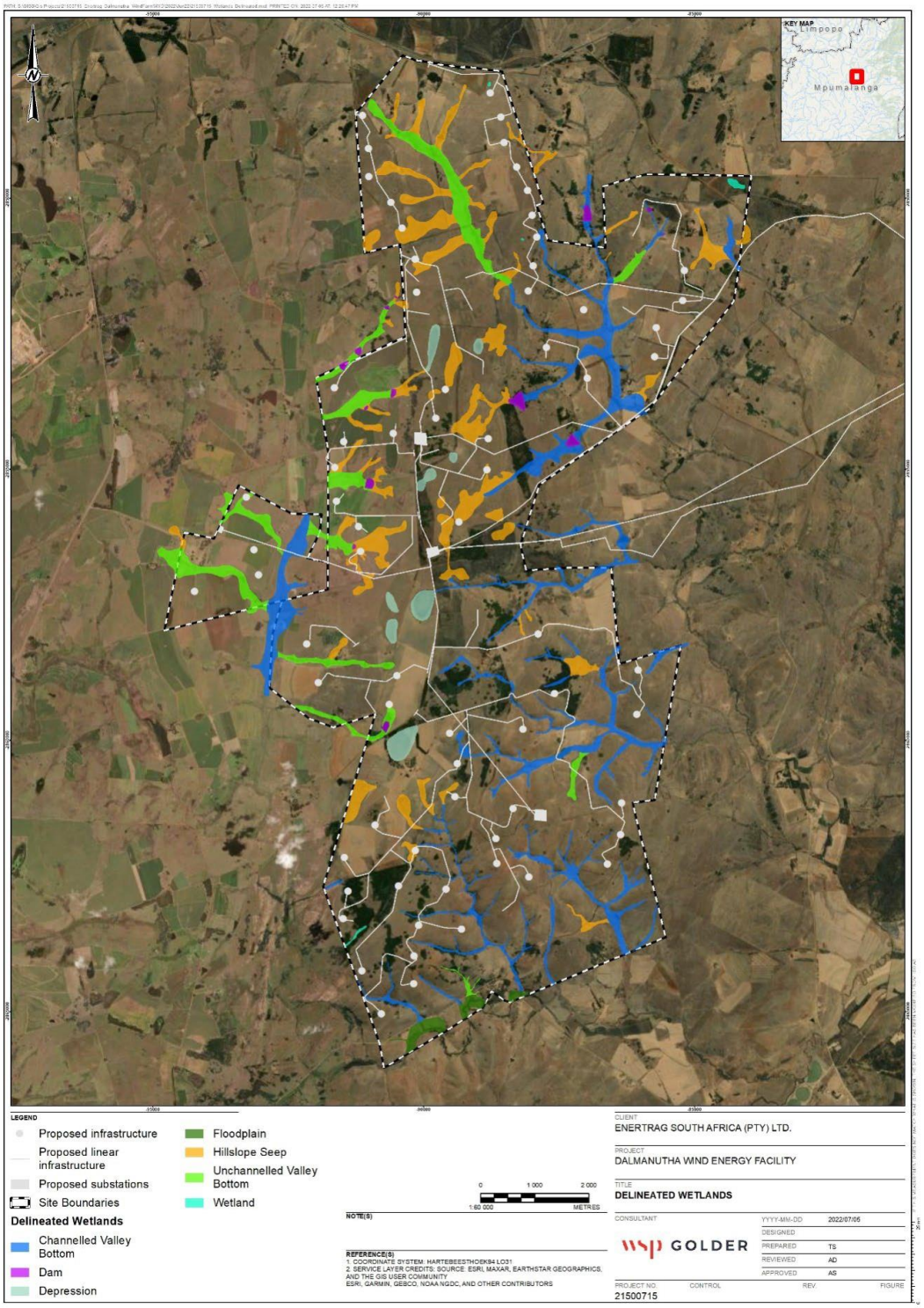


Figure 5-26: Baseline Wetland delineation and classification (Pre-optimised 77 turbine layout)

Baseline aquatic biomonitoring locations for the study area have been selected based on the proposed positioning of WEF infrastructure and access roads, and the future need to measure and monitor potential impacts on the various surface water systems that coincide and interact with the proposed infrastructure and activities. The baseline aquatic monitoring locations are shown on **Figure 5-27**. High-flow baseline surveys have already been completed, the results of which will be presented in the overall Aquatic Biodiversity Specialist Assessment that will be produced in support of the EIA.

Figure 5-27: Baseline Aquatic biomonitoring locations (Pre-optimised 77 turbine layout)

5.2.13 AQUATIC AND TERRESTRIAL SENSITIVITY

The findings of the site sensitivity verification exercise, based on the data gathering activities conducted to date (review and consolidation of available desktop data, scoping site visits, meetings with stakeholders), together with the anticipated reporting requirement as stipulated by the various protocols, are summarised in **Table 5-2**

Table 5-2: Site sensitivity verification results

THEME	SCREENING TOOL SENSITIVITY	ACTUAL SITE-BASED SENSITIVITY	MOTIVATION	SCOPED REPORT REQUIREMENT
Terrestrial biodiversity	Very high	Very high in primary grasslands, PES A/B wetlands. Low in secondary grasslands and modified habitats	Secondary grasslands and modified habitats cannot contribute to provincial conservation targets, which is the intention of CBAs. Only (unavoidable) impacts sustained in primary grasslands and high value wetlands can be considered to affect CBAs, and as such trigger potential offset/compensation requirements.	Terrestrial Biodiversity Specialist Assessment
Aquatic biodiversity	Very high	Very high	Presence of wetland CBA, wetland cluster ESA and Klein-Komati river CBA throughout Study Area.	Aquatic Biodiversity Specialist Assessments, covering wetland and riparian systems
Animal species	High	High in primary and secondary grasslands, wetlands	Evidence of presence of fauna SCC including Cape Mole Rat (G. capensis), grey rhebuck (Pcapreolus) and southern mountain reedbuck (R.fulvorufula fulvorufula) has been observed during first fauna survey.	Terrestrial Animal Species Specialist Assessment Report
Plant species	Medium	Medium in primary grasslands, PES A/B wetlands,	The presence and extent of primary grasslands and flora SCC to be confirmed during flora survey; however most sensitive areas are situated beyond Project footprint.	Terrestrial Plant Species Compliance Statement

5.2.14 AVIFAUNA

IMPORTANT BIRD AREAS

The proposed wind farm partially overlaps the Steenkampsberg Important Bird and Biodiversity Area (IBA - Marnewick et al, 2015) (**Figure 5-28**).

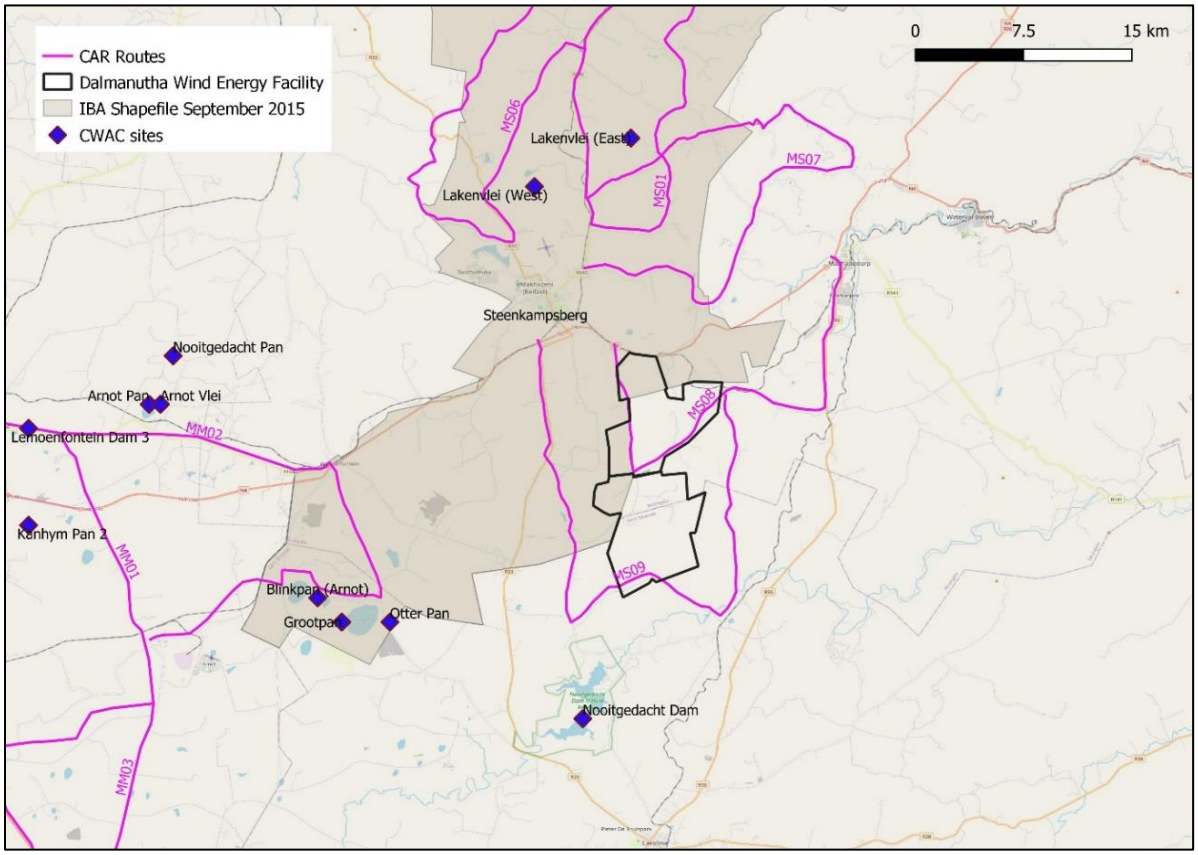


Figure 5-28: IBA in relation to project area (Wildskies, 2022)

This IBA consists primarily of rolling high-altitude (1 700–2 100 m a.s.l.) grassland interspersed with rocky outcrops. The area receives an average rainfall of 1 025 mm p.a. Annual average minimum and maximum temperatures are 5 °C and 20 °C respectively, with a range from -8 °C to 39 °C. Two wetland systems are particularly important in the Steenkampsberg area. The first is Lakensvleispruit, which lies 8 km north-east of Belfast. The second is Verloren Valei. Lying approximately 9 km north of Dullstroom. The proposed wind farm is not in close proximity to either of these systems (although smaller wetlands exist on site).

The core area of the IBA, especially along Steenkampsberg towards Dullstroom, is covered by Endangered Dullstroom Plateau Grassland. Globally threatened species found in this IBA include:

- Southern Bald Ibis *Geronticus calvus*,
- Wattled Crane *Grus carunculata*,
- Blue Crane,
- Grey Crowned Crane *Balearica regulorum*,
- White-winged Flufftail *Sarothrura ayresi*,
- Rudd's Lark *Heteromirafra ruddi*,
- Yellow-breasted Pipit,
- Denham's Bustard *Neotis denhami*,
- Blue Korhaan *Eupodotis caerulescens*
- Secretary bird *Sagittarius serpentarius*.

Regionally threatened species are:

- African Marsh Harrier *Circus ranivorus*,
- Black-rumped Buttonquail *Turnix nanus*,
- Striped Flufftail *Sarothrura affinis*,

— White-bellied Korhaan *Eupodotis senegalensis*,
— African Grass Owl *Tyto capensis*,
— Black Stork *Ciconia nigra*
— Lanner Falcon *Falco biarmicus*.

Restricted-range and biome-restricted species are

— Kurrichane Thrush *Turdus libonyanus*
— Buff-streaked Chat *Campicoloides bifasciatus*, both of which are common.
— Rudd's Lark,
— Yellow-breasted Pipit and Gurney's Sugarbird *Promerops gurneyi* are uncommon,
— White-bellied Sunbird *Cinnyris talatala* is fairly common.

BIRD HABITAT

Whilst much of the distribution and abundance of the bird species in the project site 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.

Figure 5-29 shows that the northern part of the site falls in the highest sensitivity categories in terms of avifauna (darker colours indicate higher risk) The site falls partially within an IBA (Marnewick et al, 2015). This IBA has already been described above.

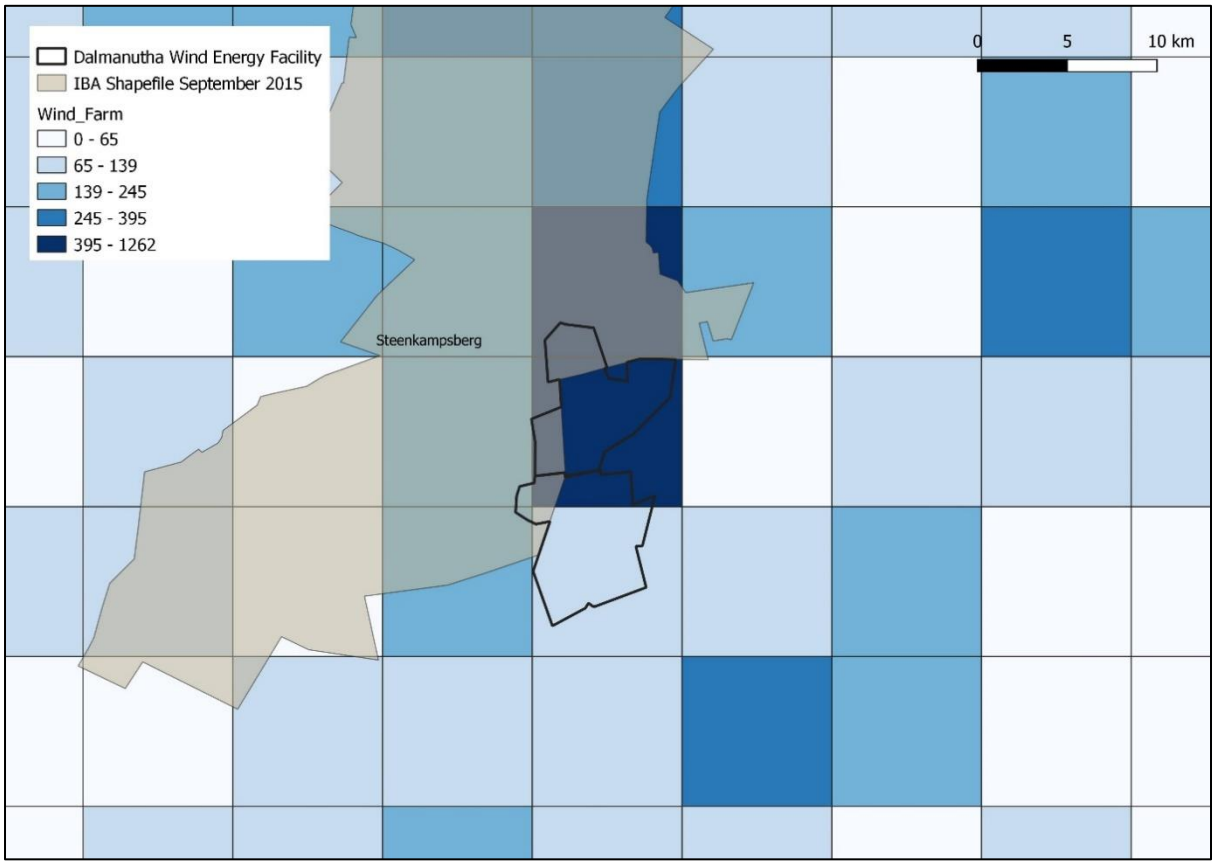


Figure 5-29: The position of the site relative to the Avian wind farm sensitivity map (Retief et al, 2011) & Important Bird Areas (Marnewick et al 2015).

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

GRASSLAND

The majority of the habitat in the project site comprises grassland. The grassland varies from dense stands of relatively high grass to areas of heavily grazed short grass. The priority 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 priority species which could occasionally use the natural grassland in the project site are the following:

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

DRAINAGE LINES AND WETLANDS

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

- Blue Crane
- Grey Crowned Crane
- African Grass Owl
- Marsh Owl

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

- African Marsh Harrier
- Montagu's 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 priority species which could potentially use the agricultural fields in the project site on a regular basis are the following:

- Blue Crane
- Grey Crowned Crane
- Common Buzzard
- Spotted Eagle-Owl
- Amur Falcon
- Lanner Falcon
- Southern Bald Ibis
- Black-winged Kite

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

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

DAMS

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

- African Fish Eagle

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

- 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 priority species which could potentially use the pans in the project site on a regular basis are the following:

- Common Buzzard
- Jackal Buzzard
- Blue Crane
- Black-chested Snake Eagle
- Long-crested Eagle
- Lanner Falcon

- Greater Flamingo
- Lesser Flamingo
- African Harrier-Hawk

The priority species which could occasionally use the pans in the project site are the following:

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

PRIORITY SPECIES

The first and second South African Bird Atlas Projects (SABAP1 – Harrison et al 1997; SABAP2 – www.sabap2.birdmap.africa) have recorded a combined total of approximately 297 bird species in the broader study area. These 297 species include a number of regionally Red Listed species. Many of these have been recorded by monitoring on site by the specialist as described below.

- Exceptions include: Verreaux's Eagle (low report rate of 0.9%)
- Lesser Flamingo *Phoeniconaias minor* (low report rate of 0.5%)
- Red-billed Oxpecker *Buphagus erythrorynchus* (low report rate of 1.5%)
- Yellow-breasted Pipit *Anthus chloris* (low report rate of 0.5%)
- European Roller *Coracias garrulus* (low report rate of 0.5%).

A total of 220 bird species have been recorded on site to date by the specialist in Seasons 1 to 4. Twelve of these species are regionally Red Listed as described below (2 Critically Endangered, 4 Endangered, 5 Vulnerable, 2 Near-threatened). One further species is regionally Least Concern but Globally Near-threatened – the Blue Korhaan. The most important findings on site to date are described below. The EIA phase study will elaborate on the detailed data on these species.

- **Wattled Crane *Grus carunculata*.** Wattled Crane is regionally Critically Endangered (Taylor et al, 2015). A single bird appears to be resident on site and has been recorded in all seasons, always in the same wetland. The wetland was surveyed for a nests, but no nest was identified. At a second wetland the farmer has advised that Wattled Crane normally breed, however this has not been confirmed. Lockwood (pers comm – Appendix 5) reports up to 4 cranes being seen together over the last 12 years. This species is anticipated to be highly susceptible to wind turbine collision. The spatial avoidance of risk through a buffer around the wetland is not anticipated to be sufficient, and the collision risk will also need to be mitigated.
- **White-backed Vulture *Gyps africanus*.** White-backed Vulture is regionally Critically Endangered (Taylor et al, 2015). Several records of small numbers (<5) of birds flying on site were made in Season 1 but not again in subsequent seasons. It is considered that the species is an occasional visitor to the area.
- **Cape Vulture *Gyps coprotheres***. Cape Vulture is regionally Endangered (Taylor et al, 2015). Multiple records of up to a maximum of 26 birds (in S4) flying on site have been made in all seasons. Birds have been found roosting at night on Eskom transmission lines on site. One of the landowners of the farm Leeuwkloof, has a vulture restaurant. He reports seeing up to 100 vultures on and around his property. This requires further investigation to confirm and would need to be closed if the project proceeds. The risk of attracting vultures onto site would be too high. During S4 we recorded between 54 and 70 vultures feeding on a dead calf on site. This species is considered to forage and roost regularly on the site.

- **Martial Eagle *Polemaetus bellicosus***. Martial Eagle is regionally Endangered (Taylor et al, 2015). Single records of single birds of this species were made in S1 and S2. It can be concluded that the proposed site falls marginally within the home range of a pair of this species and that the eagles forage occasionally on the site.
- **Grey Crowned Crane *Balearica regulorum***. Grey Crowned Crane is regionally Endangered (Taylor et al, 2015). A pair has been seen foraging at a pan at Leeukloof several times, and in May 2022 two adults were seen with a juvenile, indicating breeding probably took place in this area.
- **Black-rumped Buttonquail *Turnix nanus***. Black-rumped Buttonquail is regionally Endangered (Taylor et al, 2015). Several records of pairs of birds flushed from the side of the road in S1 and S4. Lockwood (pers comm) reports 'fairly regular' records in the area.
- **Denham's Bustard *Neotis denhami***. Denham's Bustard is regionally Vulnerable (Taylor et al, 2015). The species was recorded in low numbers in S1 and S2. This is probably an occasional visitor to the site.
- **White-bellied Bustard *Eupodotis senegalensis***. White-bellied Korhaan is regionally Vulnerable (Taylor et al, 2015). Several records of up to four birds together have been made in all seasons. Lockwood (pers comm) reports 'fairly regular' records in the area. A small population is probably more or less resident on site.
- **Secretary bird *Sagittarius serpentarius***. Secretarybird is regionally Vulnerable (Taylor et al, 2015). Single record of single birds have been made in all seasons, and one record of a pair in S3. A nest has been found several kilometres off site to the east. This will be investigated further when the grid connection corridor is assessed. Lockwood (pers comm) reports 'fairly regular' records in the area.
- **Southern Bald Ibis *Geronticus calvus***. Southern Bald Ibis is regionally Vulnerable (Taylor et al, 2015). Several records of small groups have been made across all seasons. During S4 a roost site was identified on site, where up to 10 birds roost at night. Lockwood (pers comm) reports that up to 18 birds and 5 active nests have been recorded here.
- **Lanner Falcon *Falco biarmicus***. Lanner Falcon is regionally Vulnerable (Taylor et al, 2015). Records of single birds have been in each season, including a pair in S3.
- **Blue Crane *Grus paradisea***. Blue Crane is regionally Near-threatened (Taylor et al, 2015). The species has been recorded in S3 and S4 on site. A group of three birds was recorded on site in S3. Landowners have anecdotally reported to our field team that Blue Cranes breed on site but this remains unconfirmed. Lockwood (pers comm) has several records for the species, including a nest site.

This is a high diversity of Red Listed species, collectively utilising almost the full component of micro habitats on site: wetlands; grasslands; dams; arable lands; pans. The only micro habitat not considered useful is the exotic tree stands (wattle and eucalyptus). Although not recorded the species, Lockwood (pers comm) reports three records over 12 years of Yellow-breasted Pipit (regionally Vulnerable).

Of particular concern is the Critically Endangered Wattled Crane & Endangered Cape Vulture. For both of these species, spatial avoidance of turbine collision risk is not considered sufficient. If the significance of the impact of turbine collision on these species is to be reduced to acceptable levels extensive and effective mitigation measures will need to be implemented for the full project lifespan. These will likely include Shutdown on Demand, on site vulture food management, and blade painting. Also of concern is the sheer diversity of regionally Red listed birds on this site. Whilst the risk to most of them can be managed in various ways, the 'whole risk' to avifauna is almost certainly greater than the 'sum of the parts'.

Table 5-3 lists all the species that have been identified on site and in which season they were noted. The following abbreviations and acronyms are used:

- NT = Near threatened
- VU = Vulnerable
- EN = Endangered
- CR = Critically Endangered
- LC = Least Concern

Table 5-3: Bird species data for the site

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Wattled Crane	*Grus carunculata*	CR, VU	1	1	1	1
White-backed Vulture	*Gyps africanus*	CR, CR	1			
Martial Eagle	*Polemaetus bellicosus*	EN, VU	1	1		1
Black-rumped Buttonquail	*Turnix nanus*	EN, LC	1			1
Cape Vulture	*Gyps coprotheres*	EN, EN	1	1	1	1
Grey Crowned Crane	*Balearica regulorum*	EN, EN			1	1
Southern Bald Ibis	*Geronticus calvus*	VU, VU, SLS	1	1	1	1
Secretary bird	*Sagittarius serpentarius*	VU, VU	1	1	1	1
Crowned Eagle	*Stephanoaetus coronatus*	VU, NT				1
Denham's Bustard	*Neotis denhami*	VU, NT	1	1		
Lanner Falcon	*Falco biarmicus*	VU, LC	1	1	1	1
White-bellied Korhaan (Bustard)	*Eupodotis senegalensis*	VU, LC	1	1	1	
Blue Crane	*Grus paradisea*	NT, VU			1	1
Greater Flamingo	*Phoenicopterus roseus*	NT, LC				1
Blue Korhaan	*Eupodotis caerulescens*	LC, NT, SLS				1
Cape Grassbird	*Sphenoeacus afer*	NE	1	1	1	1
Cape Weaver	*Ploceus capensis*	NE	1	1	1	1
Cape White-eye	*Zosterops virens*	NE	1	1	1	
Cloud Cisticola	*Cisticola textrix*	NE			1	1
Fiscal Flycatcher	*Melaenornis silens*	NE	1	1	1	1
Jackal Buzzard	*Buteo rufofuscus*	NE	1	1	1	1
Southern Double-collared Sunbird	*Cinnyris chalybeus*	NE		1		
Buff-streaked Chat	*Campicoloides bifasciatus*	SLS	1	1	1	1
Drakensberg Prinia	*Prinia hypoxantha*	SLS	1	1	1	1
Eastern Long-billed Lark	*Certhilauda semitorquata*	SLS	1	1	1	1

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Greater Double-collared Sunbird	*Cinnyris afer*	SLS				1
Pied Starling	*Lamprotornis bicolor*	SLS	1	1	1	1
South African Cliff Swallow	*Petrochelidon spilodera*	BSLS	1	1	1	1
African (Purple) Swamphen	*Porphyrio madagascariensis*		1	1	1	1
African Black Duck	*Anas sparsa*					1
African Black Swift	*Apus barbatus*		1		1	1
African Darter	*Anhinga rufa*		1			1
African Dusky Flycatcher	*Muscicapa adusta*		1			
African Firefinch	*Lagonosticta rubricata*		1			
African Fish Eagle	*Haliaeetus vocifer*		1	1	1	1
African Goshawk	*Accipiter tachiro*		1	1	1	
African Harrier-Hawk	*Polyboroides typus*		1	1	1	1
African Hoopoe	*Upupa africana*		1	1	1	1
African Olive Pigeon	*Columba arquatrix*				1	
African Palm Swift	*Cypsiurus parvus*				1	1
African Paradise Flycatcher	*Terpsiphone viridis*				1	1
African Pipit	*Anthus cinnamomeus*		1	1	1	1
African Quail-finch	*Ortygospiza atricollis*		1	1	1	
African Rail	*Rallus caerulescens*		1		1	1
African Reed Warbler	*Acrocephalus baeticatus*					1
African Sacred Ibis	*Threskiornis aethiopicus*		1	1	1	1
African Snipe	*Gallinago nigripennis*		1	1	1	1
African Spoonbill	*Platalea alba*				1	
African Stonechat	*Saxicola torquatus*		1	1	1	1
African Wattled Lapwing	*Vanellus senegallus*		1		1	1
Alpine Swift	*Tachymarptis melba*		1		1	1

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Amethyst Sunbird	*Chalcomitra amethystina*				1	1
Amur Falcon	*Falco amurensis*					1
Ant-eating Chat	*Myrmecocichla formicivora*		1	1	1	1
Baillon's Crake	*Porzana pusilla*		1			
Banded Martin	*Riparia cincta*		1			1
Barn Swallow	*Hirundo rustica*		1		1	1
Bar-throated Apalis	*Apalis thoracica*		1	1	1	1
Black Crake	*Amaurornis flavirostra*		1	1	1	1
Black Cuckoo	*Cuculus clamosus*				1	
Black Saw-wing	*Psalidoprocne pristoptera*					1
Black Sparrowhawk	*Accipiter melanoleucus*		1	1	1	
Black-chested Prinia	*Prinia flavicans*					1
Black-chested Snake Eagle	*Circaetus pectoralis*		1	1	1	1
Black-collared Barbet	*Lybius torquatus*		1	1	1	1
Black-headed Heron	*Ardea melanocephala*		1	1	1	1
Black-headed Oriole	*Oriolus larvatus*		1	1	1	1
Blacksmith Lapwing	*Vanellus armatus*		1	1	1	1
Black-throated Canary	*Crithagra atrogularis*				1	1
Black-winged Kite	*Elanus caeruleus*		1	1	1	1
Black-winged Lapwing	*Vanellus melanopterus*		1	1	1	1
Black-winged Stilt	*Himantopus himantopus*			1		
Blue Quail	*Excalfactoria adansonii*					1
Bokmakierie	*Telophorus zeylonus*		1	1	1	1
Brimstone Canary	*Crithagra sulphurata*			1		
Brown Snake Eagle	*Circaetus cinereus*		1	1	1	1
Brown-backed Honeybird	*Prodotiscus regulus*		1	1	1	
Brown-throated Martin	*Riparia paludicola*		1		1	1

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Buffy Pipit	*Anthus vaalensis*		1	1	1	1
Cape Bunting	*Emberiza capensis*		1	1		1
Cape Canary	*Serinus canicollis*		1	1	1	1
Cape Crow	*Corvus capensis*		1	1	1	1
Cape Longclaw	*Macronyx capensis*		1	1	1	1
Cape Robin-chat	*Cossypha caffra*		1	1	1	
Cape Sparrow	*Passer melanurus*		1	1	1	
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*		1	1	1	1
Cape Wagtail	*Motacilla capensis*		1	1	1	1
Capped Wheatear	*Oenanthe pileata*		1	1	1	
Cardinal Woodpecker	*Dendropicos fuscescens*				1	
Chinspot Batis	*Batis molitor*					1
Cinnamon-breasted Bunting	*Emberiza tahapisi*					1
Common (Kurrichane) Buttonquail	*Turnix sylvaticus*		1		1	
Common (Steppe) Buzzard	*Buteo buteo*				1	1
Common House Martin	*Delichon urbicum*					1
Common Moorhen	*Gallinula chloropus*		1	1	1	1
Common Myna	*Acridotheres tristis*		1	1		1
Common Quail	*Coturnix coturnix*		1	1	1	
Common Sandpiper	*Actitis hypoleucos*			1	1	
Common Square-tailed Drongo	*Dicrurus ludwigii*					1
Common Swift	*Apus apus*				1	
Common Waxbill	*Estrilda astrild*		1	1	1	1
Crested Barbet	*Trachyphonus vaillantii*			1	1	1
Crowned Lapwing	*Vanellus coronatus*		1	1	1	1

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Dark-capped (African) Yellow Warbler	*Iduna natalensis*					1
Dark-capped Bulbul	*Pycnonotus tricolor*		1	1	1	1
Diederik Cuckoo	*Chrysococcyx caprius*				1	1
Eastern Clapper Lark	*Mirafra fasciolata*		1	1	1	1
Egyptian Goose	*Alopochen aegyptiaca*		1	1	1	1
European Bee-eater	*Merops apiaster*				1	
European Honey Buzzard	*Pernis apivorus*					1
Familiar Chat	*Oenathe familiaris*			1		
Fan-tailed Widowbird	*Euplectes axillaris*				1	1
Fiery-necked Nightjar	*Caprimulgus pectoralis*		1			1
Fork-tailed Drongo	*Dicrurus adsimilis*		1	1	1	
Giant Kingfisher	*Megaceryle maxima*			1	1	1
Glossy Ibis	*Plegadis falcinellus*			1	1	1
Golden-breasted Bunting	*Emberiza flaviventris*				1	1
Goliath Heron	*Ardea goliath*					1
Great Egret	*Ardea alba*		1		1	
Great Sparrow	*Passer motitensis*					1
Greater Honeyguide	*Indicator indicator*		1	1	1	
Greater Kestrel	*Falco rupicoloides*			1		
Greater Striped Swallow	*Cecropis cucullata*		1		1	1
Grey Heron	*Ardea cinerea*		1	1	1	1
Groundscraper Thrush	*Turdus litsitsirupa*		1	1		1
Hadeda (Hadada) Ibis	*Bostrychia hagedash*		1	1	1	1
Hamerkop	*Scopus umbretta*		1	1	1	1
Harlequin Quail	*Coturnix delegorguei*					1
Helmeted Guineafowl	*Numida meleagris*		1	1	1	1

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Horus Swift	*Apus horus*					1
House Sparrow	*Passer domesticus*		1	1	1	1
Karoo Scrub Robin	*Cercotrichas coryphoeus*					1
Laughing Dove	*Spilopelia senegalensis*		1	1		1
Lazy Cisticola	*Cisticola aberrans*		1		1	1
Lesser Striped Swallow	*Cecropis abyssinica*				1	1
Lesser Swamp Warbler	*Acrocephalus gracilirostris*		1	1	1	1
Levaillant's Cisticola	*Cisticola tinniens*		1	1	1	1
Little Egret	*Egretta garzetta*			1	1	
Little Grebe	*Tachybaptus ruficollis*		1	1	1	1
Little Rush Warbler	*Bradypterus baboecala*		1		1	1
Little Swift	*Apus affinis*		1	1	1	1
Long-crested Eagle	*Lophaetus occipitalis*				1	1
Long-tailed Widowbird	*Euplectes progne*		1	1	1	1
Malachite Kingfisher	*Corythornis cristatus*		1			1
Malachite Sunbird	*Nectarinia famosa*		1	1	1	1
Marsh Owl	*Asio capensis*		1			1
Mocking Cliff Chat	*Thamnolaea cinnamomeiventris*					1
Mountain Wheatear	*Myrmecocichla monticola*		1	1	1	1
Namaqua Dove	*Oena capensis*		1		1	
Natal Spurfowl	*Pternistis natalensis*		1	1	1	1
Neddicky	*Cisticola fulvicapilla*		1	1	1	1
Nicholson's Pipit	*Anthus similis*		1	1	1	
Olive Thrush	*Turdus olivaceus*		1		1	1
Olive Woodpecker	*Dendropicos griseocephalus*					1
Pale-crowned Cisticola	*Cisticola cinnamomeus*				1	1

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Pearl-breasted Swallow	*Hirundo dimidiata*			1		
Peregrine Falcon	*Falco peregrinus*			1	1	
Pied Crow	*Corvus albus*			1	1	1
Pied Kingfisher	*Ceryle rudis*					1
Pin-tailed Whydah	*Vidua macroura*		1	1	1	1
Plain-backed Pipit	*Anthus leucophrys*			1		
Purple Heron	*Ardea purpurea*		1		1	1
Red-billed Oxpecker	*Buphagus erythrorynchus*				1	1
Red-billed Quelea	*Quelea quelea*		1	1	1	1
Red-billed Teal	*Anas erythrorhyncha*		1			1
Red-capped Lark	*Calandrella cinerea*		1	1	1	1
Red-chested Cuckoo	*Cuculus solitarius*				1	
Red-chested Flufftail	*Sarothrura rufa*		1	1	1	1
Red-collared Widowbird	*Euplectes ardens*		1		1	1
Red-eyed Dove	*Streptopelia semitorquata*		1	1	1	1
Red-faced Mousebird	*Urocolius indicus*		1			
Red-knobbed coot	*Fulica cristata*		1	1	1	1
Red-throated Wryneck	*Jynx ruficollis*		1		1	1
Red-winged Francolin	*Scleroptila levaillantii*		1	1	1	1
Red-winged Starling	*Onychognathus morio*		1	1	1	1
Reed Cormorant	*Microcarbo africanus*		1	1	1	1
Rock Dove	*Columba livia*		1	1		
Rock Kestrel	*Falco rupicolus*			1	1	1
Rock Martin	*Ptyonoprogne fuligula*		1	1		1
Rufous-naped Lark	*Mirafra africana*		1	1		1
Sedge Warbler	*Acrocephalus schoenobaenus*					1
South African Shelduck	*Tadorna cana*		1	1		

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
Southern (Common) Fiscal	*Lanius collaris*		1	1	1	1
Southern Black flycatcher	*Melaenornis pammelaina*					1
Southern Boubou	*Laniarius ferrugineus*		1	1	1	1
Southern Grey-headed Sparrow	*Passer diffusus*		1	1	1	1
Southern Masked Weaver	*Ploceus velatus*		1	1	1	1
Southern Red Bishop	*Euplectes orix*		1	1	1	1
Southern Yellow White-eye	*Zosterops senegalensis*					1
Speckled Mousebird	*Colius striatus*		1	1	1	1
Speckled Pigeon	*Columba guinea*		1	1	1	1
Spike-heeled Lark	*Chersomanes albofasciata*		1	1	1	1
Spotted Eagle-Owl	*Bubo africanus*		1			1
Spotted flycatcher	*Muscicapa striata*					1
Spotted Thick-knee	*Burhinus capensis*				1	1
Spur-winged Goose	*Plectropterus gambensis*		1	1	1	1
Streaky-headed Seedeater	*Crithagra gularis*		1	1	1	1
Swainson's Spurfowl	*Pternistis swainsonii*		1	1	1	1
Temminck's Courser	*Cursorius temminckii*		1		1	
Three-banded Plover	*Charadrius tricollaris*		1	1		1
Wailing Cisticola	*Cisticola lais*			1	1	1
Western Cattle Egret	*Bubulcus ibis*		1		1	1
Whiskered Tern	*Chlidonias hybrida*		1		1	1
White Stork	*Ciconia ciconia*					1
White-breasted Cormorant	*Phalacrocorax lucidus*			1	1	
White-browed Sparrow-Weaver	*Plocepasser mahali*					1
White-fronted Bee-eater	*Merops bullockoides*		1	1	1	1
White-rumped Swift	*Apus caffer*		1	1	1	1

COMMON NAME	*TAXONOMIC NAME*	STATUS (REGIONAL, GLOBAL, ENDEMIC)	S1	S2	S3	S4
White-throated Swallow	*Hirundo albigularis*		1		1	1
White-winged Tern	*Chlidonias leucopterus*					1
White-winged Widowbird	*Euplectes albonotatus*				1	1
Willow Warbler	*Phylloscopus trochilus*				1	1
Wing-snapping Cisticola	*Cisticola ayresii*		1	1	1	1
Wood Sandpiper	*Tringa glareola*					1
Yellow-billed (Intermediate) Egret	*Ardea intermedia*			1	1	1
Yellow-billed Duck	*Anas undulata*		1	1	1	1
Yellow-billed Kite	*Milvus aegyptius*					1
Yellow-crowned Bishop	*Euplectes afer*			1		1
Yellow-fronted Canary	*Crithagra mozambica*		1	1	1	1
Zitting Cisticola	*Cisticola juncidis*		1	1	1	1

5.2.15 BATS

Based on the desktop study conducted, **Table 5-4** shows that there are 13 species of bats from four families that could potentially occur in the area. No conservation areas were found within 100km of the proposed WEF site.

Table 5-4: Potential bat species in the area based on desktop study

FAMILY	LATIN NAME	COMMON NAME
Vespertilionidae	*Glauconycteris variegata*	Variegated butterfly bat
Vespertilionidae	*Laephotis botswanae*	Botswana long-eared bat
Vespertilionidae	*Laephotis capensis*	Cape serotine
Vespertilionidae	*Myotis bocagii*	Rufous myotis
Vespertilionidae	*Myotis tricolor*	Temminck's myotis
Vespertilionidae	*Myotis welwitchii*	Welwitsch's myotis
Vespertilionidae	*Pipistellus hesperidus*	Dusky pipistelle
Vespertilionidae	*Pipistellus rusticus*	Rusty pipistelle

Vespertilionidae	*Scotophilus dinganii*	Yellow-bellied house bat
Miniopteridae	*Miniopterus natalensis*	Natal long-fingered bat
Molossidae	*Tadarida aegyptica*	Egyptian free-tailed bat
Molossidae	*Mops midas*	Midas free-tailed bat
Emballonuridae	*Taphozous mauritianus*	Mauritian tomb bat

There are several bat species in the vicinity of the site that occur commonly in the area. Some of these species are of special importance based on their likelihood of being impacted by the proposed project, due to high abundances and certain behavioural traits. They have also been dominating records of fatalities at wind energy facilities in South Africa. The relevant species are discussed below.

TADARIDA AEGYPTIACA

The Egyptian free-tailed bat, *Tadarida aegyptiaca*, is a Least Concern species (SANBI Red List 2016) as it has a wide distribution and high abundance throughout South Africa and is part of the free-tailed bat family (Molossidae). It occurs from the Western Cape of South Africa, north through to Namibia and southern Angola; and through Zimbabwe to central and northern Mozambique (Monadjem et al. 2020). This species is protected by national legislation in South Africa (ACR 2020).

Egyptian free-tailed bats roost communally in small (dozens) to medium-sized (hundreds) groups in caves, rock crevices, under exfoliating rocks, in hollow trees and behind the bark of dead trees. It has also adapted to roosting in buildings, in the roofs of houses in particular (Monadjem et al. 2020). Thus, man-made structures and large trees on the site would be important roosts for this species.

Tadarida aegyptiaca forages over a wide range of habitats, flying above the vegetation canopy. It appears that the vegetation has little influence on foraging behaviour as the species forages over desert, semi-arid scrub, savannah, grassland and agricultural lands. Its presence is strongly associated with permanent water bodies due to concentrated densities of insect prey (Monadjem et al. 2020).

After a gestation of four months, a single pup is born, usually in November or December, when females give birth once a year. In males, spermatogenesis occurs from February to July and mating occurs in August. Maternity colonies are apparently established by females in November.

The Egyptian free-tailed bat is considered to have a high risk of fatality on wind energy facilities due to turbine collisions (MacEwan et al. 2020). Due to the high abundance and widespread distribution of this species, high mortality rates due to wind turbines would be a cause for concern as these species have more significant ecological roles than the rarer bat species and are currently displaying moderate to high numbers of mortalities at nearby operating wind farms.

LAEPHOTIS CAPENSIS

Laephotis capensis is commonly called the Cape serotine (formerly *Neoromicia capensis*) and has a conservation status of Least Concern (SANBI Red List 2016) as it is found in high numbers and is widespread over much of Sub-Saharan Africa. High mortality rates of this species due to wind turbines would be a cause for concern as precisely because of its abundance. As such, it has a more significant role to play within local ecosystems than the rarer bat species, since they can consume larger numbers of nocturnal insects.

The Cape serotine roosts individually or in small groups of two to three bats in a variety of shelters, such as under the bark of trees, at the base of aloe leaves, and under the roofs of houses. They will use most man-made structures as day roosts which can be found throughout the site and surrounding areas (Monadjem et al. 2020). They do not undertake migrations and thus are considered residents of the site.

Mating takes place from the end of March until the beginning of April. Spermatozoa are stored in the uterine horns of the female from April until August, when ovulation and fertilisation occur. They give birth to twins

during late October and November, but single pups, triplets and quadruplets have also been recorded (van der Merwe 1994 and Lynch 1989).

They are tolerant of a wide range of environmental conditions as they survive and prosper across arid and semi-arid areas to montane grasslands, forests, and savannas; indicating that they may occupy several habitat types across the site and are amenable towards habitat changes. They are however clutter-edge foragers, meaning they prefer to hunt on the edge of vegetation clutter, but can occasionally forage in open spaces. They are thought to have a low to high likelihood of fatality due to wind turbines (MacEwan et al. 2020) and are currently displaying moderate to high numbers of mortalities at operational wind farms in South Africa. This species being the most common species across the site and is most likely breeding in the area.

MINIOPTERUS NATALENSIS

Miniopterus natalensis, commonly referred to as the Natal long-fingered bat, occurs widely across the country but mostly within the southern and eastern regions, and is listed as Least Concern (Monadjem et al. 2020). This bat is a cave-dependent species and identification of suitable roosting sites may be more important in determining its presence in an area than the presence of surrounding vegetation. It occurs in large numbers when roosting in caves with approximately 260 000 bats observed making seasonal use of the De Hoop Guano Cave in the Western Cape, South Africa. Culverts and mines have also been observed as roosting sites for either single bats or small colonies. Separate roosting sites are used for winter hibernation activities and summer maternity behaviour, with the winter hibernacula generally occurring at higher altitudes in more temperate areas and the summer hibernacula occurring at lower altitudes in warmer areas of the country (Monadjem et al. 2020).

Mating and fertilisation usually occur during March and April and is followed by a period of delayed implantation until July/August. Birth of a single pup usually occurs between October and December as the females congregate at maternity roosts (Monadjem et al. 2020 & van de Merwe 1979).

The Natal long-fingered bat undertakes short migratory journeys between hibernaculum and maternity roosts. Due to this migratory behaviour, they are considered to be at high risk of fatality from wind turbines if a wind farm is placed within a migratory path (MacEwan et al. 2020). The mass movement of bats during migratory periods could result in mass casualties if wind turbines are positioned over a mass migratory route and such turbines are not effectively mitigated. Very little is known about the migratory behaviour and paths of M. natalensis in South Africa with migration distances exceeding 150 kilometres. If the site is located within a migratory path, the bat detection systems should detect higher numbers and activity of the Natal long-fingered bat in spring and autumn; this will be examined over the course of the 12-month monitoring survey.

A study by Vincent et al. (2011) on the activity and foraging habitats of Miniopteridae found that the individual home ranges of lactating females were significantly larger than that of pregnant females. It was also found that the bats predominately made use of urban areas (54%) followed by open areas (19.8%), woodlands (15.5%) orchards and parks (9.1%) and water bodies (1.5%) when selecting habitats. Foraging areas were also investigated with the majority again occurring in urban areas (46%), however a lot of foraging also occurred in woodland areas (22%), crop and vineyard areas (8%), pastures, meadows and scrubland (4%) and water bodies (4%).

MacEwan et al. (2020) advise that *M. natalensis* faces a medium to high risk of fatality due to wind turbines. This evaluation was based on broad ecological features and excluded migratory information. The species is currently displaying low to moderate numbers of mortalities at operational wind farms in South Africa.

A total of nine bat species were recorded during the site survey period, all of Least Concern based on the IUCN Red Data list and are not endemic to South Africa, not (Convention on International Trade in Endangered Species of Wild Fauna and Flora) CITES listed and not (Threatened or Protected Species) ToPS species. The species are from four different families of varying risk of impact with turbines. The dominant species observed in the area was the Cape Serotine which has a large influence on activity patterns observed across the site.

Table 5-5 indicates the species of bat which have been confirmed to occur on site. For each species, the risk of impact by wind energy infrastructure was assigned by MacEwan et al. (2020) based on their distributions, altitudes at which they fly, and foraging ecology.

Table 5-5: List of bat species that has been detected on the area including their conservation status, foraging habits and risk of impact with wind turbines

SPECIES	COMMON NAME	CONSERVATION STATUS (SANBI & EWT, 2016)	POSSIBLE FORAGING HABITAT UTILISED ON SITE	RISK OF IMPACT (MACEWAN ET AL. 2020 FOR WIND)
Family: Vespertilionidae				
Laephotis capensis	Cape serotine	Least concern	Clutter-edge	Low
Scotophilus dinganii	Yellow-bellied house bat	Least concern	Clutter-edge	Medium to high
Myotis bocagii	Rufous myotis	Least concern	Clutter-edge & Clutter	Medium to high
Pipistrellus rusticus	Rusty pipistrelle	Least concern	Clutter-edge	Medium to high
Pipistrellus hesperidus	Dusky pipistrelle	Least concern	Clutter-edge	Medium to high
Family: Miniopteridae				
Miniopterus natalensis	Natal long-fingered bat	Least concern	Clutter-edge	High
Family: Emballonuridae				
Taphozous mauritianus	Mauritian tomb bat	Least concern	Open-air	High
Family: Molossidae				
Mops midas	Midas free-tailed bat	Least concern	Open-air	High
Tadarida aegyptiaca	Egyptian free-tailed bat	Least concern	Open-air	High

5.3 SOCIAL ENVIRONMENT

5.3.1 LAND USE

Lamb and mutton farming dominate the land-use character in the western part of the study area, as well as dairy and maize farming. Timber is a leading industry in the district, therefore exotic plantations are located throughout the study area, but are more concentrated in areas towards the north, north-east and southeast south-east of the site.

Mining / quarrying Mining/quarrying areas (coal and black granite are other leading industries in the study area), have been delineated towards the west, north-west, north-east and south of the proposed Dalmanutha WEF. 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 5-30**).

SURROUNDING AREAS

The study area is located approximately 7km south-east of the town of Belfast. 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.

The towns of Belfast (north of the site, with a population of 200.7 people per km^2), Emgwenya or Waterval Boven and Machadodorp (north-east of the site, with Waterval Boven having 153.0 people per km^2 and Machadadorp having 152.1 people per km^2), and Carolina (south of the site, having 1,150 people per km^2) lie within the study area. The town of Carolina therefore, therefore, accounts for the highest population concentration within the region.

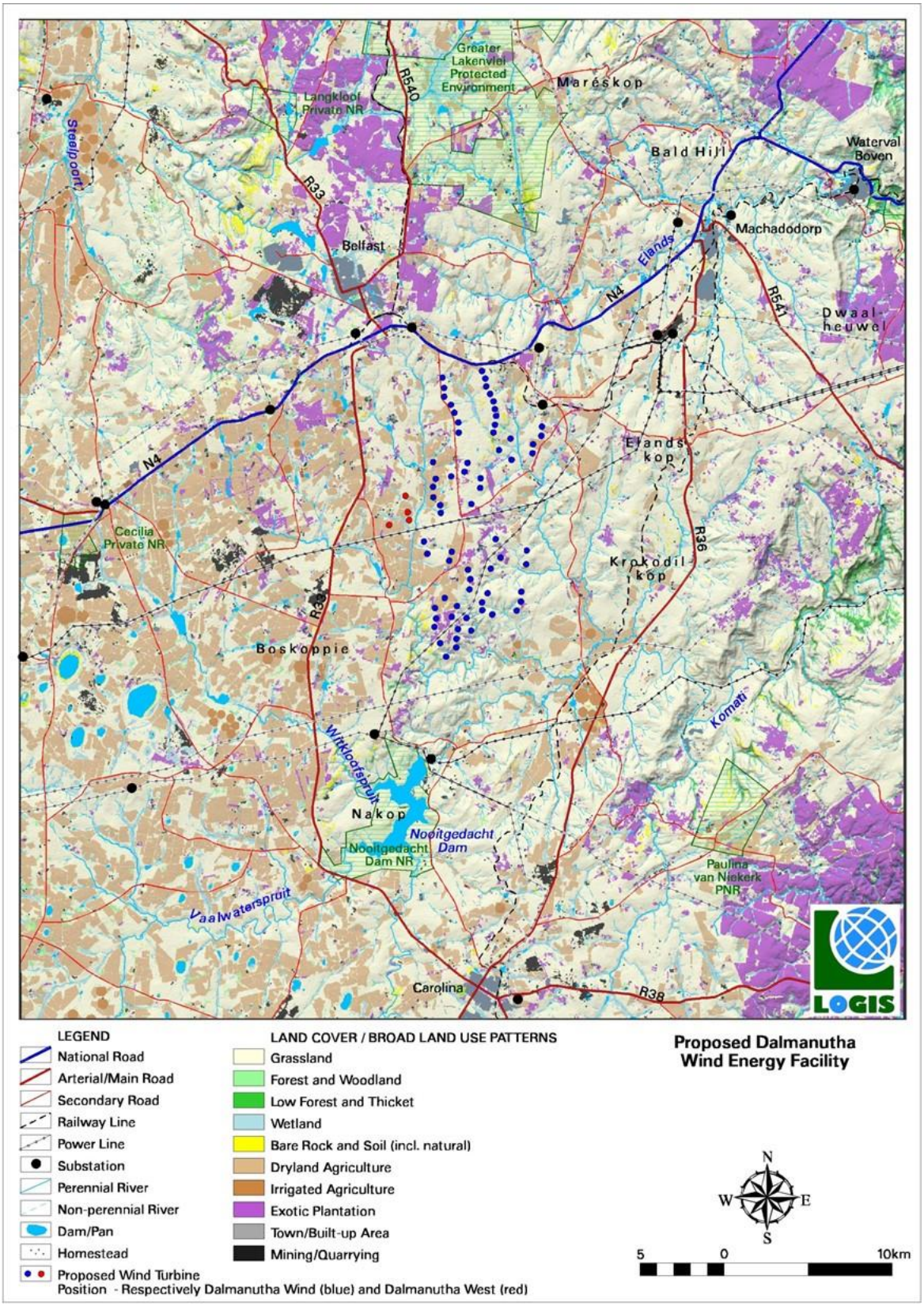


Figure 5-30: Broad land cover classification (LoGIS 2022) (Pre-optimised 77 turbine layout)

5.3.2 NOISE CLIMATE

The existing noise climate surrounding the Dalmanutha WEF is predominantly rural with very low baseline noise levels anticipated. Noise sources may include birds, insects, livestock, and the activities of resident farmers. Vehicular influences may include traffic on local roads and the nearby N4 National Road and R33 Regional Road.

Sensitive receptors are identified as areas that may be impacted negatively due to noise associated with the proposed WEF. Examples of receptors include, but are not limited to, schools, shopping centres, hospitals, office blocks and residential areas. Being such a remotely located site, dominant receptors in the area surrounding the site include small farmsteads and farmhouses. The specific sensitive receptors (farmhouses) considered in this study are presented in **Figure 5-31**.

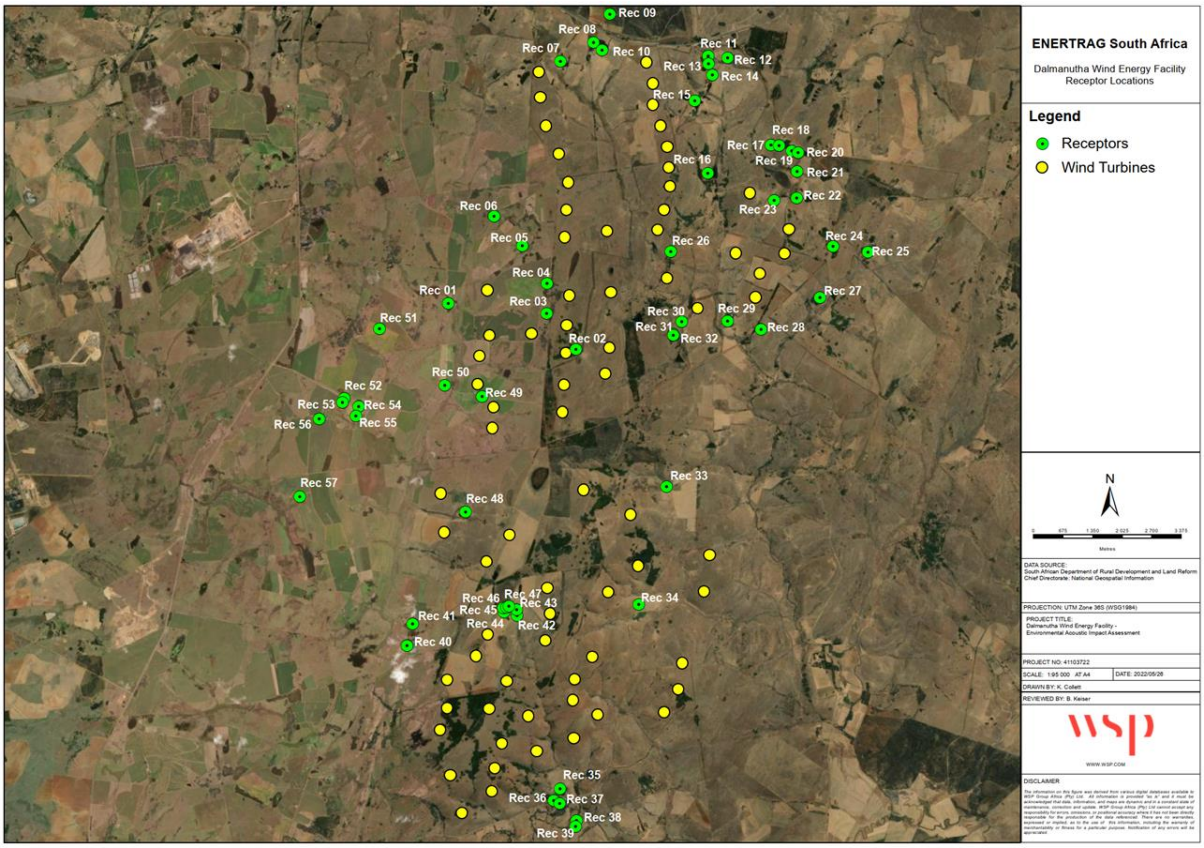


Figure 5-31: Sensitive receptors surrounding the Dalmanutha WEF (Pre-optimised 77 turbine layout)

Based on the proximity (< 500 m) of many of the wind turbines to sensitive receptors (namely Rec 02, Rec 30 and Rec 49 – occupation of these receptors will be confirmed during the EIA Phase), the resultant acoustic impacts are anticipated to be high. From previous experience, turbines within such a close distance of sensitive receptors may cause impacts and complaints. Additionally, based on the number of wind turbines being proposed, the cumulative impact of many turbines on other receptor locations may result in impacts and complaints. Specific impacts can, however, only be determined during the modelling exercise in the EIA phase of the project.

Noise from wind turbines can be classified into two categories, namely mechanical noise generated from the turbine's mechanical components and aerodynamic noise, produced by flow of air over the turbine blades. Based on the proximity of some of the turbines to the sensitive receptors in the region, such impacts may be anticipated, however, these can only be confirmed during the preliminary modelling exercise to be carried out in the EIA phase.

MECHANICAL NOISE

The mechanical noise generated by a wind turbine is predominantly tonal (dominated by a narrow range of frequencies), but may also be broadband in character, displaying a wide range of frequencies (Council of Canadian Academics, 2015). Such noise is produced by the physical movement of the following components:

- Gearbox;
- Generator;
- Yaw drives;
- Cooling fans; and
- Auxiliary equipment.

Over time, appropriate design and manufacturing have reduced the mechanical noise produced from wind turbines. As such, the aerodynamic noise from the blades has become the dominant source of noise for modern turbines, however, low frequency tones associated with mechanical sources are audible for some turbines (Hau, 2006; Manwell et al., 2009; Oerlemans, 2011).

AERODYNAMIC NOISE

Aerodynamic noise is typically broadband in nature and is generated by the interaction between air flow and different parts of the turbine blades. These interactions depend on the speed and turbulence of the wind; the shape of the blade; the angle between the blade and relative wind velocity flowing over the blade; and the distance from the hub. The noise levels produced are relative to the velocity of the air flow, with higher rotor speeds resulting in higher noise levels. Specifically, parts of the blade closer to the tips move faster than those closer to the hub, resulting in faster relative air velocities and create higher aerodynamic noise levels. As such, most of the aerodynamic noise is produced near (but not at) the blade tips. This is partly why turbines with longer blades have a higher sound power level (Oerlemans, 2011).

Aerodynamic noise from wind turbines also has a strong directional component, projecting primarily downward, upward, or even perpendicular depending on the dominant mechanism (Oerlemans, 2011). As such, noise levels measured at a particular location can vary depending on the direction, speed and turbulence of the prevailing wind. Furthermore, as the rotor turns, the orientation of each blade changes in relation to a stationary receiver. As such, the noise levels at the receiver will vary as the blades rotate, resulting in periodic regular changes in noise levels over time (Renewable UK, 2013).

As wind speed increases, the aerodynamic noise of the turbines also increases. At low speeds the noise created is generally low and increases to a maximum at a certain speed (around 10 m/s) where it either remains constant or can even slightly decrease.

LOW FREQUENCY NOISE AND INFRASOUND

In addition to the noise discussed above, wind turbines also produce some steady, deep, low frequency sounds (between 1 – 100 Hz), particularly under turbulent wind conditions. Sound waves below 20 Hz are called infrasound. These infrasound levels are only audible at very high sound pressure levels. Older wind turbines that had downwind rotors created noticeable amounts of infrasound. Levels produced by modern-day, up-wind style turbines are below the hearing threshold for most people (Jakobsen, 2005).

The human ear is substantially less sensitive to sound at very low or very high frequencies. For most people, a very low pitch sound (20 Hz) must have a sound pressure level of 70 dB to be audible. Levels of infrasound near modern commercial wind turbines are far below this level and are generally not perceptible to people (Leventhall, 2006).

Low frequency sound, like all other sound, decreases as it travels away from the source. Siting wind turbines further away from sensitive receptors will therefore decrease the risk of infrasound. It is, however, important to note that in flat terrain, low frequency sound can travel more effectively than high frequency sound. Most environmental sound measurements and noise regulations are based on the A-weighed decibel scale (dB(A)), which under-weights low frequency sounds in order to mimic the human ear. Thus, noise limits based on the dB(A) levels do not fully regulate infrasound. The dB(C) scale offers an alternative of measuring sound that provides more weight to lower frequencies (Jakobsen, 2005; Bolin et al., 2011).

SANS 10103 proposes a methodology to identify whether low frequency noise could be an issue. The method suggests that if the difference between LAeq and LCeq is greater than 10 dB, then a predominant low frequency component may be present. However, in all cases the existing acoustic energy in low frequencies associated with wind must be considered.

SUBSTATION AND TRANSFORMER NOISE

In addition to the noise from wind turbines, wind farms require a substation and transformers, which produce a characteristic "hum" or "crackle" noise. Utility companies have experience with building and siting such sources to minimise their impact. Substation-related noise is relatively easy to mitigate should this be required, based on the use of acoustic shielding and careful planning regarding placement away from sensitive receptors. As such, noise associated with this source is not considered in this assessment.

5.3.3 TRANSPORT AND TRAFFIC NETWORK

The site is located directly south of National Road N4, and in between the Provincial Road R33 to the west and the R36 to the east. The N4 is the primary east-west road link from the Botswana border via Pretoria and Mbombela to the Mozambique border. In the vicinity of the site, the N4 is a single carriageway with 1 lane per direction and gravel shoulders. Refer to **Figure 5-33** for the Provincial Road network located in the greater site area.

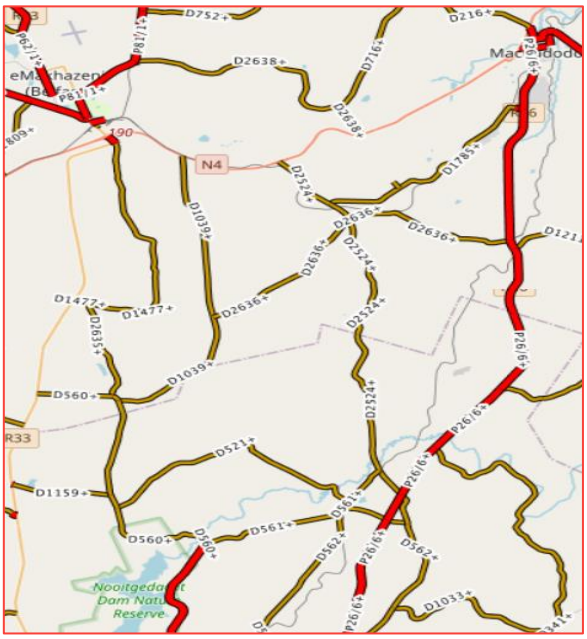


Figure 5-33: Provincial Road network

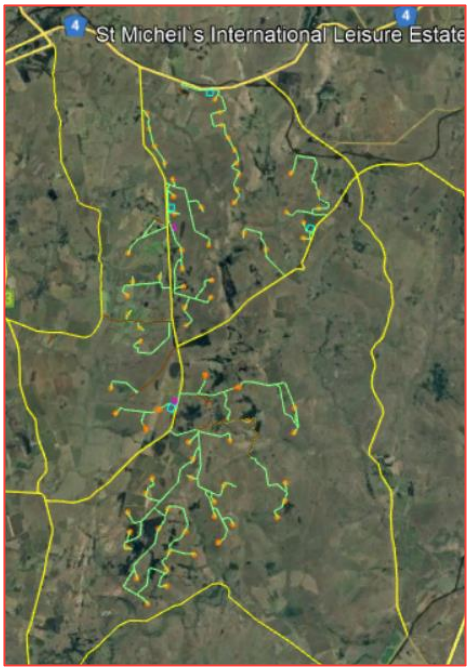


Figure 5-32: Provisional onsite access roads

The planned local access roads on-site will take access off the N4 and local unsurfaced roads that takes access off the N4 and R36. Refer to **Figure 5-32** for the provisional layout of the on-site access roads. The access routes and access points off the primary and secondary road network will be assessed in detail in the TIA.

5.3.4 HERITAGE AND CULTURAL RESOURCES

The proposed site for the Dalmanutha WEF and associated infrastructure is located approximately 7km southeast of the Belfast town within Emakhazeni and Chief Albert Luthuli Local Municipalities, Mpumalanga Province. The archaeological record for the greater study area consists of the Stone Age and Iron Age as well as Battlefield historical sites.

STONE AGE

The Stone Age of southern Africa starts when hominins (ancestral to modern-day humans) first started to produce crude tools made with stone. The Earlier Stone Age (2 million - 200 000 years ago) is associated with hominins such as Homo habilis and Homo erectus (Dusseldorp et al. 2013). Mpumalanga currently does not have an extensive Early Strone Age (ESA) archaeological record, at Maleoskop on the farm Rietkloof, only a few ESA artefacts have been found and stone tools consisted of choppers (Oldowan), hand axes, and cleavers (Acheulean) (Esterhuysen & Smith 2007) and some surface scatters have been recorded near Piet Retief (Nel & Karodia 2013).

Middle Stone Age (MSA) artefacts represents archaic and modern humans that occupied the landscape between 300 000 to 40 000 before present. Later Stone Age (LSA) occupational sequences reflect San and Khoisan communities from 40 000 years ago until recently (Dusseldorp et al. 2013). Although the MSA and LSA has not been extensively studied in Mpumalanga, evidence for these periods has been excavated from Bushman Rock Shelter in the Ohrigstad District (Esterhuysen & Smith 2007; Lombard et al. 2012) and it is known that San communities lived near Lake Chrissie as recently as the 1950s (e.g., Schlebusch et al. 2016). MSA and LSA surface scatters have also been investigated in the vicinity of Piet Retief, and De Wittekrans is a Later Stone Age archaeological rock art site complex (Nel & Karodia 2013).

IRON AGE

The archaeology of farming communities of southern Africa encompasses three phases. The Early Iron Age (200-900 CE) represents the arrival of Bantu-speaking farmers in southern Africa. Living in sedentary settlements often located next to rivers, these farmers cultivated sorghum, beans, cowpeas, and kept livestock. The Middle Iron Age (900-1300 CE) is mostly confined to the Limpopo Valley in southern Africa with Mapungubwe Hill probably representing the earliest ‘state’ in this region (Huffman 2007).

The Late Iron Age (1300-1840s CE) marks the arrival and spread of ancestral Eastern Bantu-speaking Nguni and Sotho-Tswana communities into southern Africa. The location of Late Iron Age settlements is usually on or near hilltops for defensive purposes. The Late Iron Age as an archaeological period ended by 1840 CE, when the Mfecane caused major socio-political disruptions in southern Africa (Huffman 2007).

Dates from Early Iron Age sites indicated that by the beginning of the 5th century CE Bantu-speaking farmers had settled in the Mpumalanga lowveld. Subsequently, farmers continued to move into and between the lowveld and highveld of Mpumalanga. Iron Age sites such as Welgelegen Shelter, Robertsdrift and Tafelkop dates from the 12th to the 18th century (Derricourt & Evers 1973; Esterhuysen & Smith 2007).

During the mid-17th century Europeans started to settle in modern-day Cape Town. During and after the conflict caused by the Mfecane (1820-1840), during the reign of king kaSenzangakhona Zulu, known as Shaka, Dutch-speaking farmers started to migrate to the interior regions of South Africa. A period that is marked by various skirmishes and battles between the local inhabitants, Dutch settlers and the British (Giliomee & Mbenga 2007).

BATTLEFIELDS AND WAR HISTORY

The discovery of diamonds and gold in the northern provinces had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonised the Cape and Natal, had intensions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902 in South Africa, and which was one of the most turbulent times in South Africa’s history.

Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicised, and republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims (Du Preez, 1977).

During the British advance between February to September 1900, Lord Roberts replaced Genl. Buller as the supreme commander and applied a different tactic in confronting the Boer forces instead of a frontal attack approach he opted to encircle the enemy. This proved successful and resulted for instance in the surrender of Genl. Piet Cronje and 4000 burghers at Paardeberg on 27 February 1900.

This was the start of several victories for the British and shortly after they occupied Pretoria on 5 June 1900, a skirmish at Diamond Hill resulted in the Boer forces under command of Louis Botha, retreated alongside the Delagoa Bay railway to the east. Between the 21-27 August, Botha and 5000 burghers defended their line at Bergendal but were overwhelmed by superior numbers and artillery. This resulted in the Boer forces retreating even further east and three weeks later the British reached Komatipoort and thus the whole of the Eastern Transvaal south of the Delagoa Bay railway line was now occupied by British Forces.

At the time of the War, several Blockhouses were located alongside the existing railway, including one near Wonderfontein in the vicinity of the Belfast area.

The "Scorched earth" policy implemented by Roberts led to the establishment of a number of camps where Boer women and children were harboured as a result of their homes being burnt and food reserves destroyed. This policy was also imposed on black people who stayed on Boer farms but also on their own pieces of land and homesteads. Maladministration, bad planning, insufficient medical assistance, malnutrition and exposure led to many deaths among people in these camps both white and black. An estimated 27 927 Boer women and children and a further 14 154 black people succumbed in these camps (Bergh, 1999). Belfast was the location of two camps for black people during the war (Bergh, 1999).

GRAVES AND BURIAL SITES

The Farm Geluk 405

War memorial (**Figure 5-34**) located at (-25 51.716 ; 30 04.800). The memorial reads:

The 1st the King's Liverpool Regt. to the memory of their comrades who fell in action on the 23rd August 1900. The Guild of Loyal Women contributing to the other service. The grave of MC Kruger located at (-25 51.485 ; 30 4.724) with numerous other unmarked graves.

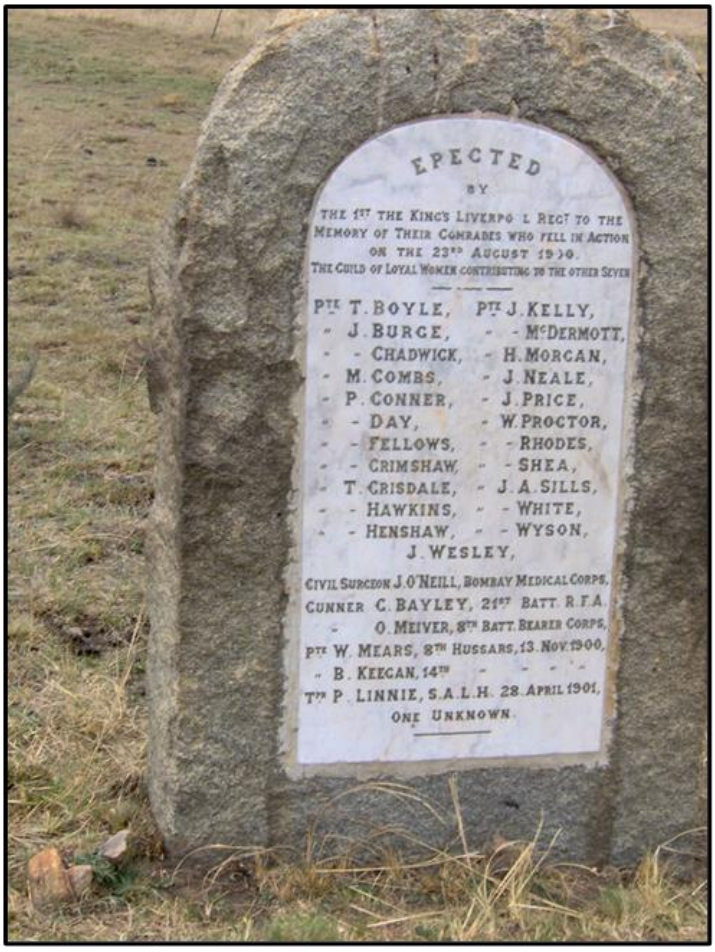


Figure 5-34: War memorial on farm Geluk 405

The Farm Berg en Dal 378

Approximately 10 graves located in a farm cemetery at (-25 44.050 ; 30 06.230). The graves date to the early 1900's. The farm is also home to a Burgher Monument at (-25 44.084 ; 30 6.183). Another cemetery for British soldiers is located at (-25 44.078 ; 30 06.348).

The farm Dalmanutha 401

The last cemetery is located on Damanutha 401 at (25°45'22.62"S ; 30°10'12.30"E) and contains 10 graves.

Several burial sites are on record for the general area and are discussed below according to their farm locations. The features are spatially indicated in **Figure 5-35.**

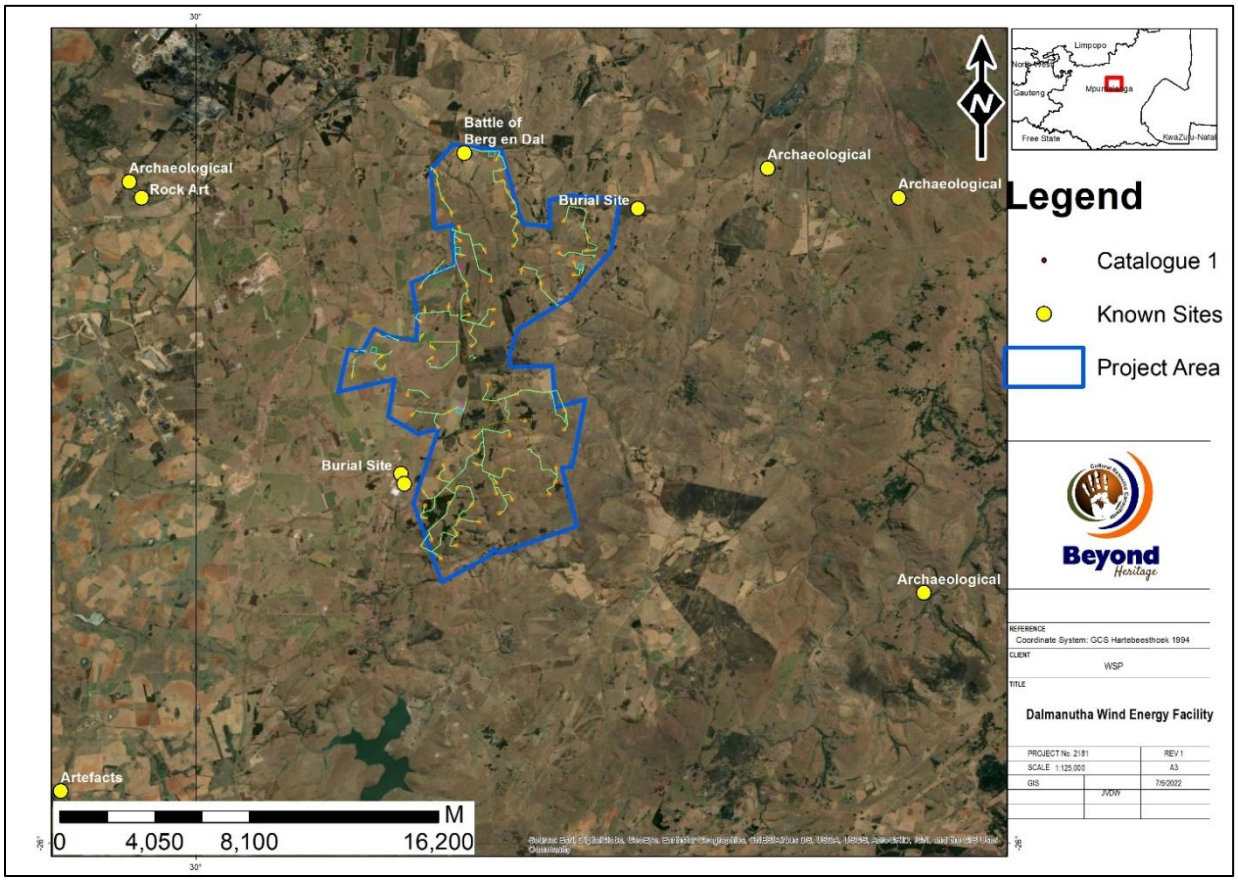


Figure 5-35: Project area in relation to known Cultural and Heritage sites (Pre-optimised 77 turbine layout)

CULTURAL LANDSCAPE

Regionally the area is mostly cultivated, and forms part of a landscape characterised by wide scale cultivation and mining activities. Development in the study area is limited to farming infrastructure such as access roads, fences, and agricultural developments. The study area is part of a large cultural landscape that include battlefield sites and cemeteries.

5.3.5 VISUAL CHARATER AND SENSITIVITY

VISUAL CHARACTER AND CULTURAL VALUE

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly

modified urban or industrial landscape being at the opposite end of the scale to a largely natural, undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads, and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the sense of place relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

Lamb and mutton farming dominate the land-use character in the western part of the study area, as well as dairy and maize farming. Timber is a leading industry in the district, therefore exotic plantations are located throughout the study area, but are more concentrated in areas towards the north, north-east and southeast south-east of the site.

Mining / quarrying Mining/quarrying areas (coal and black granite are other leading industries in the study area), have been delineated towards the west, north-west, north-east and south of the proposed Dalmanutha WEF. 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

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 WEF into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the visual character in much of the area has been significantly transformed and degraded by urban, industrial, mining, and infrastructural development.

5.3.6 SOCIO-ECONOMIC

SOCIAL OVERVIEW OF THE STUDY AREA

Mpumalanga Province

Mpumalanga Province is located in the north-eastern part of South Africa. The province borders two of South Africa's neighbouring countries viz. Mozambique and Swaziland; and five other South African provinces, namely, Gauteng, Limpopo, KwaZulu-Natal and Free State Provinces. Mpumalanga is characterised by the high plateau grasslands of the Middleveld, which roll eastwards for hundreds of kilometres. It rises towards mountain peaks in the northeast and terminates in an immense escarpment.

Mpumalanga Province covers an area of 76 495km² and has a population of approximately 4 335 965. The capital city of Mpumalanga is Mbombela (previously Nelspruit), and other major cities and towns include Emalahleni (formerly Witbank), Standerton, eMkhondo (previously Piet Retief), Malelane, Ermelo, Barberton and Sabie. The province is divided into three district municipalities: Gert Sibande, Ehlanzeni and Nkangala Districts. These three districts are further subdivided into 17 Local Municipalities. The proposed development falls within the Emakhazeni Local Municipality. The Emakhazeni Local Municipality falls under the Nkangala District Municipality (NDM). The Chief Albert Luthuli local municipality falls under the Gert Sibande District Municipality

Nkangala District Municipality

The NDM is a Category C municipality in the Mpumalanga Province. It is one of three district municipalities in the province, making up 22% of its geographical area. The NDM comprises the Victor Khanye, Emalahleni, Steve Tshwete, Emakhazeni, Thembisile Hani, and Dr JS Moroka local municipalities. The NDM is

headquartered in Middelburg. The NDM is the economic hub of Mpumalanga and is rich in minerals and natural resources. The NDM is host to the Maputo corridor, bringing increased economic growth and tourism development potential.

Emakhazeni Local Municipality

The Emakhazeni Local Municipality is strategically located between Pretoria/Johannesburg complex in Gauteng and Nelspruit in Mpumalanga. It is bordered to the north by The Greater Groblersdal and Thaba-Chweu Local Municipalities, forming part of the Limpopo Province and Ehlanzeni District Municipality. Emakhazeni is the gateway to the major tourist attraction points in Mpumalanga and the eastern parts of Limpopo Province. The N4 and Road P81-1 provide links from Gauteng to the major tourism centres in Mpumalanga, specifically the Kruger National Park to the east and Pilgrim's Rest, Graskop, Lydenburg and Hoedspruit to the north-east.

Chief Albert Luthuli local Municipality

The Municipality is located on the eastern escarpment of Mpumalanga Province. The Municipality spans an area of approximately 5,560km2, and according to StatsSA 2016 Community Survey, is home to some 187,630 people, which have increased. The Municipality consists of a diverse society that faces various social, economic, environmental and governance challenges. The rural community faces challenges such as lack of access to services like water, good roads, proper sanitation and access to job opportunities. The urban community, on the other hand experiences challenges such skyrocketing prices for services which cannot be dove-tailed to fit the income levels

National Development Plan

The objective of the NDP relates to the implementation of public employment programmes, with which the municipality aligns to through its Expanded Public Works Programme (EPWP) and the Community Works Programme (CWP) implementation. The municipality also has close working relations with the social partners in ensuring that the locals are prioritized through employment when implementing capital programmes.

Government Outcomes

Cabinet adopted 12 Outcomes within which to frame public-service delivery priorities. Cabinet Ministers accordingly signed Performance Agreements linked to these Outcomes. More detailed delivery Agreements have since been developed to extend targets and responsibilities to National and Provincial Departments, Agencies and Municipalities. Outcome 10 addresses protection and enhancement of environment assets and natural resources. ELM has an Environmental Management Framework which looks to reduce greenhouse gas emissions, mitigate climate change impacts, and improve air quality.

ADMINISTRATIVE CONTEXT

The study area is located within the Emakazeni and Chief Albert Luthuli Local Municipalities, within the Mpumalanga Province. These local municipalities form part of the Nkangala and Gert Sibande District municipalities respectively as outlined in **Figure 5-36** below.

Figure 5-36: Location of Municipalities within the Mpumalanga Province

DEMOGRAPHIC OVERVIEW

POPULATION

Emakhazeni Local Municipality

Emakhazeni Local Municipality's population increased by 0.4% (47 216 – 48 149) from 2011 to 2016. The total number of households grew from 13 722 in 2011 to 14 633 in 2016, contributing to 3.5% of the number of households in Nkangala (**Table 5-6**). The youth population grew by 1.6% per annum between 2011 and 2016 and forms 39.6% of the total population. **Table 5-6** shows population and household numbers from 2011 to 2019 and the 2030 population projection.

Table 5-6: Population of Emakhazeni Local Municipality

KEY INDICATORS	CENCUS 2011	COMMUNITY SURVEY 2016	GROWTH RATE 2011-2016	ESTIMATED 2019	PROJECTED 2030
Population number	47 216	48 149	0.4% per annum	48 729	50 917
Household number	13 722	14 633	1.3 % per annum	15 208	17 519

Table 5-7 and **Table 5-8** indicate a slight increase in the Black African population while there is a noticeable decrease in the Coloureds, White and Indian population. Based on in 2011, 87.2% of the population was Black, 10.8% White, 1.2% Coloureds, Indian and Asian 0.7%, and other was 0.2%. The percentages since 2016 have changed to 89.4% Black Africans, 0.6% Coloureds, 0.3% Indian/ Asian and 9.7% Whites.

Table 5-7: Percentage Distribution of Emakhazeni Municipality by population group -2011

GROUP	TOTAL	%
Black African	41 168	87.2%
Coloureds	563	1.2%
Indian or Asian	330	0.7%
White	5076	10.8%
Other	79	0.2%
Total	48.149	100%

Table 5-8: Percentage Distribution of Emakhazeni Municipality by Population Group- 2016

GROUP	TOTAL	%
Black African	43 025	89.4%
Coloureds	322	0.6%
Indian or Asian	156	0.3%
White	4.646	9.7%
Other	43 025	89.4%
Total	48.149	100%

Chief Albert Luthuli Local Municipality

According to the Chief Albert Luthuli Municipality IDP (2021), the Municipality comprises of 53 480 households. This equates to an average annual growth rate of 0.2% in the number of households since 2011; with an average annual growth rate of 0.2%. 98.0% of households belong to the African population group. The White population group had a total composition of 2% (ranking second). The Asian population group had a total composition of 0.5% of the total households. According to Stats SA (2016 Community Survey - CS), Chief Albert Luthuli's population increased from 186 010 in 2011 to 187 630 people in 2016 – 10th largest population in the province and 16.5% of total population of Gert Sibande in 2016. Population grew by 1 620 in the relevant period and recorded a population growth rate of 0.2% per annum between 2011 and 2016. The population number for 2030 is estimated at more or less 192 952 people given the historic population growth per annum. (0.2% growth per annum).

The number of households in Chief Albert Luthuli increased from 47 705 in 2011 to 53 480 households (almost 6 000 households increase) in 2016 - represents 16% of the Gert Sibande household figure - household size declining from 3.9 to 3.5 in the same period. Youth population (15-34 years) forms 38% of the total population. The share of the female population in 2016 according to the CS was 52.9%. Population movement in the region appears to follow the pattern of economic activity and access to urban

HOUSEHOLDS AND HOUSE TYPES

According to the IDP Emakhazeni Local Municipality (2021), there is a need to prioritise the finalisation of township establishment so people can formally and adequately settle. Approximately 70% of people live in formal dwellings or brick/concrete houses. Traditional dwellings cover 10% of the population. These may be households in rural areas. However, there are still 4% living in an informal settlement and 6% in informal dwellings/shacks in the backyard.

EMPLOYMENT

The unemployment rate of Emakhazeni decreased from 25.92% in 2011 to 23.8% in 2015. In 2015, the unemployment rate was the 7th lowest among all the municipal areas of Mpumalanga. In 2015, the unemployment rate for females was 29.2%, and 19.9% for males. The municipality recorded an unemployment rate of 26.9% in 2017, with the majority of its employed in the mining and transport sectors.

In the Chief Albert Luthuli LM, the high unemployment rate amongst people in the 14 to 64 age group, being the economic productive years, is a noteworthy concern. In 2016 about 36,000 people in this age group were not working (Statistic SA 2016). The unemployment rate in the Municipality is 35,4% and the unemployment rate for young people is alarmingly high at 45%, which is mainly influenced by the lack of economic opportunities in the municipal area. The highest number of unemployed (54%) is in Ward 12 (Ekulindeni area) and the lowest number (20%) is in Ward 21 (Carolina area). Employment in the Municipality increased with 8,600 jobs between 2001 and 2011, and the number of employed individuals is 29 141 (0.12%). The percentage of employment in formal sector was 65.6%, and in the informal sector 21,9% (StatsSA 2016). Unemployment rate (%) 35,4%.

The IDP notes that in terms of future economic development, coal mining can be expected to remain an important sector for the short to medium term. However, the role of this sector is expected to decline in the medium to long term due to limited coal resources, and a move away from a coal-based economy locally and globally due the impact on climate. The current transport and logistics sector is also likely to be impacted on by a decline in coal mining.

EDUCATION

In 2004 around 21% of the population had passed grades 3-6. This percentage decreased to approximately 11% in 2014. **Figure 5-37** indicates that few people have post matric qualifications within the municipality. The implication is that the local community members will not be able to take advantage of job opportunities created by the economic sectors. This has a negative consequence on the payment of municipal rates and socio-economic conditions in the area. The municipality should then speed up the process of the establishment of a Technical and Vocational Education and Training (TVET) Campus. This campus will assist a great deal as it will focus on technical skills needed as the main economic activities relate to mining and trade.

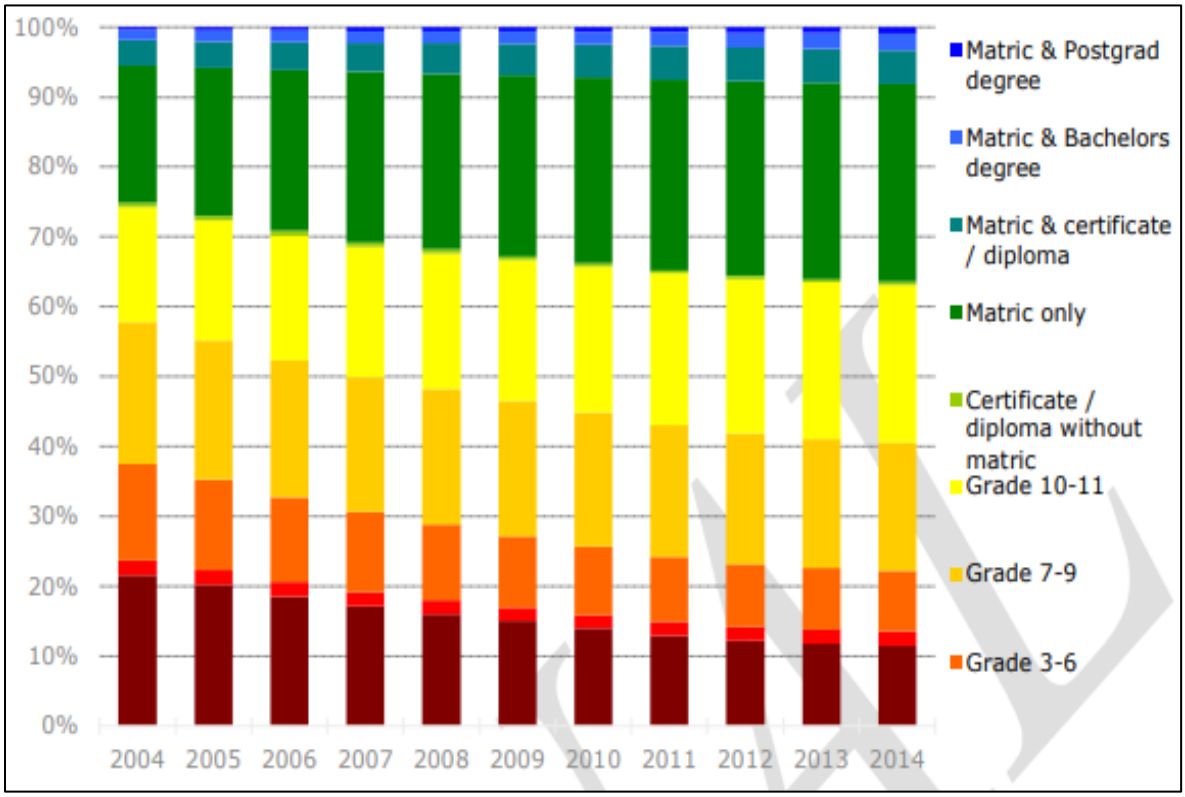


Figure 5-37: Educational attainment for Emakhazeni Local Municipality from 2004 to 2014

Chief Albert Luthuli Municipality is predominantly a municipality whose population does not have tertiary education. Of the total population of the area; only 5% has university degree qualification; 33% have matric, 30% with some secondary education. 15% of the population has primary education, and 15% do not have any education. According to the 2016 CS of Stats SA the population in Chief Albert Luthuli aged 20+ completed grade 12, increased from 31 122 in 2011 to 38 131 (increase of 7 009) in 2016 – an increase of 22.5% in the relevant period. Chief Albert Luthuli's grade 12 pass rate decreased from 80.9% in 2016 to 79.0% in 2017 which was the 7th highest of the municipal areas of the Province. The area achieved an admission rate to university/degree studies of 28.6% in 2017. The challenge is to accommodate the educated young people in the area – a matric is no "ticket" to a job in the labour market – employability of the youth. Provision of adequate educational, recreational infrastructure and skills development to meet the needs of the community. The **Figure 5-38** below outlines the education profile of the municipality.

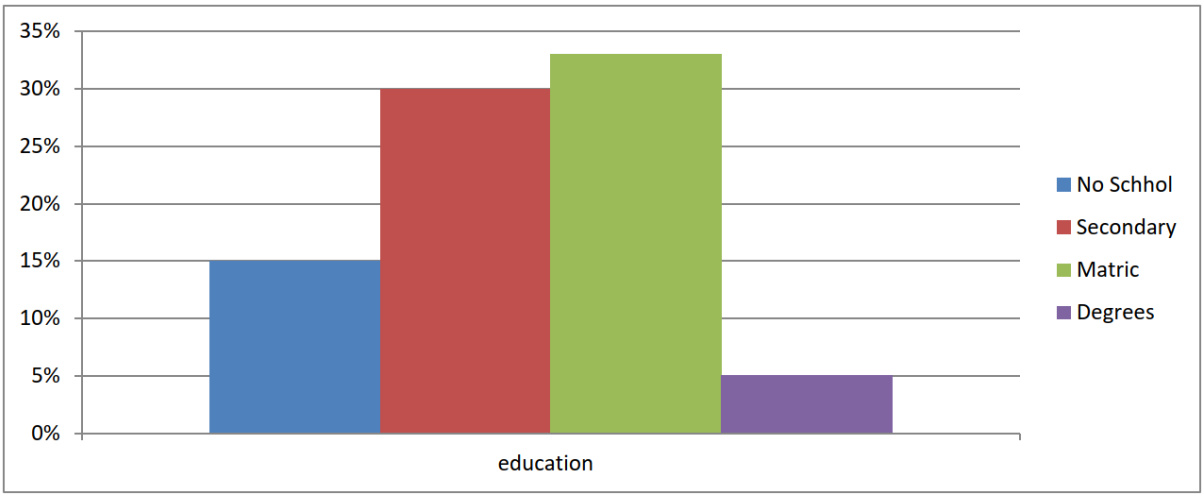


Figure 5-38: Education profile of Chief Albert Luthuli LM (Stats SA 2016)

MUNICIPAL SERVICES

ELECTRICITY

Figure 5-39 below represents the percentage of households with access to electricity in the Emakhazeni municipality and other energy sources.

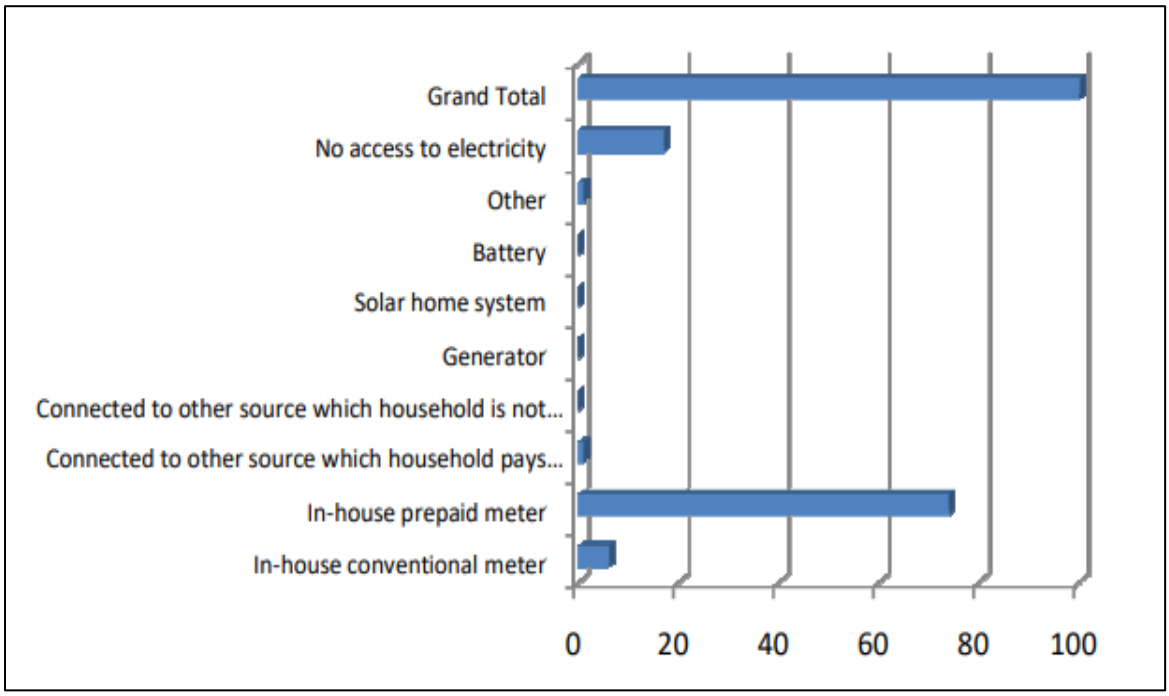


Figure 5-39: Percentage of household access to electricity in the Emakhazeni LM

Access to electricity is measured on whether a household has access to electricity for cooking, heating, and light. Most households have access to electricity for lighting purposes. However, less than half of the population in Chief Albert Luthuli LM has access to electricity for heating and cooking purposes.

Figure 5-40 indicates the areas in Chief Albert Luthuli LM where households have no access to electricity for lighting purposes. Areas, where more than 50% of households have no access to electricity for lighting, include Empuluzi, Dundonald, Elukwatini, Nhlazatje and Tjakastad.

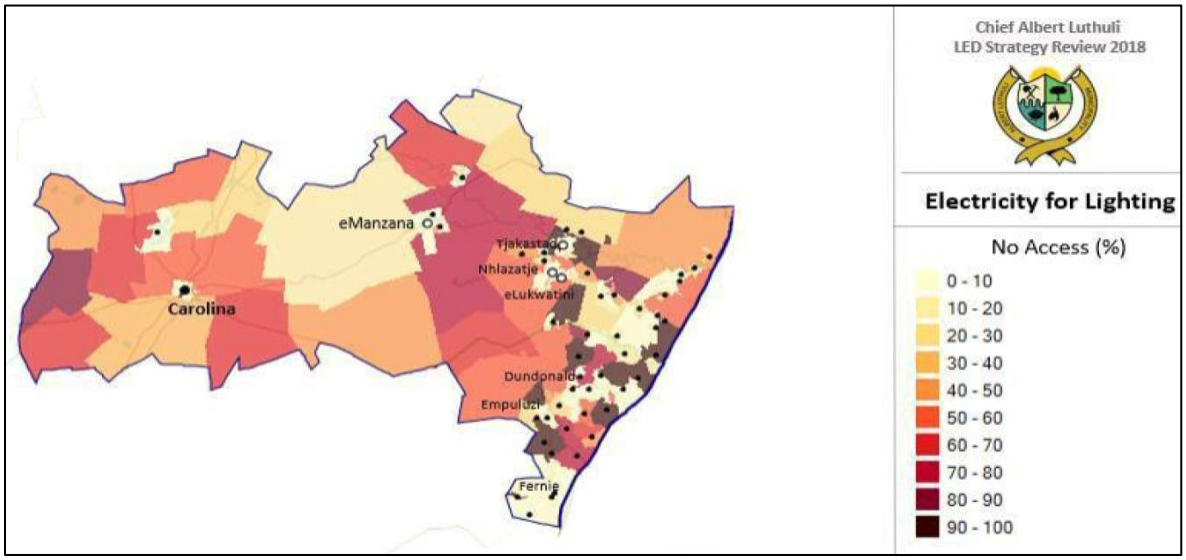


Figure 5-40: Access to electricity in the Chief Albert Luthuli LM (Statistics South Africa, 2011 via MapAble, 2017)

ACCESS TO WATER

According to the Chief Albert Luthuli IDP (2022), 23% of the households in all three study areas have access to water inside their dwellings. Compared to the District and Province, Chief Albert Luthuli LM has a significant number of households with no access to piped water. The areas that have the highest proportion of households with below basic access to water or no access to water are in the eastern areas. These areas also coincide with the areas which have lower levels of access to electricity.

The eMakhazeni Local Municipality had a total number of 6 640 (or 45.46%) households with piped water inside the dwelling, a total of 5 010 (34.27%) households had piped water inside the yard and a total number of 2 010 (13.78%) households had no formal piped water.

SANITATION

Less than 20% of households have access to toilets while 21% of households have access to flush toilets, while the majority of households use a pit latrine with ventilation (38%). In 2011, Chief Albert Luthuli LM had 473 households still using the bucket system.

The eMakhazeni Local Municipality had a total number of 10 900 flush toilets (74.47% of total households), 469 Ventilation Improved Pit (VIP) (3.21% of total households) and 1 510 (10.34%) of total households pit toilets.

REFUSE COLLECTION

In Chief Albert Luthuli LM, only 23 % of households have their refuse removed by the local authority at least once a week. The relatively higher percentage that dispose of their waste at their own dump reflects the rural nature of the area and the difficulty of providing municipal services to areas located at a distance from the main towns in the area.

According to the eMakhazeni LM IDP (2021), the refuse removal by the municipality has dropped since 2011 census. eMakhazeni Local Municipality had a total number of 9 730 (66.61%) households which had their refuse removed weekly by the authority, a total of 396 (2.71%) households had their refuse removed less often than weekly by the authority and a total number of 3 620 (24.79%) households which had to remove their refuse personally (own dump).

ECONOMIC OVERVIEW

In 2014, the eMakhazeni Local Municipality achieved an annual growth rate of 1.26% which is a significant lower GDP growth than the Mpumalanga Province's 2.65%, but is lower than that of South Africa, where the 2014 GDP growth rate was 1.55%. Similar to the short-term growth rate of 2014, the longer-term average growth rate for eMakhazeni (2.46%) is also slightly lower than that of South Africa (2.94%). The economic growth in eMakhazeni peaked in 2010 at 7.96%.

Farming is the dominant economic activity in the eMakhazeni area occupying the largest part of the physical area. Small towns serve as service centres to the agricultural sector. The most dominant activities in the area include field, horticultural, animal husbandry, forestry and some fishing. Agriculture generates and inter-regional income and has a high multiplier effect in the local economy. Belfast, Dullstroom, Machadodorp and Waterval-Boven act as service providers to the surrounding rural areas and provide social services as well as farming and household necessities to the farmers and farm workers in the region.

The main economic driver in the Chief Albert Luthuli Municipality is Community Services Sector, in the form of the various government departments that are the main employers, the Municipality included. The Retail Sector is another key economic driver in the Chief Albert Luthuli Municipality. There are shopping precincts in Carolina, at The Crossing (Elukwatini), Emanzana, and Mayflower/Fernie. These retail chains contribute towards job creation and food security. The Retail Sector is another key economic driver in the Chief Albert Luthuli Municipality. There are shopping precincts in Carolina, at The Crossing (Elukwatini), Emanzana, and Mayflower/Fernie. These retail chains contribute towards job creation and food security

5.3.7 RISK AND SAFETY

Two battery technologies will be considered for the proposed BESS they are Lithium-ion and Vanadium Redox Flow batteries. The safety and health risks associated with vanadium redox flow batteries will likely be lower than for the lithium-ion battery type for both employees and members of the public outside the facility.

Lithium batteries pose a higher fire and explosion risk as well as the possibility of generating noxious smoke under these circumstances. However, they are easier to install, i.e., containers as opposed to formal brick and mortar structures, and probably will not require as many permanent staff as vanadium redox utility scale operations. The environmental risks of aquatic contamination with the vanadium type batteries will likely be higher than for solid state batteries, due to the presence of liquids.

As lithium batteries pose a possibility of generating noxious smoke, there may be a need to slightly adjust the proposed location the Dalmuntha West WEF BESS installation to mitigate the risks of noxious smoke from possible fires on near-by facilities, i.e., ideally the BESS facilities should be 500m from the closest farmsteads / private businesses etc. Similarly, in choosing between the northern, central and southern locations of the Dalmuntha WEF, the central option present lower SHE RA risks as it is further from farmhouses while still be accessible for emergency response. **Figure 5-41** below outlines the alternative BESS sites in relation to the nearby occupied farmhouses.

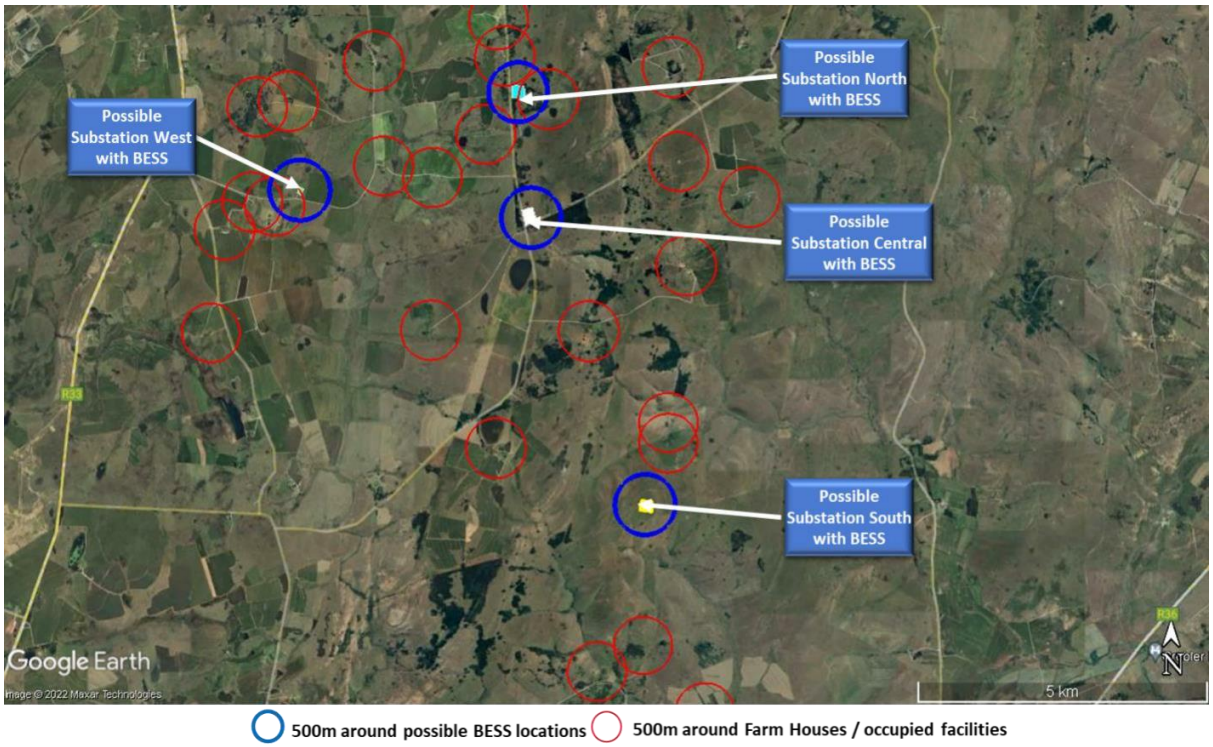


Figure 5-41: Possible BESS locations for Dalmanutha WEF in relation to occupied farmhouses (in relation to Pre-optimised 77 turbine layout)

6 SITE SENSITIVITY VERIFICATION

The following section outlines the sensitivities identified by the DFFE National Screening tool in relation to that of the Specialists scoping studies for the relevant disciplines.

6.1 AGRICULTURE

Figure 6-1 illustrates the agricultural theme sensitivity from the screening report generated on 24 November 2022.

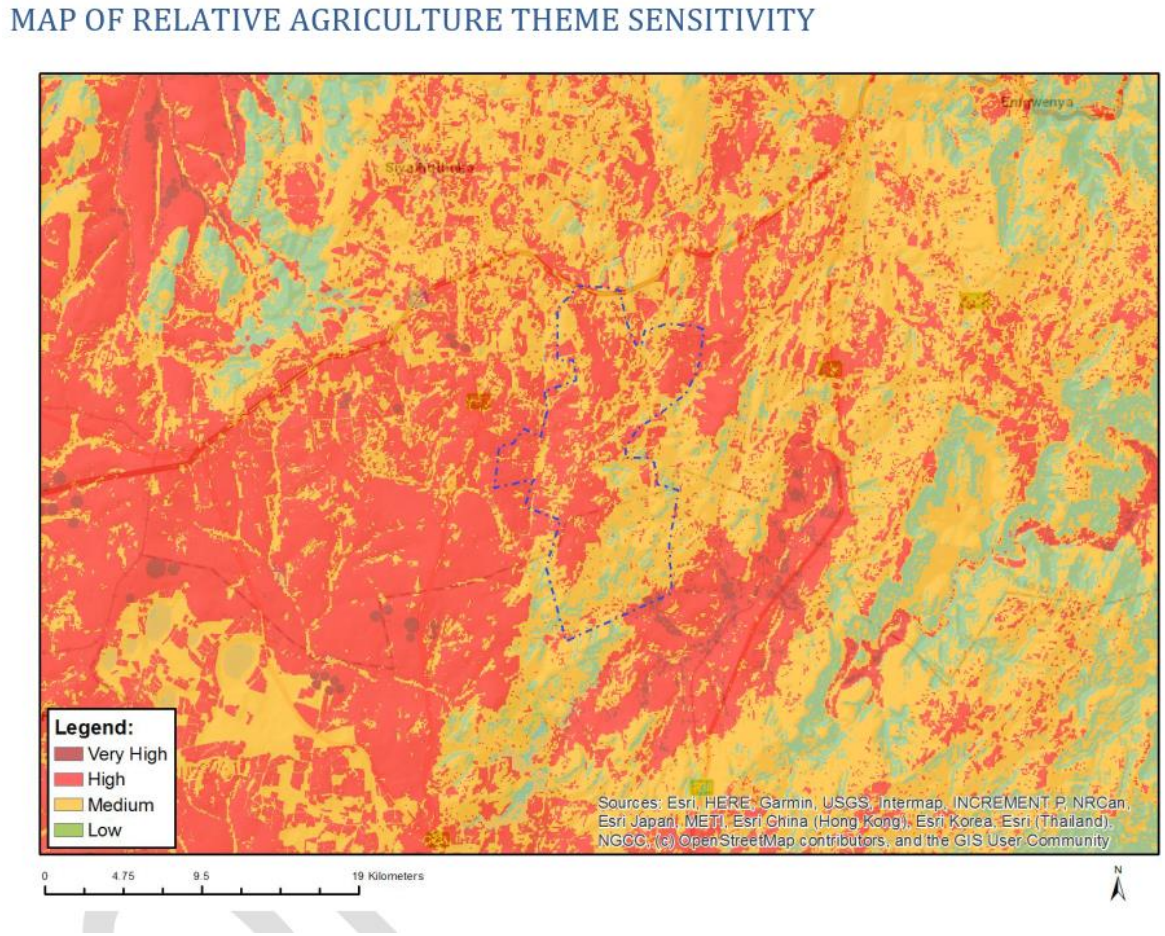


Figure 6-1: DFFE agricultural theme sensitivity

As noted by the agricultural scoping study (**Appendix M**) the agricultural sensitivity of the entire area, for the purposes of this impact assessment, can be considered to be medium before mitigation has been applied.

Based on the site work undertaken to date, the areas that must be avoided are the exclusion area and the areas around the watercourses (**Figure 6-2**). A 50m buffer – as opposed to a more typical 100m buffer – has been used as the terrestrial (dry) soils appear to start close to the edges of the watercourses in the area.

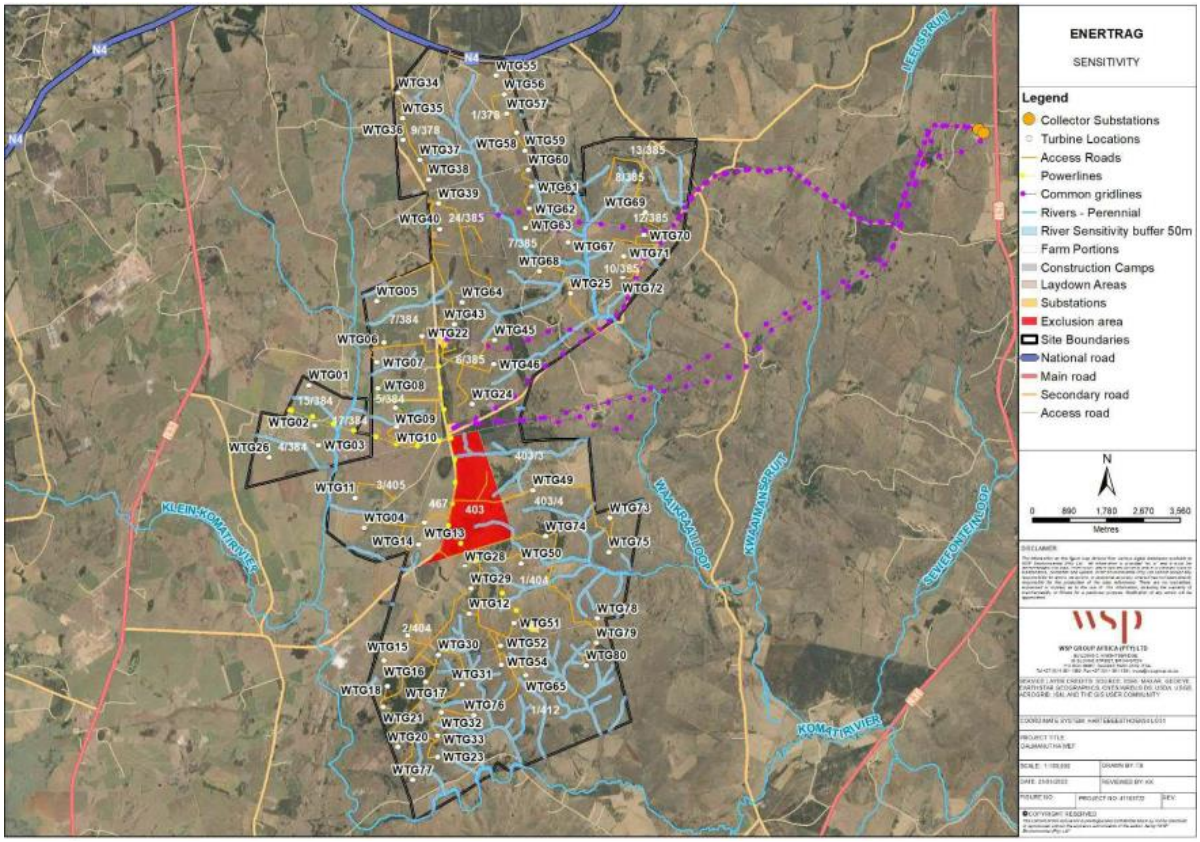


Figure 6-2: Preliminary site sensitives for soils (Pre-optimised 77 turbine layout)

6.2 ANIMAL SPECIES

Figure 6-3 illustrates the animal species theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

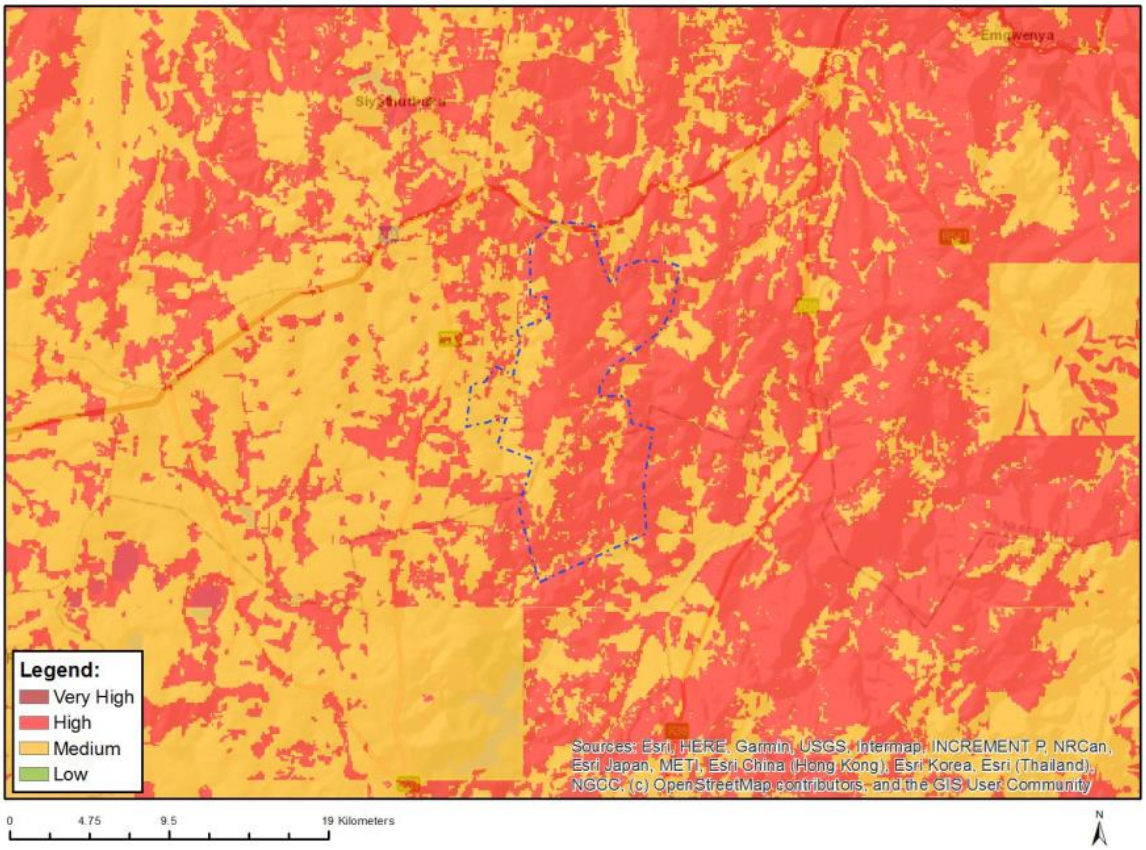


Figure 6-3: DFFE animal species theme sensitivity

The DFFE screening report identified the animal theme as high-medium, with mostly listing avifaunal species. According to the specialist study (**Appendix I**), the northern region mostly High-medium. Mostly bird species are listed, including: Black-rumped Buttonquail; Southern Bald Ibis; Secretary bird; Wattled Crane; Denham's Bustard; Yellow-breasted Pipit; African Marsh-Harrier; and White-winged Flufftail. The southern region has bird species are listed, including: Bush Blackcap; Southern Bald Ibis; Black-rumped Buttonquail; Denham's Bustard; Wattled Crane; Yellow-breasted Pipit; African Marsh-Harrier; and Secretary bird.

The specialist has confirmed that the northern region is more sensitive due to the bird species identified on site and though various communications with Geoff Lockwood, the Resident Manager at Delta Environmental Centre. The specialist work on site confirms that the site is of Medium to High sensitivity for avifauna. They have confirmed the presence of most of the above listed bird species on site, exceptions being African Marsh-Harrier and White-winged Flufftail.

The remainder of the sensitivity pertains to the fauna on site, where the screening tool identified parts of the site as having a high-medium sensitivity in primary and secondary grasslands, wetlands, the terrestrial ecology scoping report (**Appendix H**) concurs with this sensitivity. Evidence of presence of fauna SCC including Cape Mole Rat (*G. capensis*), grey rhebuck (*P capreolus*) and southern mountain reedbuck (*R. fulvorufula fulvorufula*) has been observed during first fauna survey.

6.3 AQUATIC BIODIVERSITY

Figure 6-4 illustrates the aquatic biodiversity theme sensitivity from the screening report generated on 24 November 2022.

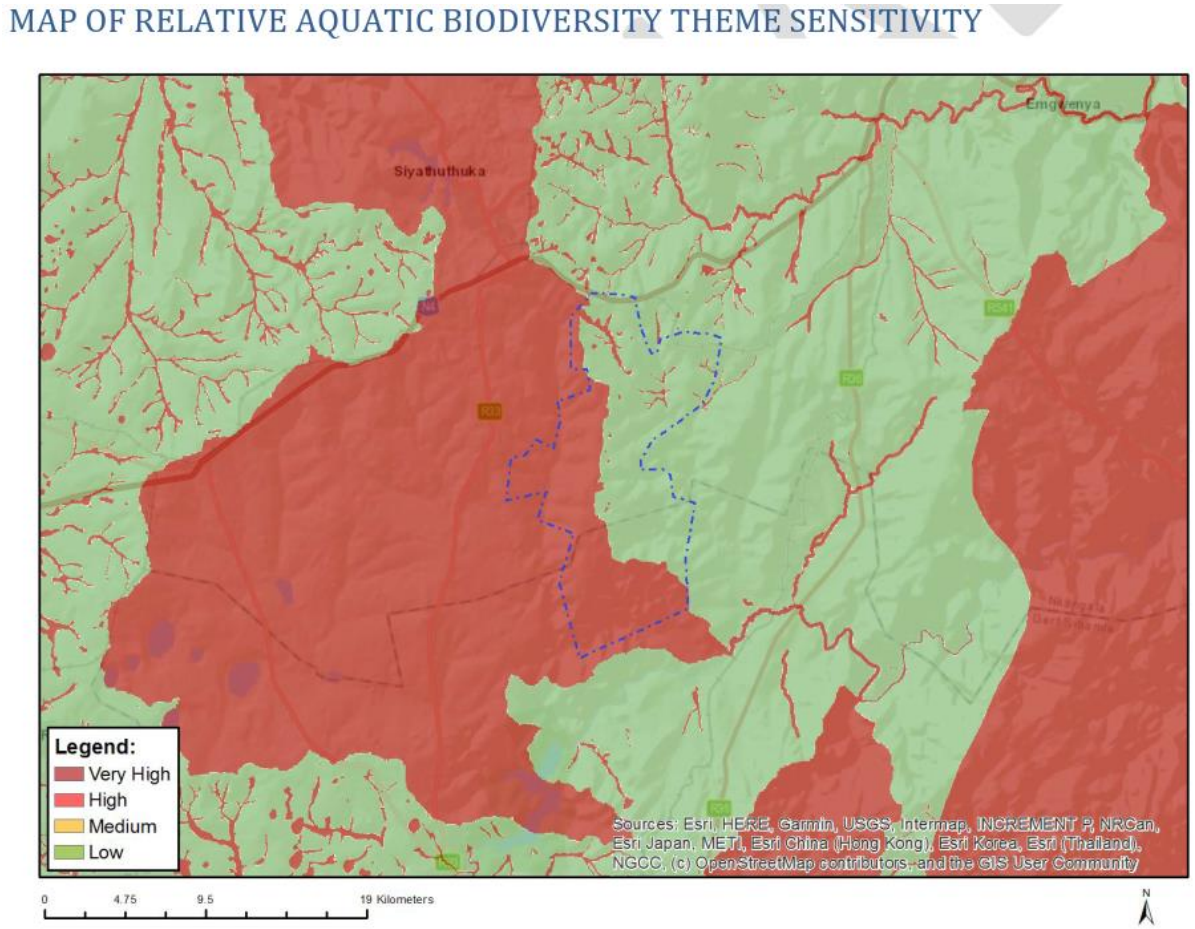


Figure 6-4: DFFE aquatic theme sensitivity

The aquatic sensitivity of the site is identified as high-low by the screening tool, the aquatic scoping report (**Appendix H**) confirms the Presence of wetland CBA, wetland cluster ESA and Klein-Komati river CBA throughout study area. The sensitivity is further confirmed to be very high.

6.4 ARCHAEOLOGICAL & CULTURAL HERITAGE

Figure 6-5 illustrates the archaeological and cultural heritage theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

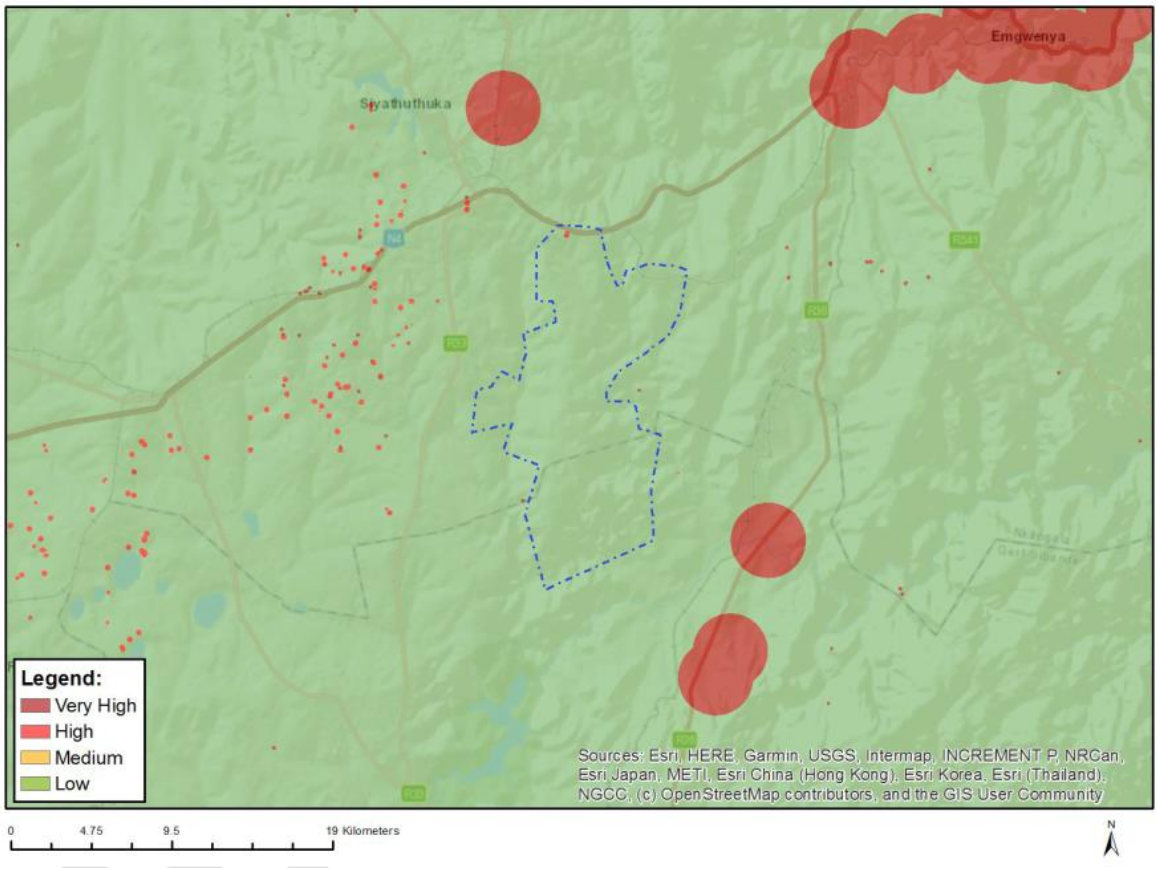


Figure 6-5: DFFE archaeological & cultural heritage theme sensitivity

The screening tool has identified the site as being low sensitivity with isolated points being high.

Regionally the area is mostly cultivated, and forms part of a landscape characterised by wide scale cultivation and mining activities. Development in the study area is limited to farming infrastructure such as access roads, fences, and agricultural developments. The study area is part of a large cultural landscape that include battlefield sites and cemeteries. According to the heritage scoping study (**Appendix R**) the placement of the turbines has avoided all identified graves and cultural heritage sources in the project area.

6.5 BATS

Figure 6-6 illustrates the bats (wind) theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE BATS (WIND) THEME SENSITIVITY

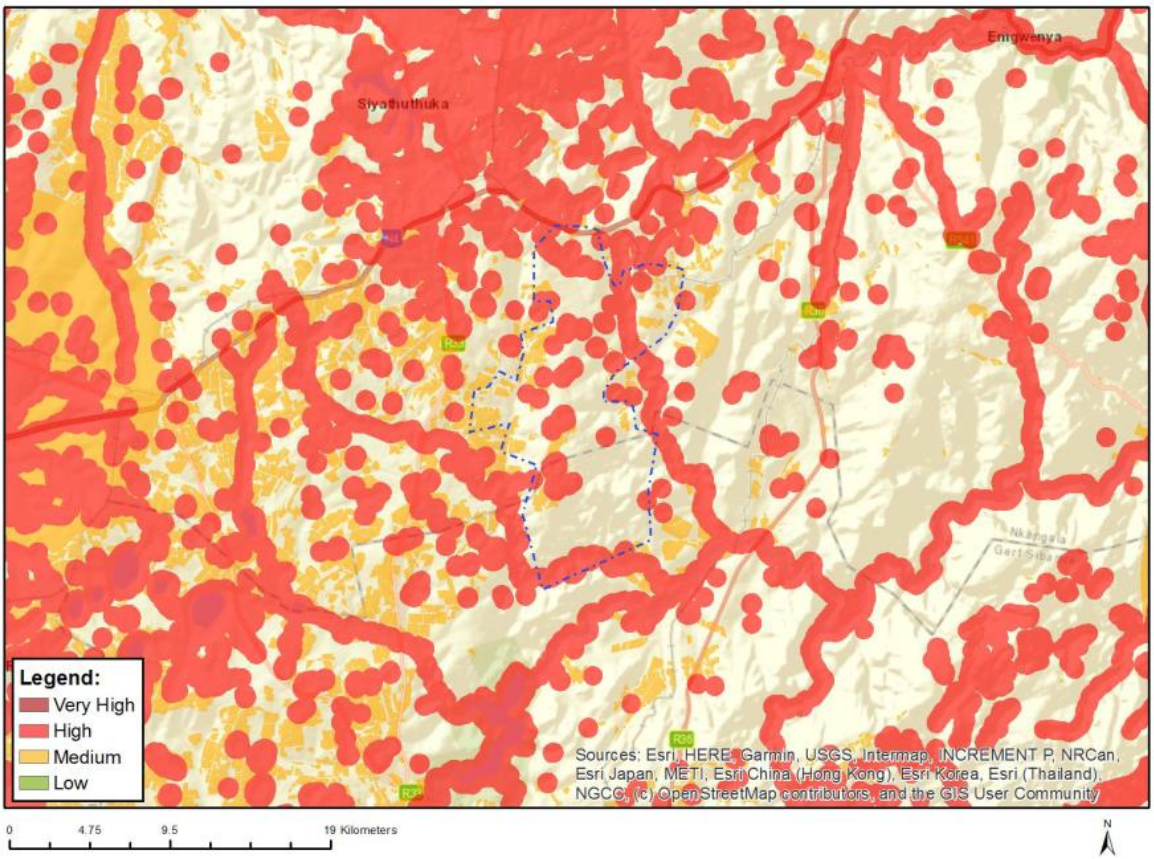


Figure 6-6: DFFE bats theme

The DFFE screening tool identified parts of the site as high sensitivity.

According to the specialist scoping study (**Appendix J**), current data suggests that the proposed project area is located in an area with LOW RISK of bat mortalities, and that the most common species in the area is at low risk of collision. However, a further study will be required.

Currently it must be stressed that all water sources will be considered as SENSITIVE, and possibly no-go, areas. Buffers will be implemented around all sources of water. In other words, no turbine blades may intrude into high sensitivity buffers. Currently this does not affect the proposed layout of the WEF.

Currently no bat sensitive features have been identified as HIGH or VERY HIGH sensitive features. As per the SABPG (McEwan et al., 2020) no turbines or any other structure, including infrastructure and major roads, may thus be constructed 200m around bat sensitive areas.

Based on data recorded by bat detectors on site (**Figure 6-7**), transect areas with trees seems to be important to bats. These areas are foraging and potential roosting sites and a 200m buffer might be implemented around the larger vegetated areas, but currently is not listed as sensitive based on data from DAL3.

Based on conversations with farmers these areas are being controlled, and trees removed in order to ensure that the exotic species do not spread too widely, but small portions is always left. All water bodies should have a 200m buffer around them as these are frequently used by bats for foraging and as drink sites. This is based on the data obtained from bat detector DAL02. All confirmed roosting locations should have a 200m buffer around them.

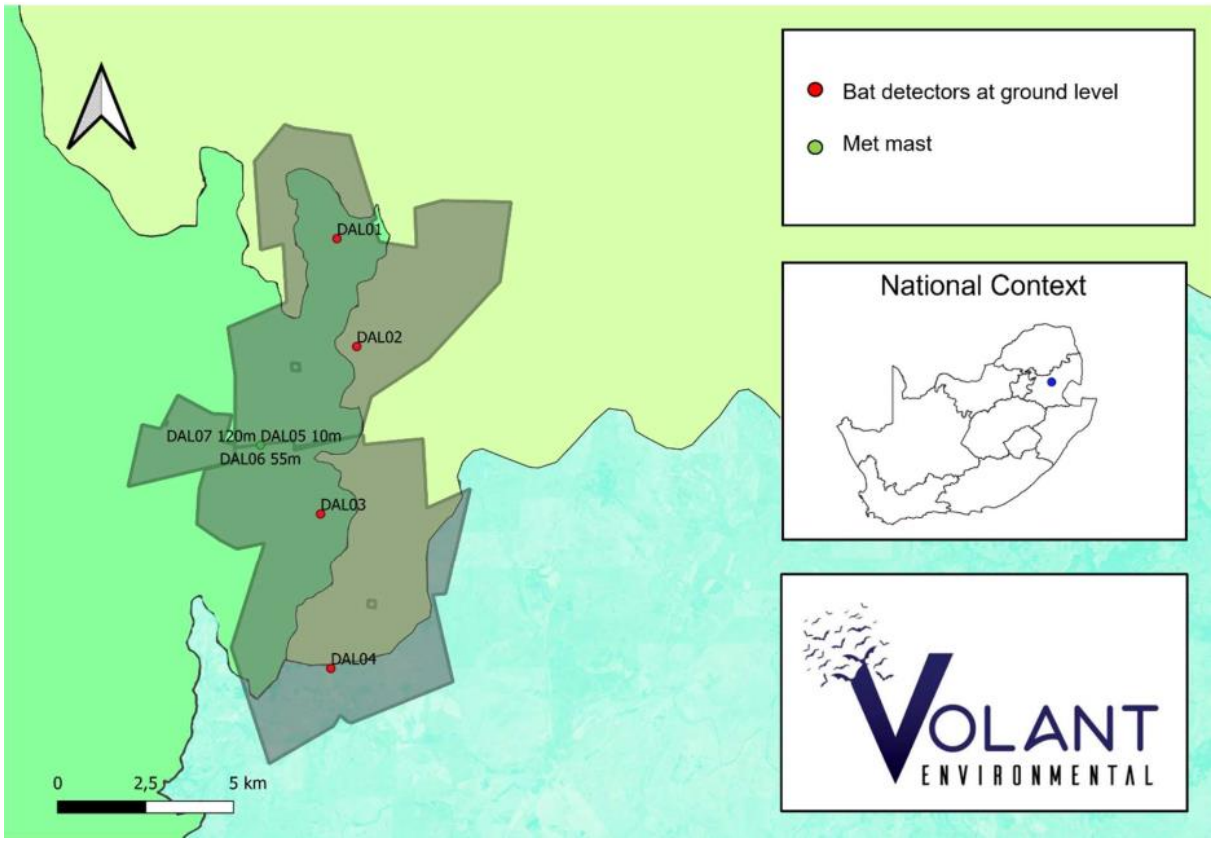


Figure 6-7: Bat detector locations- Steenkamp Montane Grassland in the north-eastern section, the KaNgwane Montane Grassland in the south-eastern section and the Eastern Highveld Grassland in the western section

Figure 6-8 depicts the sensitive areas of the site, based on features identified to be important for foraging and roosting of the species that were identified in the area. Currently these sensitive areas do not overlap with many of the proposed turbine locations, but some turbine locations will have to be reconsidered to avoid clashes with sensitive areas.

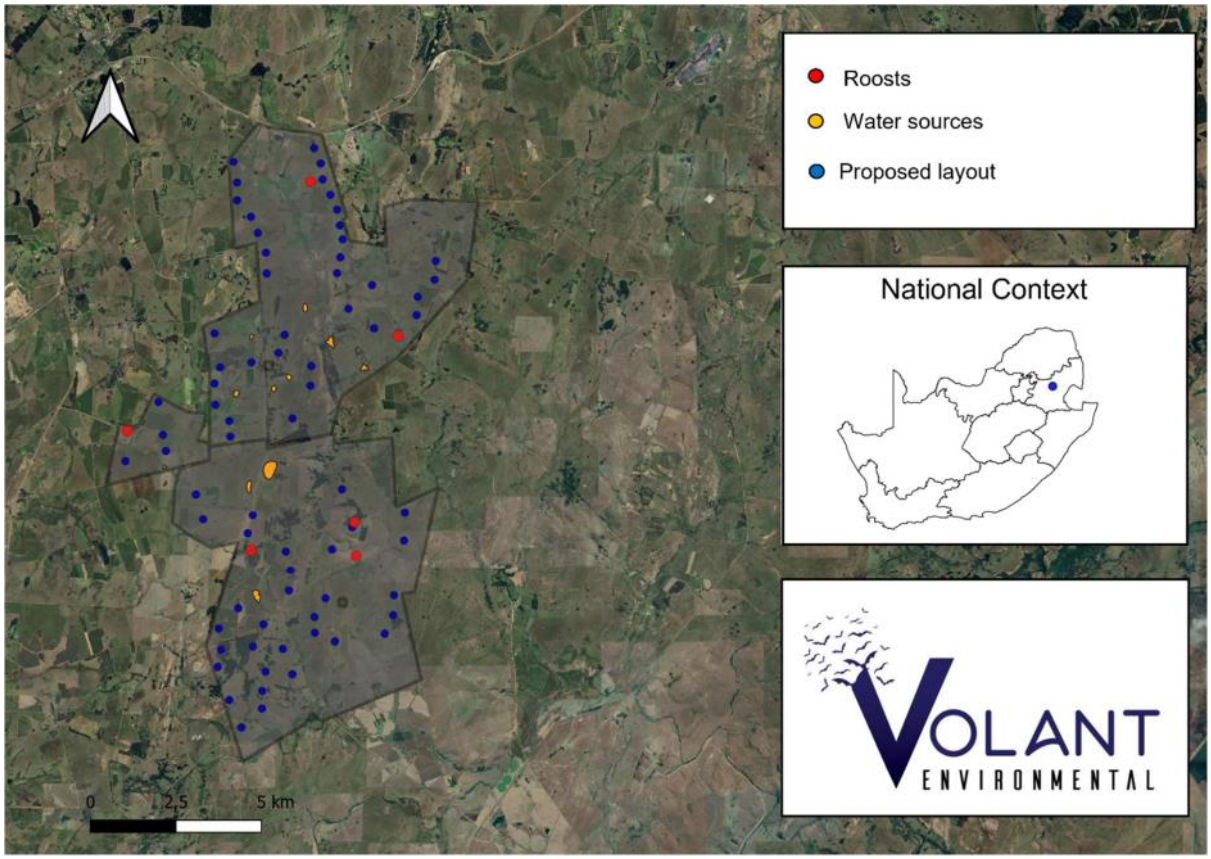


Figure 6-8: Bat sensitivity in relation to proposed turbine location (Pre-optimised 77 turbine layout)

6.6 AVIFAUNA

Figure 6-9 illustrates the avian theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE AVIAN (WIND) THEME SENSITIVITY

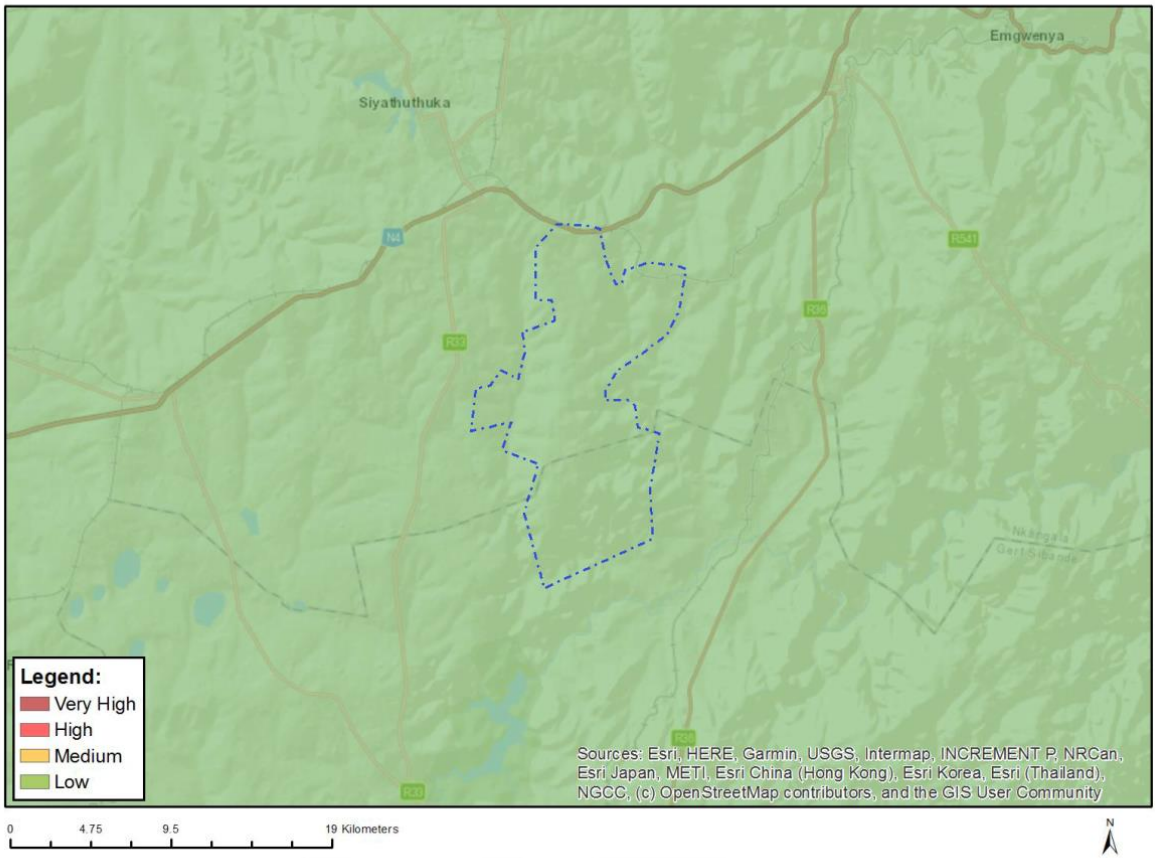


Figure 6-9: DFFE Avian Theme

The DFFE screening tool identified the site as low sensitivity for avifauna.

At a landscape level the site is classified as High sensitivity for avifauna, based on the above sources. The northern parts of the site certainly appear to be more sensitive and constrained than the southern parts.

All wetlands, at this stage these areas have not been buffered, as we will likely need to ensure consistency with the wetland specialist. This will be described more in the EIA Phase.

Berg en Dal Main wetland body: The main body of this wetland has proven to be of high value with a rich diversity of birdlife including 2 pairs of Marsh Owl and a resident Wattled Crane. Although no second Wattled Crane has been recorded and no nest found, breeding at this site remains a possibility in the future. It's recommended that a buffer of 1km should be delineated. If however a Wattled Crane breeding site is found here in the future this would need to be increased.

Leeuwkloof Pan: A round, medium sized permanent pan covered in short emergent vegetation. This is ideal habitat for many waterfowl and wetland species. It's recommended that a buffer of 500m should be delineated.

Leeuwkloof Pan 2 (**Figure 6-10**): A round, medium sized permanent pan covered in short emergent vegetation. This is ideal habitat for many waterfowl and wetland species. Based on two separate reports from farmers living in the immediate area, this pan of water is a regular seasonal breeding site for both Blue and Wattled Cranes. It's recommended that a buffer of 750m should be delineated.

Figure 6-10: Leeukloof Pan 2 (Wildskies, 2022)

Cape Vulture Roosts: Cape Vultures have been recorded roosting on three stretches of existing Eskom powerlines in the evenings. Up to a maximum of approximately 40 vultures have been recorded roosting. The large pylons running through this broader area appear to be a regular overnight roost for Cape Vultures. Two of these roosts are on site and have been mapped and buffered by 500m. The third is 1.6km off site to the south and has not been mapped at this stage. This size buffer is not sufficient for this species (mitigating risk would require many kilometres) but assumes that other forms of mitigation would be used to manage this risk and to be detailed in the EIA phase. For such a wide-ranging species any buffer would have to be very big and would probably eliminate the entire project. Furthermore, although certain areas have been identified as being used as roosts to date, all the pylons along these power lines are exactly the same from a roosting point of view and the birds could just as easily roost anywhere along the line.

Southern Bald Ibis roost/breeding colony (**Figure 6-11**). A small gorge with cliffs has been identified as being used as a roost by this species. Up to 10 birds have been recorded roosting here by our own surveys. Our survey of the cliffs revealed no evidence of breeding, although it cannot be ruled out in the future, and Lockwood (pers comm) reports 5 active nests at this location. It appears that the roost may not be used every evening and it is conceivable that it is used for breeding in some years and not others. This location site has been buffered by 1km to provide protection for these birds flying in and out of the roost.

Figure 6-11: The gorge where Southern Bald Ibis roost (Wildskies, 2022)

Blue Crane nest. Lockwood (pers comm) has reported a nest location on site. this location has been included in the sensitivity mapping and buffered the nest by 1km. However, it has been noted that landowners have recently ploughed up most of the grassland surrounding this nest location. Although the nest location itself was likely in or close to the seep area and probably left intact, time will tell whether this pair of cranes choose to nest here in the future given that their foraging grasslands around the nest no longer remain.

Grey Crowned Crane breeding area: A pair of adult cranes have been recorded in the area several times, and most recently with two juveniles. This indicates that breeding took place somewhere in this vicinity. We have identified and delineated the wetland area within which we assume these birds have bred. Without having a nest location, itself it is difficult to impose a buffer on this area, it is cautioned against planning any turbines closer to this area than the current positions.

The following specific environmental sensitivities have been identified from an avifaunal perspective:

- **100m all infrastructure exclusion zone around drainage lines and associated wetlands.** Wetlands are important breeding, roosting and foraging habitat for a variety of Red List priority species, most notably for African Grass Owl (SA status Vulnerable), Grey Crowned Crane (SA status Endangered) and African Marsh Harrier (SA status Endangered).
- **1km turbine exclusion zone around large pans.** The most significant landscape features from a collision risk perspective are the large pans. Pans attract many birds, including Red List species such as Greater Flamingo (SA status Near-threatened), Martial Eagle (SA Status Endangered), Cape Vulture (SA Status Endangered) and Secretary bird (SA status Vulnerable).
- **High sensitivity grassland - Limited infrastructure zone.** Development in the remaining high sensitivity grassland must be limited as far as possible. Where possible, infrastructure must be located near margins, with shortest routes taken from the existing roads. The grassland is vital breeding, roosting and foraging habitat for a variety of Red List priority species. These include Blue Crane (SA status near-threatened), Blue Korhaan (Global status near -threatened), White-bellied Bustard (SA Status Vulnerable), Denham's Bustard (SA Status Vulnerable).

The avifaunal sensitivities identified from a wind energy perspective for the initial Dalmanutha WEF are shown in **Figure 6-12**. A subsequent revised layout based on further avifaunal sensitivity and concerns has been developed (**See Section 6.13**)

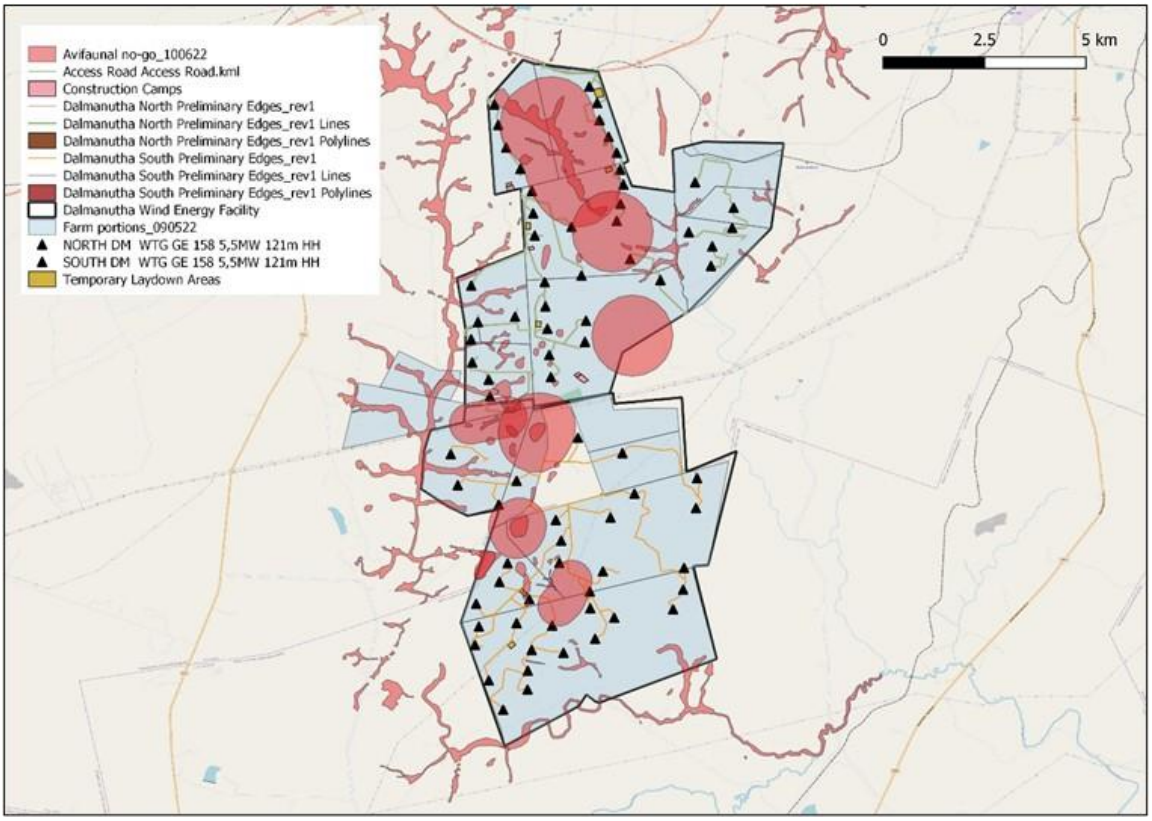


Figure 6-12: Avifaunal Sensitivities for the Dalamanutha WEF layout (Wildskies, 2022) (Pre-optimised 77 turbine layout)

6.7 FLICKER

Figure 6-13 illustrates the flicker theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE FLICKER THEME SENSITIVITY

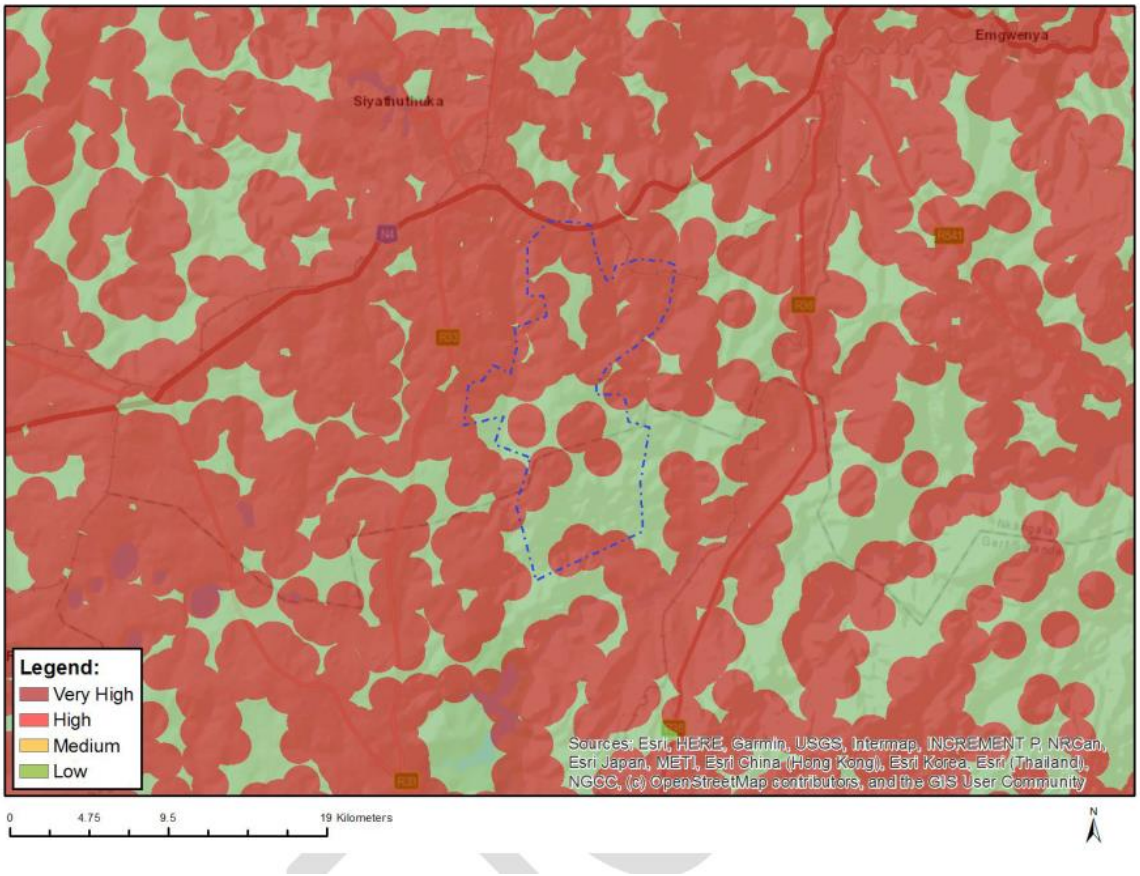


Figure 6-13: DFFE flicker theme

The screening tool identified the flicker theme as high-low.

The specialist appointed to undertake the scoping study (**Appendix K**) has rated the sensitivity of the site as high-medium pre-mitigation.

6.8 LANDSCAPE

Figure 6-14 illustrates the landscape theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE LANDSCAPE (WIND) THEME SENSITIVITY

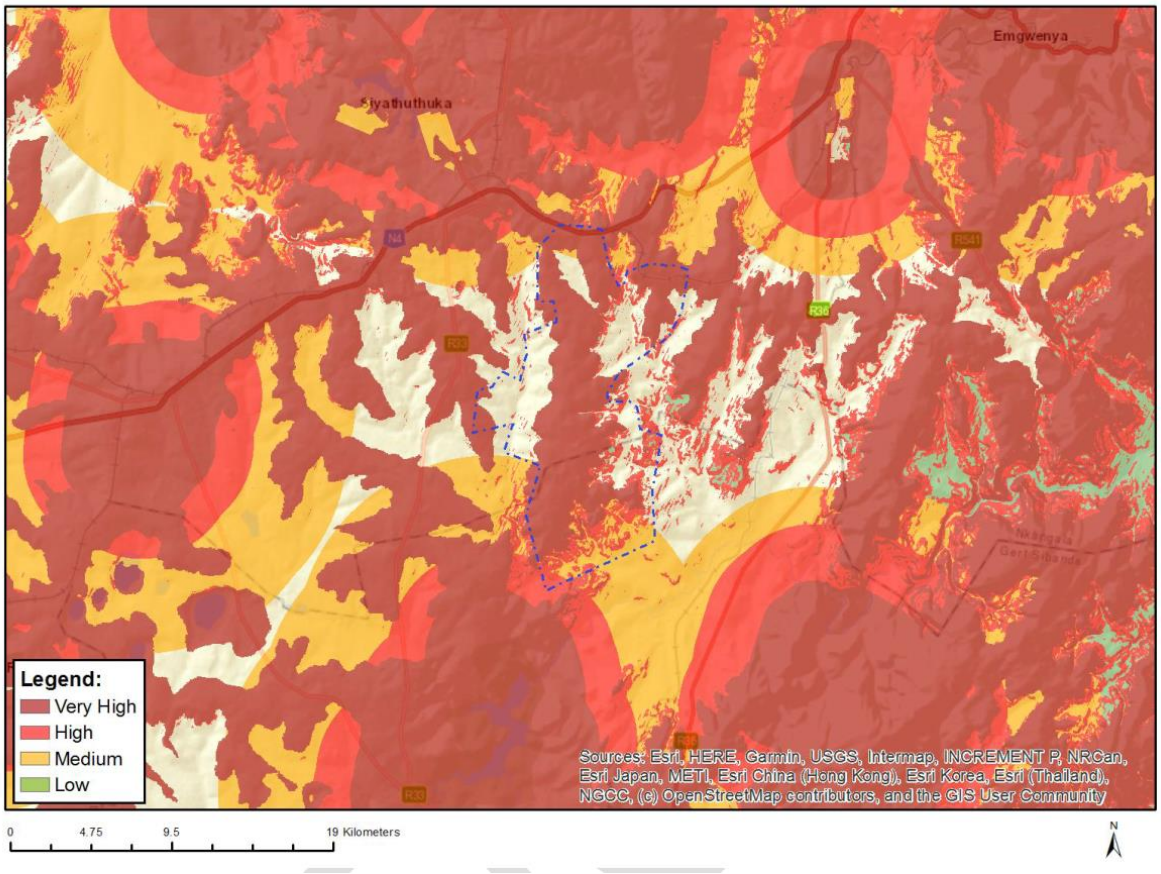


Figure 6-14: DFFE Landscape Theme

The screening tool identified the landscape theme as very high.

Visual sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e., topography, landform, and land cover), the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational or nature-based tourism) which may be based on this aesthetic appeal. It is important to note that receptors identified within the WEF project are landowners and supportive of the development proceeding. **Figure 6-15** below outlines the potential visibility of the proposed WEF to the surrounding areas.

The result of the preliminary viewshed analyses for the proposed WEF is shown on **Figure 6-15**. The initial viewshed analyses were undertaken from preliminary vantage points (with a maximum of 71) within the proposed development area at offsets of 200m above average ground level (i.e., the approximate hub height of the proposed wind turbines).

This was done to determine the general visual exposure of the area under investigation, simulating the proposed structures associated with the WEF. It must be noted that the viewshed analyses do not include the effect of vegetation cover or existing structures on the exposure of the proposed wind turbines, therefore signifying a worst-case scenario.

The viewshed analyses will be refined once a final layout of the wind energy facility is completed and will be regenerated per turbine position (and actual proposed turbine height) during the EIA phase of the project.

Figure 6-15 indicates areas from which any number of turbines (with a minimum of one turbine) could potentially be visible as well as proximity radii from the proposed development area in order to show the viewing distance (scale of observation) of the facility in relation to its surroundings.

The following is evident from the viewshed analyses:

0 – 5km

- The proposed WEF would have a large core area of potential visual exposure within a 5km radius of the development site. This is due to the tall wind turbine structures and the flat topography. This core area does not include any towns, but some unnamed homesteads that dot the delineated zone.
- The turbine structures are expected to be clearly visible from the N4 traversing the north of the delineated zone.
- The turbine structures are expected to be clearly visible from the R33 arterial road and the secondary dust roads adjoining this as these roads traverse the proposed development area.

5 – 10km

- Visual exposure will remain high in the medium distance (i.e., between 5 and 10km), due to the flat undulating nature of the topography. Of importance in this zone are the northern half of the Nooitgedacht Dam Nature Reserve, and the town of Belfast towards the northwest of the zone, as well as several settlements and homesteads. The town of Belfast shows approximately 80 percent potential visibility.
- The turbine structures are expected to be clearly visible from the N4 traversing the north of the delineated zone.
- The turbine structures are expected to be visible from the R33 west of the zone, the R540 northwest of the zone, as well as the R36, traversing the east of the delineated zone. Several secondary dust roads within the delineated area too will be affected.

10 – 20km

- In the medium to longer distance (i.e., between 10 and 20km), visual exposure will be somewhat reduced, specifically towards the northwest and east of the study area. This zone also includes a number of settlements and homesteads, the town of Machadodorp towards the northeast (with limited visibility due to the nature of the topography), and the northern regions of Belfast towards the northwest (with high potential visibility). Towards the south of the delineated area lies the northern region of the town of Carolina, with limited potential visibility due to the nature of the topography.
- Of importance in this zone towards the north is the Greater Lakenvlei Protected Environment (with approximately 50 percent potential visibility), and the Langkloof Private Nature Reserve (with approximately 60 percent potential visibility). The Paulina van Niekerk Private Nature Reserve lies towards the southeast of the delineated zone, with approximately 60 percent of the reserve showing potential visibility. South of the delineated zone lies the southern half of the Nooitgedacht Dam Nature Reserve with approximately 60 percent of the reserve showing potential visibility. Finally, the Cecilia Private Nature Reserve east of the zone indicates that about 80 percent of the reserve will be potentially visible.
- The turbine structures are expected to be clearly visible from the N4 traversing the north of the delineated zone. About 50 percent potential visibility is shown along the R33 and R540 north of the site, while potential visibility is shown along the R541 traversing the north-east of the zone, as well as the R36 and R33 south of the zone. Several secondary dust roads within the delineated area too will be affected, but to a lesser extent than those within a closer radius.

> 20km

- Visual exposure beyond a 20km radius is significantly reduced, especially towards the northwest and south-east.

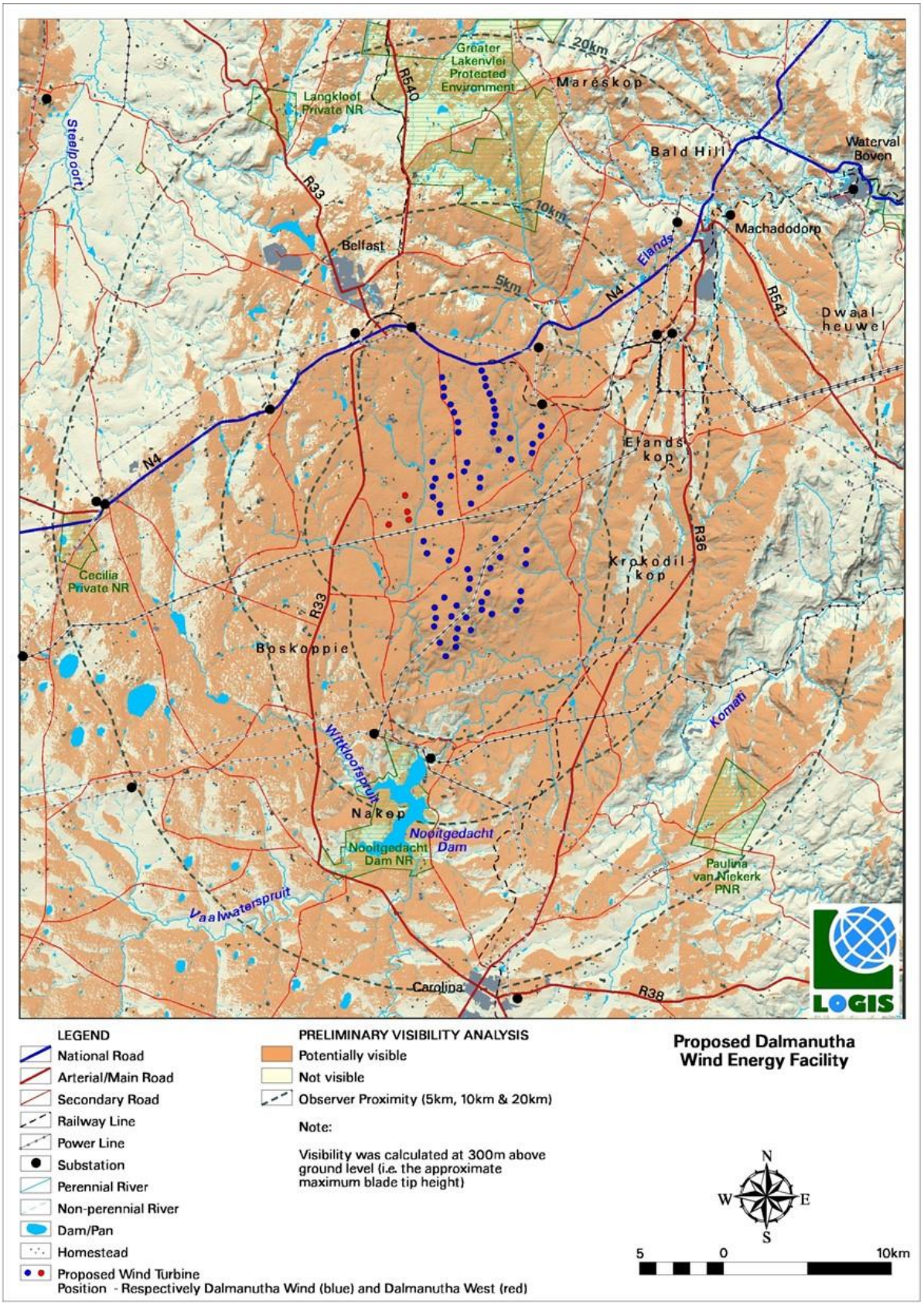


Figure 6-15: Potential visibility of the proposed Dalmanutha WEF Site (Pre-optimised 77 turbine layout)

6.9 PALAEONTOLOGY

Figure 6-16 illustrates the palaeontology theme sensitivity from the screening report generated on 24 November 2022.

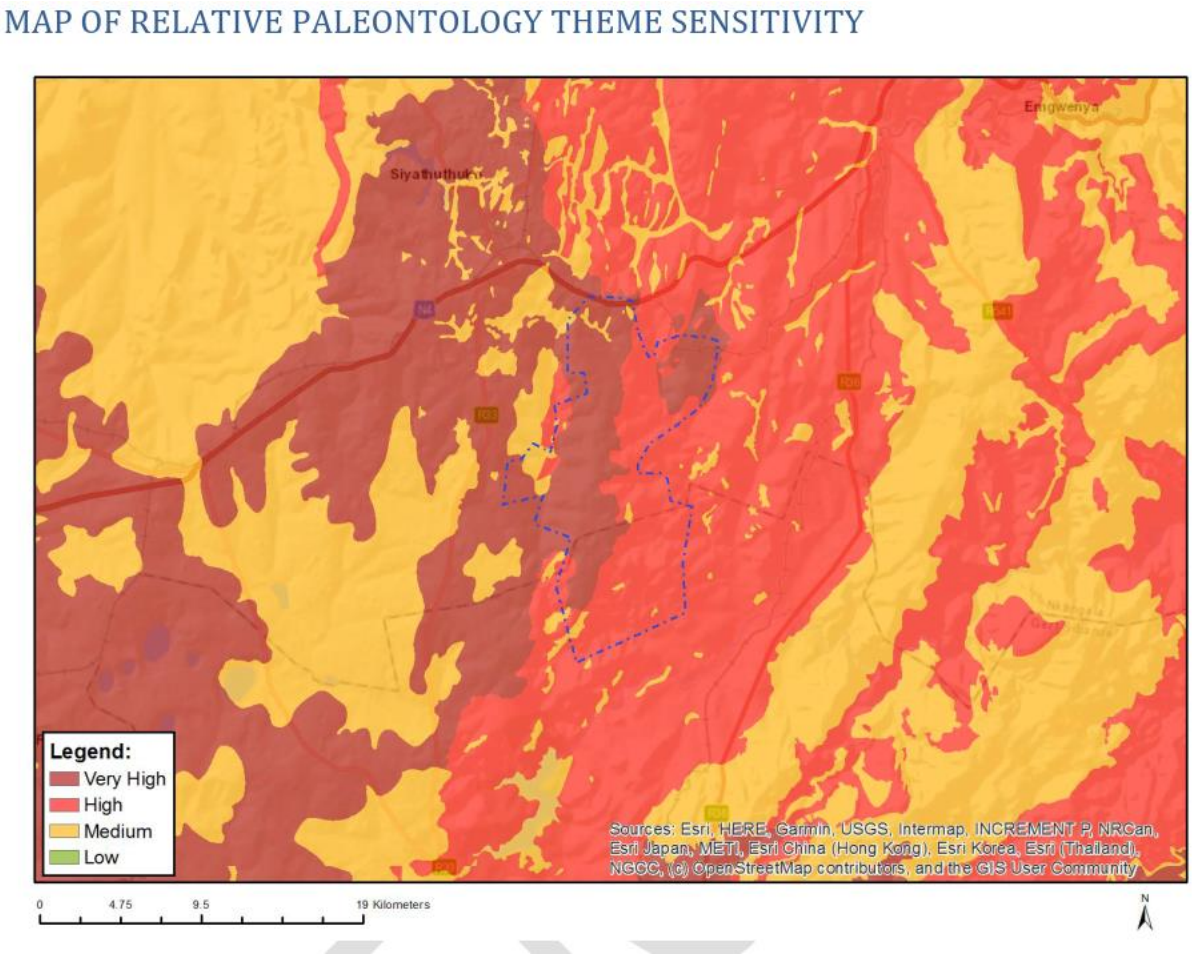


Figure 6-16: DFFE palaeontology theme

The palaeontological sensitivity of the site as per the screening tool was identified as Very High-High. However, the specialist appointed has rated the site as medium sensitivity pre-mitigation.

6.10 NOISE

Figure 6-17 illustrates the noise theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE NOISE THEME SENSITIVITY

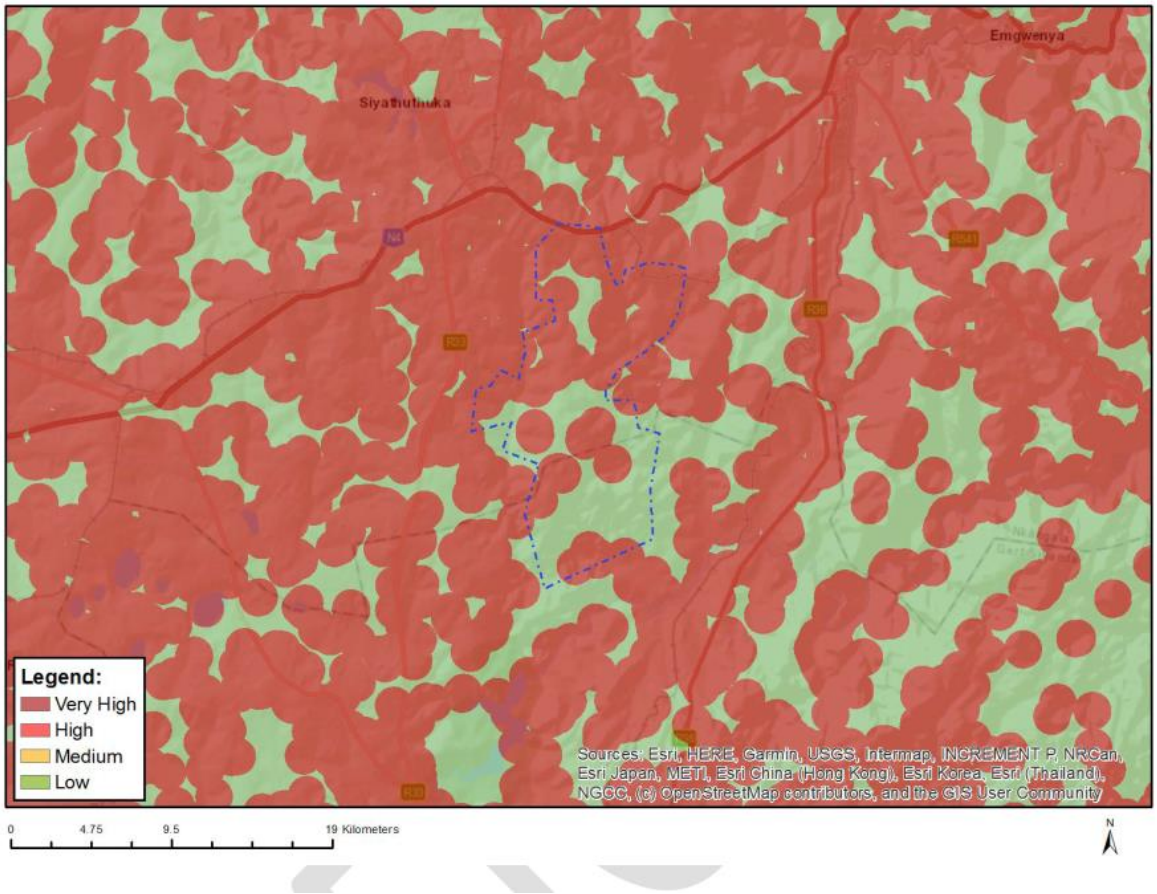


Figure 6-17: DFFE noise theme

The screening tool has identified patches of the site as being high-low sensitivity in terms of noise receptors. The acoustic scoping study (**Appendix P**), has concurred with this sensitivity, pre-mitigation.

6.11 PLANT SPECIES

Figure 6-18 illustrates the plant species theme sensitivity from the screening report generated on 24 November 2022.

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

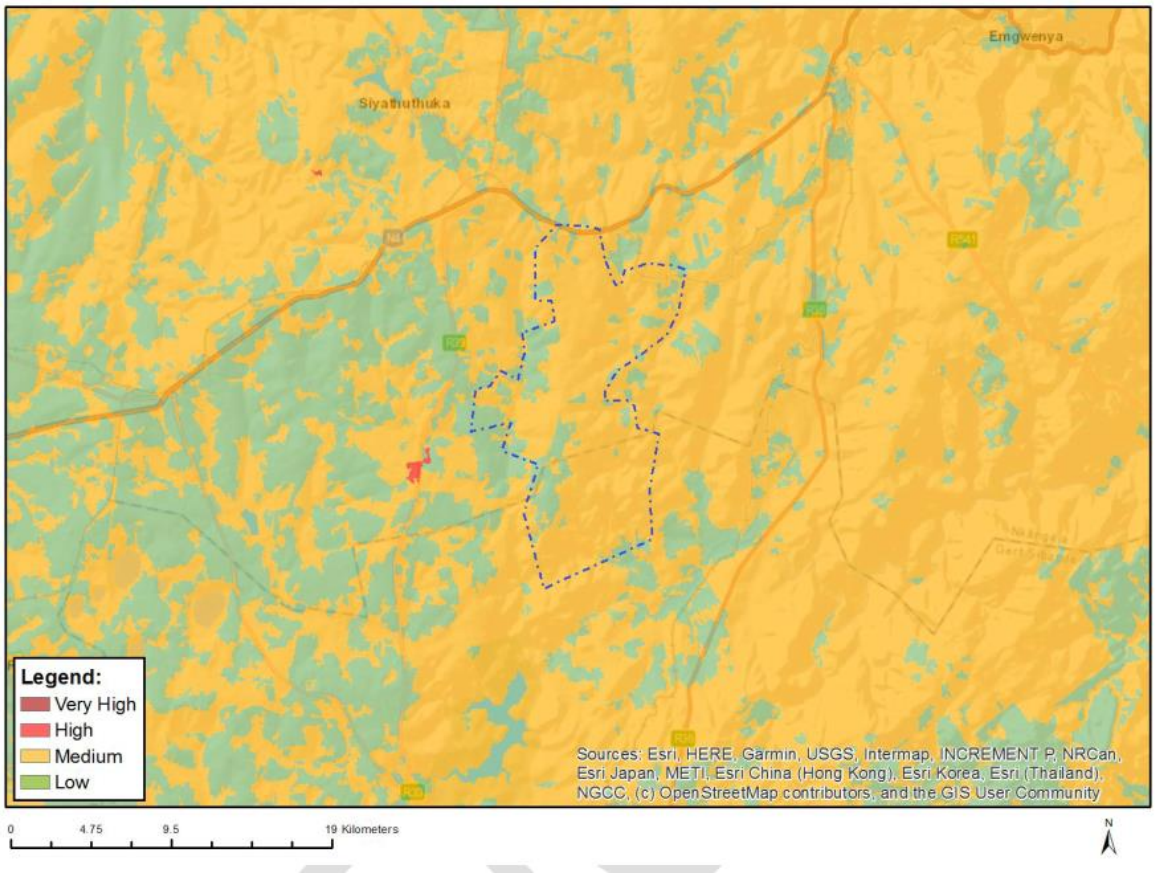


Figure 6-18: DFFE plant species theme

The screening tool identified the site as being medium-low sensitivity in terms of the plant species theme.

According to the terrestrial ecology scoping study (**Appendix H**) the site has a medium sensitivity in the primary grasslands and Present Ecological State A/B (Natural/near-natural) wetlands. The presence and extent of primary grasslands and flora SCC to be confirmed during flora survey, however most sensitive areas are situated beyond project footprint

6.12 TERRESTRIAL BIODIVERSITY

Figure 6-19 illustrates the terrestrial biodiversity theme sensitivity from the screening report generated on 24 November 2022

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY

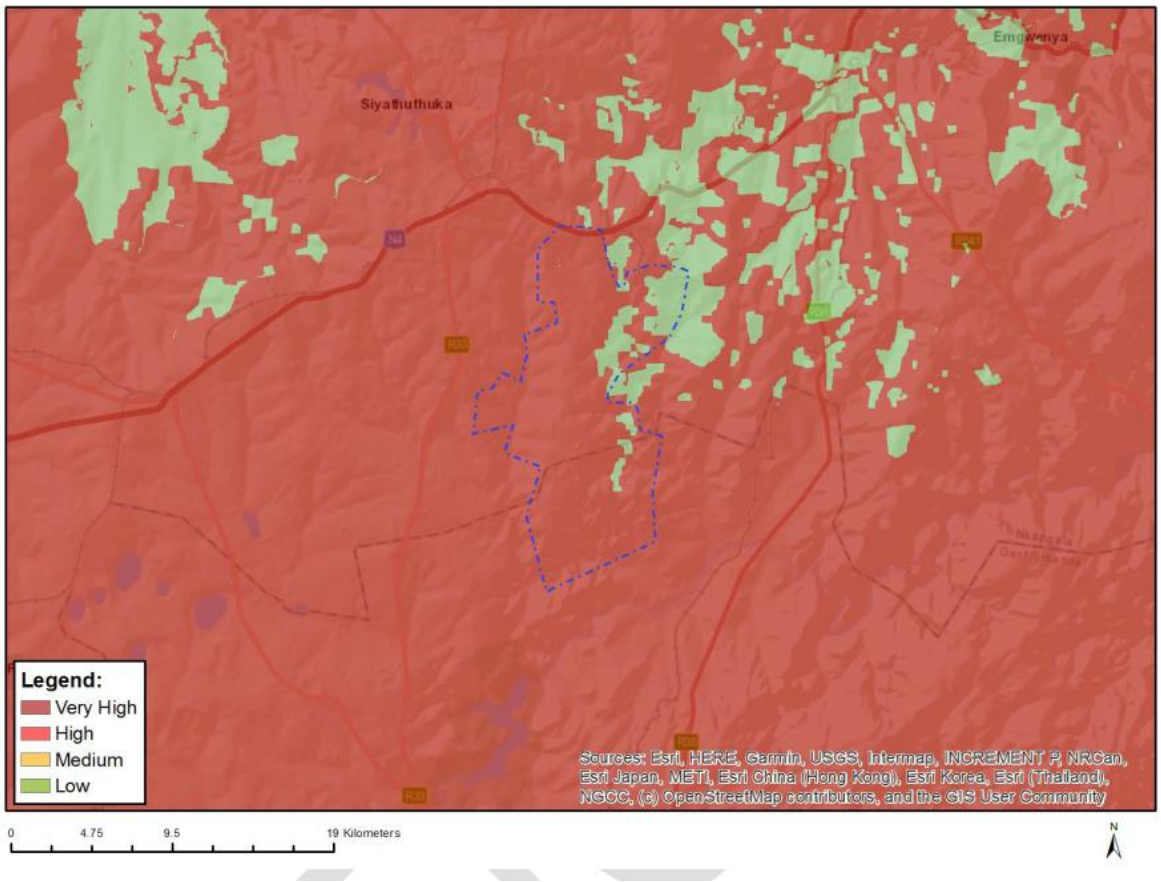


Figure 6-19: DFFE terrestrial biodiversity theme

According to the screening tool, much of the site is classified as highly sensitive, while also having patches of low sensitive areas. According to the terrestrial ecology scoping study (**Appendix H**), the site is highly sensitive is primary grasslands and has a present ecological state of A/B (Natural/near natural) in wetlands. The study also confirms the low sensitivity in secondary grassland and modified habitats. Secondary grasslands and modified habitats cannot contribute to provincial conservation targets, which is the intention of CBAs. Only (unavoidable) impacts sustained in primary grasslands and high value wetlands can be considered to affect CBAs, and as such trigger potential offset/compensation requirements.

6.13 WEF LAYOUT DEVELOPMENT

The layout of the Dalmanutha WEF originally had 77 turbines proposed. This layout has since been revised and seven turbines in the northern portion have been dropped in consideration of the sensitive avifaunal nature of the site. The avifaunal specialist has undertaken a risk assessment and ranked each turbine according to its impact on the avifaunal species on site.

The seven WTG that have been removed (**WTG 6, 7, 8, 14, 15, 16 & 17**) were ranked as the highest risk to the avifaunal species on site according to the specialist risk assessment. **Figure 6-20** below shows the original layout of the WEF with the turbines ranked. Whereas **Figure 6-21** and **Figure 6-22** shows the revised layout with the seven highest risk turbines removed.

It is important to note that the above layout is still in its preliminary stages and still subject to change if need be.

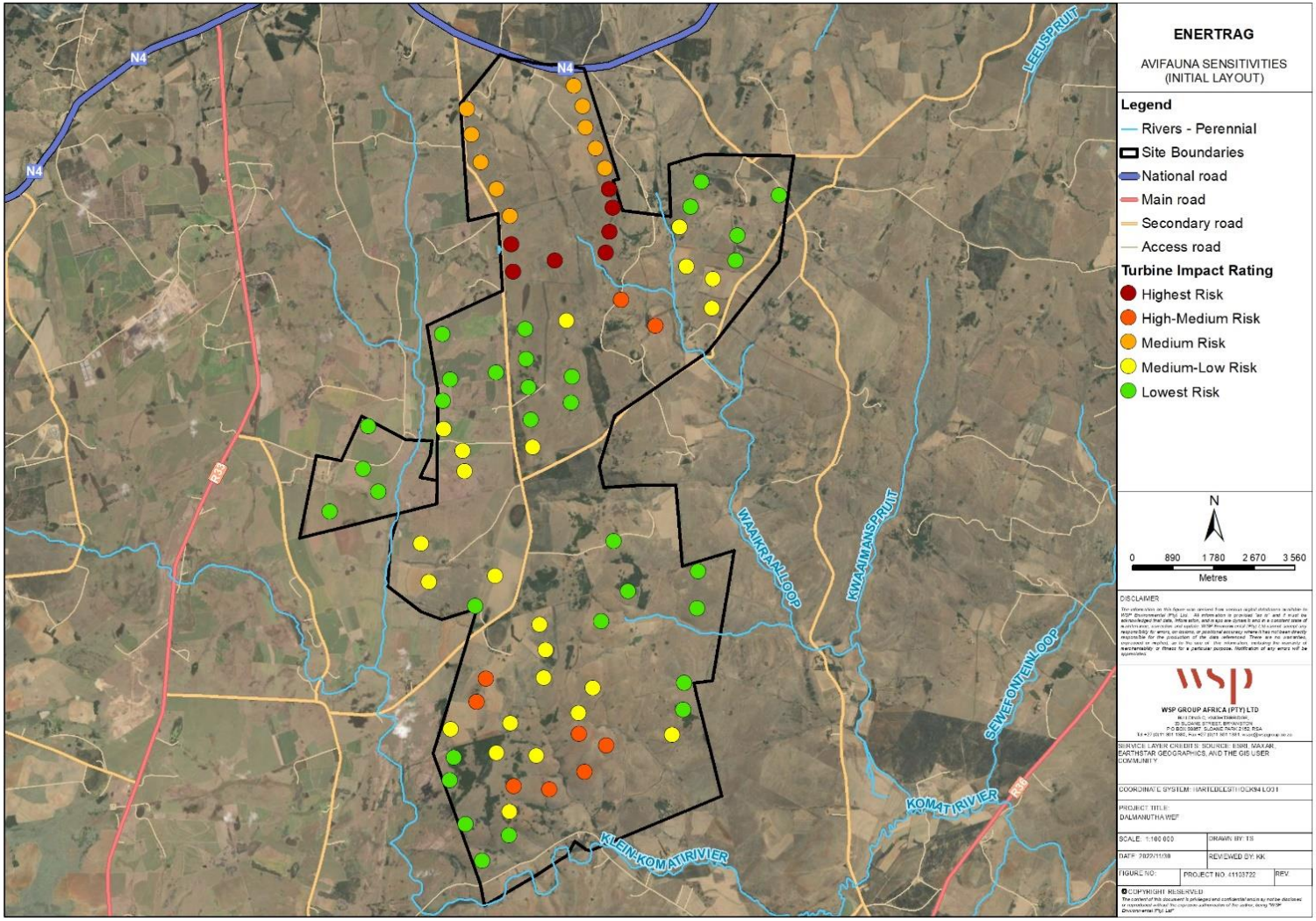


Figure 6-20: Dalmanutha WEF WTG layout ranked according to avifaunal risk (Pre-optimised 77 turbine layout)

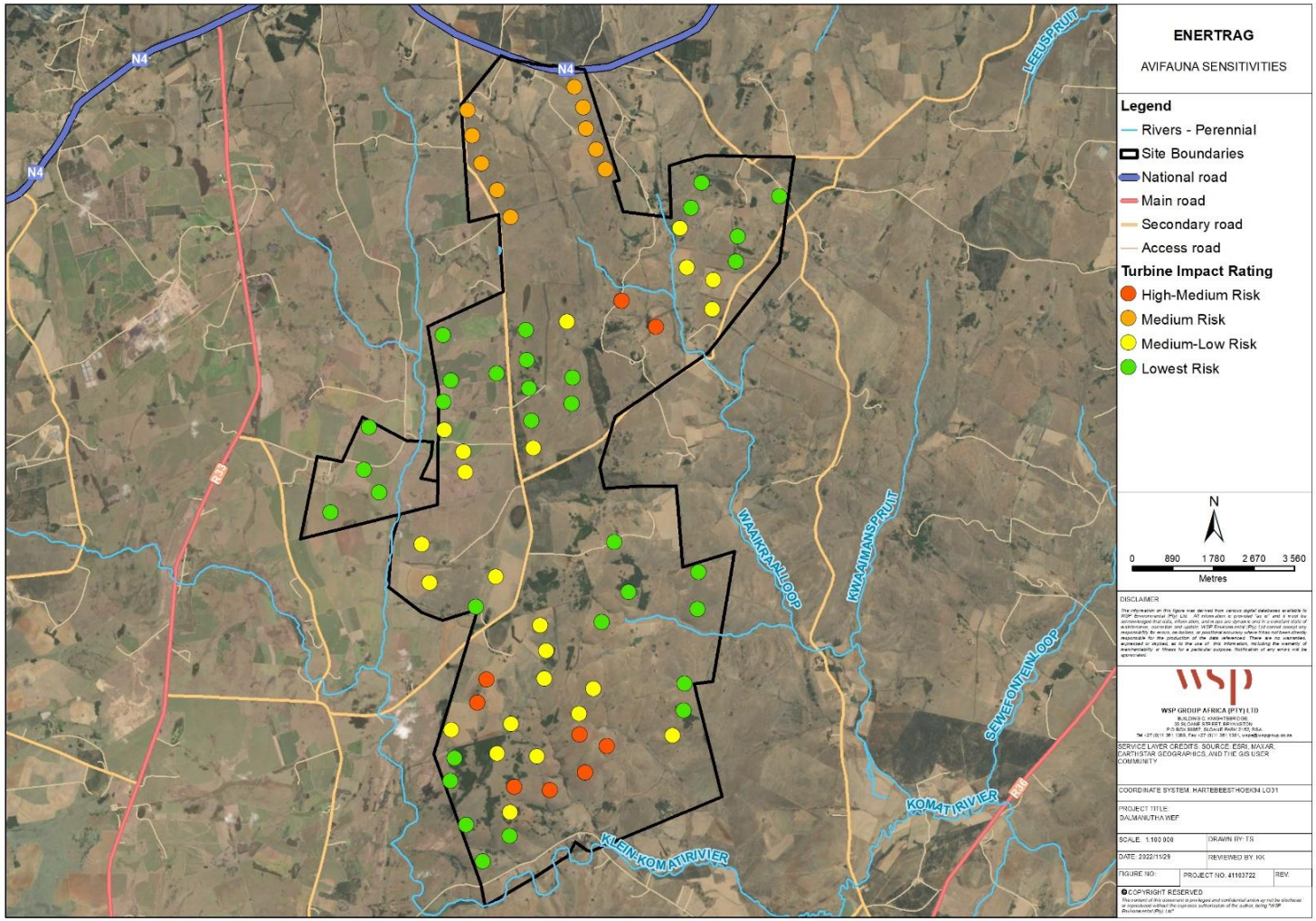


Figure 6-21: Revised Dalmanutha WEF layout (70 Turbines)

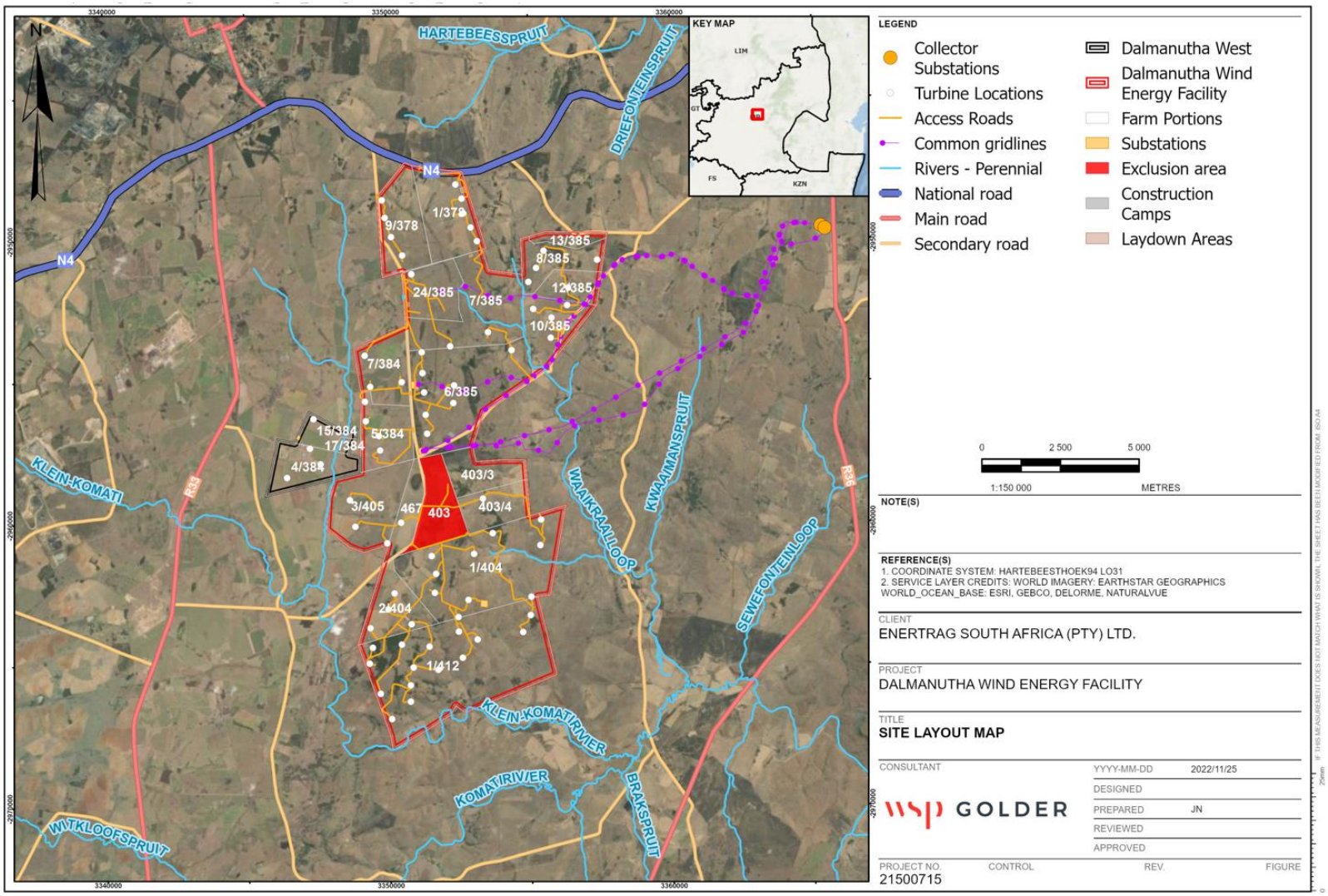


Figure 6-22: Proposed Dalmanutha WEF and associated infrastructure (70 Turbine Layout)

7 IDENTIFICATION OF POTENTIAL IMPACTS

The scoping phase of a S&EIR process is aimed to identify potential impacts that are most likely to be significant and which need to be assessed. The determination of anticipated impacts associated with the proposed development is a key component to the S&EIR process. This Chapter identifies the anticipated environmental and social impacts associated with the proposed project.

The issues identified stem from those aspects presented in **Section 5: Description of Baseline Environment** and the description of project components and phases as outlined in **Section 2: Project Description**. Each significant issue identified is to be investigated further during the S&EIR process. Non-significant issues will be scoped out of the study with reasonable consideration given within the Scoping Report.

7.1 AIR QUALITY

Receptors are identified as areas that may be impacted negatively due to emissions from the proposed development. Examples of receptors include, but are not limited to, schools, shopping centres, hospitals, office blocks and residential areas. Due to the remote location of the site, dominant receptors in the area include small farmsteads and farmhouses. A 2km radius / area of influence proposed for the project includes preliminary receptors identified farmsteads within 2km of the nearest turbine and/or associated infrastructure.

Construction Phase Impacts	**Dust Emissions** Construction is a source of dust emissions that can have a temporary impact on the local air quality situation. Emissions during construction are associated with land clearing, drilling, and blasting, ground excavation and cut and fill operations. Dust emissions vary substantially on a daily basis, depending on the level of activity, the specific operations and the prevailing meteorological conditions. A large portion of dust emissions results from movement of equipment and traffic over temporary roads at the construction site. The use of project-related vehicles and machinery can also result in an increase of gaseous emissions and potentially contributing to reduced ambient air quality.
Operational Phase Impacts	No impacts anticipated.
Mitigation Considerations	Implementation of standard construction phase mitigation measures (such as wet suppression) to be outlined in the EMPr will assist in controlling dust emissions and minimising impacts.
Recommended EIA Phase Studies	No further studies are recommended.

7.2 NOISE AND VIBRATIONS

Construction Phase Impacts	**Noise and Vibration Emissions** The following construction-related activities are likely to generate vibrations and additional noise into the environment: — Presence of workforce — Land clearing — Drilling, blasting, piling

- Cut and fill operations
- Vehicle activities associated with transport of equipment
- Use of equipment and machinery
- Concrete mixers and cranes

Vibrations and audible increase in noise can lead to the disturbance and nuisance to sensitive receptors. A receptor is defined by the WBG (April 2007) as "any point on the premises occupied by persons where extraneous noise and/or vibration are received". Being such a remotely located site, dominant receptors in the area surrounding the site include small farmsteads and farmhouses.

Operational Phase Impacts

Noise Emissions

Principal sources of noise in wind energy facilities include mechanical noise generated from the turbine's mechanical components and aerodynamic noise produced by flow of air over the turbine blades. Mechanical noise is produced by the physical movement of components such as gearbox, generator, yaw drives, cooling fans and auxiliary equipment. Over time, appropriate design and manufacturing have reduced the mechanical noise produced from wind turbines. As such, the aerodynamic noise from the blades has become the dominant source of noise for modern turbines. Aerodynamic noise is typically broadband in nature and is generated by the interaction between air flow and different parts of the turbine blades.

In addition to the noise from wind turbines, wind farms require a substation and transformers, which produce a characteristic "hum" or "crackle" noise. Utility companies have experience with building and siting such sources to minimise their impact. Substation-related noise is relatively easy to mitigate should this be required, based on the use of acoustic shielding and careful planning regarding placement away from sensitive receptors. As such, noise associated with this source is not considered in this assessment.

Cumulative Impacts

Cumulative impacts might occur due to the additional Dalmanutha West WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative.

Mitigation Considerations

- Implementation of standard construction phase mitigation measures to be outlined in the EMPr will assist in controlling noise emissions and minimising impacts.
- The following measures are outlined by the IFC / WBG Wind Energy EHS Guideline (August 2015) as having potential to assist to prevent, minimize, and control noise impacts:
  - Operating turbines in reduced noise mode.
  - Building walls/appropriate noise barriers around potentially affected buildings (only an option in hilly terrain, due to the height of turbines).
  - Curtailing turbine operations above the wind speed at which turbine noise becomes unacceptable in the project-specific circumstances.

Recommended EIA Phase Studies

An Environmental Acoustic Impact Assessment will be undertaken during the EIA phase including findings of the preliminary modelling, associated impacts, as well as detailed recommendations, including mitigation measures if deemed necessary. This data obtained will be used for the micro-siting process. Refer to **Section 7** of this Report for the Plan of Study for the Environmental Acoustic Impact Assessment.

7.3 TOPOGRAPHY AND GEOLOGY

Construction Phase Impacts

Furthermore, excavation, drilling and blasting activities have the potential to result in slope instability. It is anticipated that minor impacts to the topography will occur during construction and the impact will be limited to localised areas that is within the turbine positions and associated infrastructure.

A detailed intrusive site investigation is recommended to further characterize site conditions, to better understand the key geotechnical risks characteristics in order to refine the development of the WEF. Based on the current lack of previous geotechnical investigation data, the primary objectives of the proposed intrusive investigation must include:

- Determination of the founding conditions for all structures. The scope of the intrusive investigation should comprise test pitting, the drilling of a representative number of boreholes and laboratory testing.
- Investigation of subgrade conditions for service roads.
- Investigation for materials to be used during construction.
- Non-intrusive investigation techniques, such as geophysical (seismic refraction) surveys, thermal and electrical resistivity for ground earthing requirement.

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- Implementation of erosion management measures in line with the Erosion Management Plan and Rehabilitation Plan to be included in the EMPr.
- All cleared areas must be revegetated with indigenous vegetation.
- Implement an effective stormwater runoff control system, including runoff control features to direct and dissipate water flow from roads and other hardened surfaces.
- Progressive rehabilitation will be essential to reduce the potential for soil erosion and sedimentation.

Recommended EIA Phase Studies

No further studies are recommended. A “negative moderate to very high” impact was assessed, from a geotechnical perspective, for the pre-mitigation situation for the Dalmanutha WEF. Post-mitigation, the assessed impact decreases significantly to “very low to low.”

7.4 SOILS, LAND CAPABILITY AND AGRICULTURAL POTENTIAL

Construction Phase Impacts

Soil erosion

Some erosion will occur wherever soils are disturbed, especially if mitigation measures are not correctly put in place. The thin, hilltop soils and the less structured soils will be more vulnerable to erosion than the more clay-rich soils. Soil erosion can lead to sedimentation of the watercourses that cross the site, and to the loss of arable soil, especially topsoil, for rehabilitation purposes.

Soil erosion mitigation measures that should be considered include phase-appropriate stormwater management plans and correct soil stripping, stockpiling and monitoring, with emphasis on quick revegetation of bare soils. Further to this, existing roads should be used and regraded.

Soil erosion probability is thus definite and potential consequences severe, making the significance High.

Soil compaction

The more clay-rich soils identified on site will be more vulnerable to compaction than the sandier soils will be.

Soil compaction reduces the pore space available for air and water within soil, reducing soil arability and increasing the risk of soil erosion.

Soil compaction cannot be fully mitigated against as compacted soil cannot regain its original structure. Soils can be ripped to make them more suitable for cultivation. Soil compaction mitigation measures that should be considered include limiting vehicle routes on site by demarcating traffic areas and limiting vehicle access, and by stripping soils when they are dry. Reuse of existing roads will prevent additional areas from becoming compacted.

Soil compaction probability is thus Definite and potential consequence Moderately Severe, making the significance Medium.

Soil contamination

The more clay-rich soils identified on site will be more vulnerable to contamination than the sandier soils will as the more clay-rich soils are more chemically active and will interact with the contaminants. All soils will be at risk of contamination, especially from hydrocarbons, as a result of the Project, especially during the construction phase.

Contamination mitigation measures that should be considered will include proper handling and storage of hazardous materials, frequent vehicle maintenance, equipping onsite vehicles with drip trays, strict control of the potential contaminants entering the site and adequate waste disposal facilities on site.

Soil contamination probability is Highly Probable and potential consequence Severe, making the significance Medium.

At this stage no soils-related fatal flaws are evident for the proposed project. The areas on site that need to be buffered are the watercourses and the area that needs to be avoided is the exclusion area, which was not included

in the study at the landowner's request.

Operational Phase Impacts

Enhanced agricultural potential through increased financial security for farming operations

Reliable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and thereby could improve farming operations.

Prevention of crop spraying by aircraft over land occupied by turbines.

Interference with farming operations

Construction (and decommissioning) activities have some nuisance impact for farming operations but are highly unlikely to have an impact on agricultural production

Cumulative Impacts

Cumulative impacts might occur due to the additional Dalmanutha West WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative, with the ecological impact of all facilities operating in combination likely to exceed the sum of individual parts.

Mitigation Considerations

- Implementation of erosion management measures in line with the Erosion Management Plan and Rehabilitation Plan to be included in the EMPr.
- All cleared areas must be revegetated with indigenous vegetation.

- Implement an effective stormwater runoff control system, including runoff control features to direct and dissipate water flow from roads and other hardened surfaces.
- Progressive rehabilitation will be essential to reduce the potential for soil erosion and sedimentation.
- Areas of construction should be (practically) limited in extent, and activities outside of the project area should be kept to a minimum.
- Vegetation removal should be kept to a minimum and limited to the area of development.
- Impacts that are expected to lead to long term degradation of soil quality (i.e., soil contamination) need to be limited through appropriate on-site management measures. This includes the proper handling and storage of hazardous materials, the use of hardstanding in areas where spillages are possible, the use of bunding around storage of hazardous materials and proper upkeep of machinery and vehicles.
- existing roads are to be used (where possible) to avoid further erosion and clearing of land.

Recommended EIA Phase Studies

A detailed Agricultural Specialist Assessment would need to be undertaken during the EIA phase of the assessment. Refer to **Section 7** of this Report for the Plan of Study for the Soil and Agricultural Impact Assessment.

7.5 SURFACE WATER

Construction Phase Impacts

The construction of the project components will result in clearing of vegetation, levelling, and excavation / trenching. The removal of vegetation can result in exposure of bare soil to wind and rainfall leading to an increase in erosion potential. Generation of excess excavation material will require spoiling / stockpiling which can also lead to an increased risk of soil erosion. Rainfall on unconsolidated sediment has the potential to cause an indirect impact as runoff with higher sediment load entering surrounding drainage lines leading to sedimentation of watercourses and reduced water quality (due to increased turbidity). During construction, it is expected that the magnitude of the impact will be moderate and will require mitigation to reduce the risk. This has the potential to result in negative secondary impacts on receiving environments and ecosystem functioning. Surface water impacts associated with the proposed WEF relate to:

- Loss of aquatic species of special concern
- Damage or loss of riparian and wetlands systems and disturbance of the waterbodies during construction
- Potential impact on localised surface water quality
- Impact on habitat change and fragmentation related to hydrological regime changes

Stormwater runoff could, in the case of the temporary construction yards and laydown areas, potentially come in contact with areas dedicated for the handling of contaminants such as fuel storage areas or in the case of wind turbine sites or the substation / control building, with areas where potential contaminants such as concrete is being handled. This could result in contaminated stormwater runoff being discharged downstream. During construction, it is expected that the magnitude of the impact will be low and will require mitigation to reduce the risk.

Operational Phase Impacts

Stormwater runoff in the vicinity of the substation / control building and wind turbines could come into contact with dedicated areas where hazardous substances are handled such as fuels and oils which could result in contaminated stormwater runoff being discharged downstream. During the operational phase, it is expected that the magnitude of the impact will be low and will require mitigation to reduce the risk.

In the operational phase, the potential impacts due to the additional hardened surfaces include erosion of the surrounding environment. Eroded soil particles carried to downstream water resources can also result in the decrease in quality of nearby watercourses, due to sedimentation. The impact significance in the operation phase is expected to be moderate. During the operation of the wind farm site, an increase in stormwater runoff is expected due to an increase in impervious surfaces, i.e., proposed roads and turbine foundations. However, this increase in hardened surfaces can be considered as negligible. Therefore, very little to no increase in peak flow in the watercourses are expected, hence the impact significance is expected to be low.

Mitigation Considerations

Prevention of soil erosion and uncontrolled flow of water across the site is an essential design requirement. The project will include stormwater management infrastructure (drainage and containment) to protect project assets and control surface water flow. Additional measures to protect watercourses and aquatic ecology typically include:

- Presenting a layout that avoids all sensitive habitats that were rated as HIGH, except for making use of areas that are already disturbed e.g., upgrade road crossings.
- Where these crossings are upgraded the following must be considered:
  - The final design should take cognisance of typical baseflows and should not create any impedance of flows
  - Natural river levels upstream and downstream of the site should be maintained, thus allowing for continuity within the riverbed, i.e., not create any obstruction limiting any fauna from moving up or downstream.
  - Vehicle movement within the watercourse should be limited to the works area to prevent undue any compaction of soils
  - Bed and bank erosion protection should be included in the designs to prevent bank instability and sedimentation.
  - Protect structures such as the wind turbine bases and substation / control building from localised flooding by constructing cut-off berms / diverting flow on the uphill side in flood prone areas.
- With regard the prevention of water quality changes to the aquatic environment the following must be monitored / implemented:
  - Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early.
  - Littering and contamination of water sources during construction must be prevented by effective construction camp management.
  - Emergency plans must be in place in case of spillages onto road surfaces and water courses.
  - No stockpiling should take place within a water course.
  - All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.
  - Stockpiles must be located away from river channels.
  - The construction camp and necessary ablution facilities meant for construction workers must be beyond the proposed buffers.

Recommended EIA Phase Studies

A detailed Aquatic/surface water Impact study, including wetland assessment, would need to be undertaken during the EIA phase of the assessment. This will include the associated potential impacts and corresponding mitigation measures. Following comments from the relevant stakeholders, the final report will be updated and submitted with the final EIA report. Refer to **Section 7** of this Report for the Plan of Study for the Aquatic Impact Assessment.

7.6 GROUNDWATER

Construction Phase Impacts

Ground contamination

During the construction phase there is potential for soil contamination associated with potential release of environmental contaminants and hazardous substances (typically sewage/ portable toilet chemicals, cement, oil grease and fuel).

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- Chemicals, hydrocarbon materials and hazardous substances maintained onsite must be managed in accordance with the Hazardous Substances Act (No. 15 of 1973) and its relevant regulations.
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site or in appropriately bunded areas.
- Spill kits must be available at all locations where hazardous substances are stored, handled, or used, and spills must be cleaned up immediately in accordance with an established protocol applicable to the material.

Recommended EIA Phase Studies

No further studies are recommended.

7.7 HAZARDOUS SUBSTANCES AND POLLUTANTS

Construction Phase Impacts

Soil, groundwater, and surface water contamination

Potential exists for soil, groundwater and surface water contamination associated with potential releases of small quantities of environmental contaminants and hazardous substances. Sources of pollutants and release mechanisms include:

- Leakages of hydrocarbons (diesel and oil) from construction vehicles and heavy machinery (e.g., excavators and bulldozers).
- Loss of containment and accidental spillage associated with storage and handling of hydrocarbons, chemicals, and concrete.

Runoff creates a preferential pathway and exposure of the above contaminants into the subsurface and water resources leading to a deterioration in water quality and secondary health impacts on aquatic ecosystems and water users.

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- Chemicals, hydrocarbon materials and hazardous substances maintained onsite must be managed in accordance with the Hazardous Substances Act (No. 15 of 1973) and its relevant regulations.
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site or in appropriately bunded areas.
- Spill kits must be available at all locations where hazardous substances are stored, handled, or used, and spills must be cleaned up immediately in accordance with an established protocol applicable to the material.

Recommended EIA Phase Studies

No further studies are recommended.

7.8 WASTE MANGAEMENT

Construction Phase Impacts

Generation of General Waste

The table below provides a summary of the typical general waste types that are likely to be generated on site during construction. The presence of construction workers has the potential to increase litter on site in the absence of adequate waste receptacles. This results in an unsightly working environment and possible entry into surrounding environment. Furthermore, waste materials may attract pest species / vectors into working areas leading to potential health implications for construction staff and community members.

Spoil material unsuitable for reuse as backfill and bedding material has the potential to disrupt land use and habitats if inappropriately manage or disposed illegally.

Waste generation (domestic waste, mixed industrial and metal waste) and a lack of appropriate separation, temporary storage and recycling (i.e., not aligned with the Waste Hierarchy) has the potential to result in unnecessary waste material to landfill.

Waste Category	*Waste Type*	*Typical Constituents*
General Waste	Domestic Waste	Paper and cardboard packaging, empty plastic, and metal containers (non-hazardous original contents) etc.
	Organic Waste	Canteen, food and cooking waste
	Mixed Industrial	Wood, plastic, packaging etc.
	Metal Waste	Ferrous and non-ferrous scrap and stainless steel, metal cuttings, electrode stubs from welding.
	Spoil Material	Excavations, trenching and terracing will result in the generation of spoil material
	Building rubble	Wasted flooring material, paint containers, wall tiles, timber, piping etc.
	Biomass	Cleared vegetation

Generation of Hazardous Waste

The table below provides a summary of the typical hazardous waste types that are likely to be generated on site during construction. Hazardous waste generation and inappropriate management and disposal has the potential to lead to contamination of soil, groundwater, and surface water.

Waste Category	*Waste Type*	*Typical Constituents*
Hazardous Waste	Oily Waste	Used lubricant and hydraulic oils and hydrocarbon based solvents
	Oil Contaminated Waste	Solid material (rags etc.) that has come into contact with and contains traces of oil or grease
	Hazardous Chemical Containers	From temporary storage and use of chemicals on site

	Sanitary Waste	Sewerage / faecal matter generated at the contractor's camp

Sanitation Waste

Sanitation services are required to accommodate workers on site, contractor's yard and at site camps along the route. Temporary ablution facilities (chemical toilets) are proposed to appropriately contain and treat waste for offsite disposal. The incorrect siting of chemical toilets (i.e., within 100m of a watercourse or stream) and loss of containment could lead to pollution of the receiving environment (soil, groundwater, and surface water), leading to secondary health impact to ecosystems and communities (ground and surface water users).

Sanitary waste, if not correctly contained, has the potential to enter surface water via runoff and increase organic matter loading in water systems.

Operational Phase Impacts

Generation of General Waste

The table below provides a summary of the typical general waste types that are likely to be generated on site during operation. Waste generation (domestic waste and mixed industrial) and a lack of appropriate separation, temporary storage and recycling (i.e. not aligned with the Waste Hierarchy) has the potential to result in unnecessary waste material to landfill. However, it is noted that only small volumes of waste are anticipated to be generated by the facility during operations.

Waste Category	*Waste Type*	*Typical Constituents*
General Waste	Domestic Waste	Paper and cardboard packaging, empty plastic and metal containers (non-hazardous original contents) etc.
	Organic Waste	Canteen, food and cooking waste
	Mixed Industrial	Wood, plastic, packaging etc.

Generation of Hazardous Waste

The table below provides a summary of the typical hazardous waste types that are likely to be generated on site during construction. Hazardous waste generation and inappropriate management and disposal has the potential to lead to contamination of soil, groundwater, and surface water.

Waste Category	*Waste Type*	*Typical Constituents*
Hazardous Waste	Oily Waste	Used lubricant and hydraulic oils and hydrocarbon-based solvents
	Oil Contaminated Waste	Solid material (rags etc.) that has come into contact with and contains traces of oil or grease

Sanitation Waste

Sewage and other wastewater generated from washrooms, etc. are similar to domestic wastewater. It is anticipated that the sewage will be discharged into conservancy tank.

Mitigation Considerations

- Despite the modest volumes of waste anticipated to be generated by the Project, recycling opportunities should be sought in order to reduce the volume of waste to landfill and harness commercial benefits for both the project team and local community.
- Provisions of suitable waste receptacles for temporary storage of general and hazardous waste (in compliance with Material Safety Data Sheets).
- Collection and disposal of hazardous waste at appropriately licences landfills and proof of disposal to be retained by contractors and facility operators.

Recommended EIA Phase Studies

No further studies are recommended.

7.9 TERRRESTRIAL BIODIVERSITY

Construction phase impacts on terrestrial habitats and species largely arise because of direct impacts on the receiving environment due to clearing of land in advance of project development, and resultant loss of biodiversity. The earthworks and activities involved during the construction phase of the Project can potentially exert negative impacts on sensitive ecosystems, and flora and fauna species. Potential impacts primarily relate to vegetation clearing, direct species loss/mortalities, establishment and spread of alien and invasive species (AIS), sensory disturbances, and general anthropogenic influences associated with the construction of the proposed infrastructure.

Construction Phase Impacts

Direct loss and disturbance of natural habitat and associated flora SCC

The construction of the proposed access roads, wind turbine foundations, and temporary laydown infrastructure will result in the direct and permanent loss of areas of natural habitat, including wetlands, and primary and secondary grasslands, some of which support flora SCC. This impact is considered highly probable, and the consequence could be very severe, since permanent loss of natural habitat cannot be mitigated. However, assuming that the mitigation hierarchy is implemented at final design stage to ensure that the potential footprint of infrastructure/activities within natural habitat areas is avoided/minimised to the maximum extent possible, it is expected that high significance impacts will be restricted to a relatively small proportion of the study area, that is, those areas of primary grassland and/or PES A/B wetlands where loss/disturbance by Project infrastructure is unavoidable. These areas will require additional conservation actions to ensure no net loss of sensitive habitat occurs, that is, development of a wetland offset strategy for any unavoidable wetland losses, and a biodiversity offset report (as described in the draft National Biodiversity Offset Guidelines) for loss of primary grassland habitats. These will need to be prepared in support of Water Use License Applications and Environmental Authorisation applications respectively.

Disturbance of adjacent areas of sensitive habitats is also considered highly probable, although the severity will likely be moderate, or negligible, and more easily mitigated.

Establishment and spread of alien and invasive species

Disturbances caused by vegetation clearing and earth works during construction will exacerbate the establishment and spread of alien invasive species (AIS), particularly in the vicinity of existing plantations of wattle and eucalyptus. Alien plant infestations can spread exponentially, suppressing, or replacing indigenous vegetation. This may result in a breakdown of ecosystem functioning and a loss of biodiversity.

Without mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of Medium significance.

With the development of an auditable AIS Management Plan for the project, and the strict implementation of the recommended active control and monitoring measures throughout the construction phase, the probability of the impact occurring can be reduced, resulting in a residual impact of Low significance.

Injury and mortality of faunal species of conservation concern

The bulk earthworks involved in site development have the potential to injure/kill individual faunal species of concern. In particular, this impact could affect Badplaas Black Millipede, Cape Molerat, and the three species of mole with potential to occur in the study area, all of which are ground-dwelling and relatively slow moving, and as such are vulnerable to heavy machinery movements and site clearance activities. The bulk

earthworks and associated heavy machinery activity could also affect any breeding fauna SCC through sensory disturbances which may reduce the quality/desirability of the currently established breeding sites/dens in nearby areas.

Without mitigation, the consequence of the potential impact on moles and mole rats could be severe, and the likelihood highly probable, amounting to an impact of medium significance. Once mitigation measures are implemented, principally avoiding/minimising construction/excavation in high-risk habitats for ground-dwelling species, the probability of the impact occurring can be reduced, resulting in a residual impact of Low significance.

In the case that the Endangered Badplaas Black Millipede is affected, the consequence would be considered very severe; and significant residual impacts would need to be addressed via appropriately designed offsets.

Disturbance and fragmentation of faunal habitats

The construction phase of the Project will result in fragmentation of areas of natural habitat that may be of importance on a local level for foraging, breeding and refugia for fauna species of concern (particularly ground-dwelling species in the case of roads, and larger species where fencing is proposed), as well as the maintenance of landscape connectivity for their movements. The potential for sensory disturbances to fauna arising from noise and human/mechanical presence resulting in reduced habitat availability, is considered high during the construction phase, in the context of the existing low levels of disturbance associated with the grasslands of the area.

Without mitigation, the consequence of the potential impact could be moderately severe, and the likelihood highly probable, amounting to an impact of medium significance. Once mitigation measures are implemented, the probability of the impact occurring can be reduced, resulting in a residual impact of Low significance.

Operational Phase Impacts

Proliferation of alien invasive plant species

The potential establishment of alien invasive species in, and immediately adjacent to, the proposed development footprint will continue to be an impact of concern during the operational phase. Without mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of medium significance. With the continued implementation of an active alien species control programme during the operational phase, the probability of the impact occurring can be reduced, resulting in a residual impact of Low significance.

Fragmentation of fauna habitats/barriers to movement

The presence of new roads and access tracks throughout the operational period could present a barrier to movement for ground-dwelling fauna such as millipede, moles and mole rat in particular. The implementation of mitigation measures to limit the extent of potentially sensitive habitats for these species that will be traversed by access tracks at design phase is expected to reduce the likelihood of this impact remaining at operation phase to improbable; while the consequence would remain at least moderately severe, resulting in an impact of Low significance throughout the operation period. No additional mitigation measures to maintain landscape connectivity for ground-dwelling fauna are currently considered to be feasible, highlighting the importance of flexibility in determination of the final road access track layout.

Injury and mortality of faunal species of conservation concern

Increased vehicular traffic in the study area during the operation phase may pose a risk of injury and mortality of fauna species of conservation concern (and non-SCC). The consequence of the potential impact on fauna during the operational phase is expected to be low given the existing levels of traffic movements and sensory disturbance at the site, and the effect of the preceding construction works. The impact would occur throughout the operation phase, affect fauna at a local scale and is considered highly probable, resulting in an impact of Moderate significance prior to mitigation.

The application of the recommended mitigation measures reduces both the potential consequence and the probability of the impact occurring as predicted, resulting in a residual impact of 'low' significance.

Vibration from operating wind turbines

Ground vibrations from operating wind turbines could potentially reduce available habitat for ground-dwelling species such as moles, mole rats and invertebrates, within affected areas. The maximum distance at which these vibrations may be experienced, and whether this has a limiting effect on ground-dwelling fauna, does not appear to be well-studied; therefore for the purposes of this screening of impacts it is assumed that there is a good possibility that the impact could occur (probable), and the consequence could be severe, since it would be difficult to mitigate (unless sensitive fauna habitats are completely avoided) and would persist in the long-term, amounting to a potential impact of Medium significance. If turbines can be placed outside of potentially sensitive habitats, the possibility of the impact occurring could be reduced to Low (improbable), and the residual impact would then be of Low significance.

Cumulative Impacts

Cumulative impacts might occur due to the additional Dalmanutha West WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative, with the ecological impact of all facilities operating in combination likely to exceed the sum of individual parts.

Mitigation Considerations

- The preferred project layout must avoid sensitive habitats as far as possible.
- To prevent loss of natural habitat (grasslands, wetlands) and flora SCC beyond the direct disturbance footprint, prior to any vegetation clearing, the development footprints should be clearly marked out with flagging tape/posts in the field. Vegetation clearing should be restricted to the proposed project footprints only, with no clearing permitted outside of these areas.
- A search and rescue survey for all flora SCC should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC.
- Rescued plants should be relocated to an adjacent area of natural habitat.
- Minimise development footprint within high sensitivity areas and ensure that final development layout takes account of areas identified as sensitive during the field survey. Some avoidance and changes to the layout may be required if some areas with a high abundance of species of concern are shown to occur within the preferred development areas.
- Sensitive faunal habitats such as drainage lines and wetlands must be avoided.
- Detailed biodiversity assessment is required to determine sensitivity, quantify potential impacts to flora and fauna, and provide for recommendation of mitigation measures.
- Alien and invasive vegetation control should take place throughout the duration of the construction and operation phases. An alien management plan must be part of the EMPr.
- Should areas where Badplaas Black Millipede has been confirmed/suspected be subject to clearance, a search and rescue survey for Badplaas Black Millipede should be done immediately in advance of site clearance activities, in consultation with the relevant authorities (MTPA) and with the appropriate permits.
- Areas where Badplaas Black Millipede has been confirmed or is suspected to be present due to presence of suitable habitat should be avoided. This species is considered Endangered at the international level, is range restricted, and any anticipated Project-related loss cannot be considered sustainable and as such would not be offsetable. At present, suitable habitat is expected to consist of undisturbed

natural grassland; this habitat should therefore be avoided by the finalised project layout to the extent possible.

- Consultation with species experts to confirm habitat suitability is being undertaken so that any potentially sensitive areas can be demarcated and avoided or subjected to dedicated species-specific surveys if they cannot be avoided.
- Translocation activities should be done within the framework of an approved translocation plan.
- Roads should be created along the farm boundaries- on already existing fire breaks or to create new fire breaks for the farmers
- Existing roads will be utilised (where possible to reduce the risk of erosion from land clearance)

The main mitigation measures, other than required Management Plans for plant rescue, rehabilitation, and alien plant management, are related to infrastructure location, which is a planning phase measure. Specific recommendations will form part of the outcome of the EIA.

Recommended EIA Phase Studies

A detailed terrestrial ecological assessment will be carried out in the EIA phase. Refer to **Section 7** of this Report for the Plan of Study for the Terrestrial Ecology Impact Assessment.

7.10 AQUATIC BIODIVERSITY

Construction phase impacts on aquatic (wetland and riparian systems) largely arise because of direct impacts on the receiving environment due to clearing of land within wetlands or their immediate catchments in advance of project development, and resultant loss of biodiversity. The earthworks and activities involved during the construction phase of the Project can potentially exert negative impacts on sensitive ecosystems including loss of wetland habitat, catchment landcover changes resulting in increased sediment entry to downstream systems, construction of wetland/riparian system crossings causing impoundments/barriers to movement for aquatic species, and contamination of water bodies by construction materials / vehicles (hydrocarbons etc.).

The following impacts have been identified:

Construction Phase Impacts

Changes in wetland health/functioning

Bulk earthworks involved in site development in the immediate catchment of wetlands have the potential to cause indirect impacts on nearby wetland habitat through compaction/removal of recharge or interflow soils, as well as increased sediment deposition to downslope wetland ecosystems in stormwater runoff. If not carefully managed, the potential impact could be moderately severe, and the likelihood highly probable, resulting in an impact of Medium significance. Mitigation measures to address the potentially reduced wetland functioning, such as distribution of flow around turbine foundations and road crossing to affected downslope wetland systems could reduce the consequence of the potential impacts and likelihood of occurrence of the potential impact.

Contamination of riparian systems

Stripping of topsoil and civil works activities, resulting in a decrease in water quality due to erosion, sedimentation and the alteration in the distribution and quantity of surface water runoff, is considered highly probable during the construction phase, and could be moderately severe, resulting in an impact of Medium significance. The residual impact can be reduced to Low significance with the application of the recommended mitigation measures, which would reduce the likelihood of the impact occurring as predicted.

Operational Phase Impacts

Indirect loss and disturbance of natural habitat

Changes in catchment land-use including increased presence of roads and hard-standing (turbine pads) and stormwater management practises could cause erosion of terrestrial and

wetland habitats, and contamination of aquatic ecosystems. It is anticipated that appropriate stormwater management systems that make provision for the diffuse release of clean water to the environment will be incorporated in the project design; however, these can become problematic in the absence of regular maintenance, particularly after rainfall events.

Without mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of Medium significance; the probability can be reduced to probable and the residual impact subsequently reduced to one of low significance.

Cumulative Impacts

Cumulative impacts might occur due to the additional Dalmanutha West WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative, with the aquatic ecological impact of all facilities operating in combination likely to exceed the sum of individual parts.

Mitigation Considerations

- The preferred project layout must avoid sensitive aquatic habitats as far as possible.
- Minimise development footprint within high sensitivity areas and ensure that final development layout takes account of areas identified as sensitive during the field survey. Some avoidance and changes to the layout may be required if some areas with a high abundance of species of concern are shown to occur within the preferred development areas.
- Wetland/river crossings should be constructed utilizing designs that ensure that hydrological integrity of the affected wetlands is preserved, and natural flow regimes are maintained (i.e., no impoundment upstream of crossings, or flow concentration downstream of crossings.
- Ideally construction activities within wetlands should take place in winter (during the dry season). Where summer construction is unavoidable, temporary diversions of the streams might be required.
- Install erosion prevention measures prior to the onset of construction activities. Measures should include low berms on approach and departure slopes to crossings to prevent flow concentration, sediment barriers along the lower edge of bare soil areas, placement of hay bales around the within wetland construction areas, and re-vegetation of disturbed areas as soon as possible

The main mitigation measures, other than required Management Plans for plant rescue, rehabilitation, and alien plant management, are related to infrastructure location, which is a planning phase measure. Specific recommendations will form part of the outcome of the EIA.

Recommended EIA Phase Studies

A detailed aquatic biodiversity assessment will be carried out in the EIA phase. Refer to **Section 7** of this Report for the Plan of Study for the Aquatic Biodiversity Impact Assessment.

7.11 AVIFAUNA

The effects of a wind farm on birds are highly variable and depend on a wide range of factors, including the specification of the development, the topography of the surrounding land, the habitats affected, and the number and species of birds present.

Construction Phase Impacts

Habitat destruction

Destruction and alteration of bird habitat during construction is a negative impact, which will occur as a certain amount of habitat transformation is inevitable, in spite of any mitigation. Turbine hard stands, roads and other infrastructure need to be built and will transform habitat. The probability of this impact is therefore ‘Definite (4)’. The specialist

judges the consequence to be 'Moderately severe (2)'. This means that the significance is rated as Medium pre-mitigation.

Displacement due to disturbance during the Construction Phase

It is inevitable that a measure of displacement will take place for all priority species during the construction phase, due to the disturbance factor associated with the construction activities. This is likely to affect ground nesting species in the remaining high-quality grassland, wetlands and wetland fringes the most, as this could temporarily disrupt their reproductive cycle. Some species might be able to recolonise the area after the completion of the construction phase, but for some species, this might only be partially the case, resulting in lower densities than before once the WEF is operational, due to the disturbance factor of the operational turbines, and the habitat fragmentation.

In summary, the following species could be impacted by disturbance during the construction phase: Wattled Crane (regionally Critically Endangered); White-backed Vulture (regionally Critically Endangered); Cape Vulture (regionally Endangered); Martial Eagle (regionally Endangered); Grey-crowned Crane (regionally Endangered); Black-rumped Buttonquail (regionally Endangered); Denham's Bustard (regionally Vulnerable); White-bellied Bustard (regionally Vulnerable); Secretary bird (regionally Vulnerable; Southern Bald Ibis (regionally Vulnerable); Lanner Falcon (regionally Vulnerable); and Blue Crane (regionally Near-threatened)

Disturbance of birds during construction is a negative impact, which will definitely occur similarly to the above. The probability of this impact is 'Definite (4)'. The consequence depends on the sensitivity of the avifaunal receptors on site. For breeding sensitive species the consequence could be 'Severe (3)' if unmitigated. This would mean that the significance is High. However, for the general avifaunal community, the consequence will likely be much lower, probably 'Moderately severe (2)', resulting in a Medium significance. The extent to which this impact on sensitive breeding species can be avoided or mitigated will be investigated in the EIA phase

Operational Phase Impacts

Displacement and disturbance due to habitat loss

The network of roads is likely to result in significant habitat fragmentation. This, together with the disturbance factor of the operating turbines, could influence the density of several species, particularly larger terrestrial species which is breeding in the remaining high-quality grassland, wetlands, and wetland fringes. Given the conceptual turbine layout and associated road infra-structure, it is not expected that any priority species will be permanently displaced from the development site, but densities may be reduced. In summary, the following species are likely to be affected by habitat transformation: Blue Crane, Black-bellied Bustard, White-bellied Bustard, Denham's Bustard, Grey Crowned Crane, Grey-winged Francolin, Northern Black Korhaan, Blue Korhaan, Marsh Owl, African Grass Owl, Black-winged Lapwing and Secretary bird.

Provided that the risk to sensitive bird breeding sites has been adequately mitigated or avoided in the earlier phases, the probability of disturbance of birds in the operational phase will be 'Probable (2)' and consequence will be 'Negligible (1)' resulting in a 'Very low' significance.

Similarly, to the above, provided that the risk to sensitive bird breeding sites has been adequately mitigated or avoided in the earlier phases, the probability of displacement of birds in the operational phase will be 'Probable (2)' and consequence will be 'Negligible (1)' resulting in a 'Very low' significance.

Collisions Mortality on wind turbines

The proposed WEF will pose a collision risk to several priority species which could occur regularly at the site. Species exposed to this risk are large terrestrial species and occasional long-distance fliers i.e., bustards, cranes, flamingos, storks, Southern Bald Ibis and Secretary bird, although bustards and cranes generally seem to be not as vulnerable to turbine collisions as was originally anticipated (Ralston-Paton & Camagu 2019). Soaring priority species, i.e., species such as Cape Vulture and a variety of raptors, including

several species of eagles, are highly vulnerable to the risk of collisions. In summary, the following priority species could be at risk of collisions with the turbines: Common Buzzard, Jackal Buzzard, Blue Crane, Brown Snake Eagle, Black-chested Snake Eagle, Long-crested Eagle, Martial Eagle, Peregrine Falcon, Lanner Falcon, Greater Flamingo, , Montagu's Harrier, African Marsh Harrier, Black Harrier, African Harrier-Hawk, Cape Vulture, Secretary bird, Black-bellied Bustard, White-bellied Bustard, Denham's Bustard, Wattled Crane, Grey Crowned Crane, African Fish Eagle, Spotted Eagle-Owl, Amur Falcon, Grey-winged Francolin, Southern Bald Ibis, Black-winged Kite, , Blue Korhaan, Marsh Owl, African Grass Owl, Black Sparrowhawk and White Stork.

Collision of birds with the turbines once operating (a negative impact since birds are killed) is rated as 'Definite (4)' and with 'Severe (3)' consequence for regionally Red Listed bird species. This results in the significance being rated as High significance before mitigation.

Electrocution on the medium voltage network

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 2000). The electrocution risk is largely determined by the design of the electrical hardware.

While the intention is to place the medium voltage reticulation network underground where possible, there are areas where the lines might have to run above ground, for technical reasons. In these instances, the electricity could potentially pose an electrocution risk to several priority species that could on occasion perch on these poles. In summary, the following priority species are potentially vulnerable to electrocution in this manner: Grey Crowned Crane, Marsh Owl, African Grass Owl, Spotted Eagle-Owl, Common Buzzard, Black Harrier, Jackal Buzzard, Brown Snake Eagle, Black-chested Snake Eagle, Long-crested Eagle, Martial Eagle, Lanner Falcon, Montagu's Harrier, African Marsh Harrier, African Harrier-Hawk, Cape Vulture, African Fish Eagle, Southern Bald Ibis, Black-winged Kite, Western Osprey and Black Sparrowhawk.

Collisions with the medium voltage network

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).

While the intention is to place the majority of the medium voltage reticulation network underground at the wind farm, there are areas where the lines will run above ground. Priority species which most at risk of collisions with the medium voltage powerlines are the following: Grey Crowned Crane, Marsh Owl, African Grass Owl, Spotted Eagle-Owl, Cape Vulture, Southern Bald Ibis, Blue Crane, Black-bellied Bustard, White-bellied Bustard, Denham's Bustard, Northern Black Korhaan, Blue Korhaan, Secretary bird, Greater Flamingo, and White Stork.

Collision of birds with overhead power lines, and electrocution of birds perched on pylons (a negative impact since birds are killed) is rated as 'Definite (4)' and with 'Severe (3)' consequence for regionally Red Listed bird species. This results in the significance being rated as High significance before mitigation.

Cumulative Impacts

Cumulative impacts might occur due to the additional Dalmanutha West WEF which is adjacent to the study area. The footprint of these two developments will likely be cumulative. In relation to an activity, cumulative impact "means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities" (NEMA EIA Reg GN R982 of 2014).

The cumulative impacts of wind energy on avifauna in the proposed area will be assessed in the EIA phase according to the guidance in the DEA (DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria); and the IFC guidelines (Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets).

Specifically, the steps to be undertaken in the cumulative impact assessment section of the study will be as follows:

- Define and assess the impacts of the proposed project.
- Identify and obtain details for all operational and authorised overhead power lines and wind farms (within 30km radius of the proposed project).
- Identify impacts of the proposed project which are also likely or already exist at the other projects.
- Obtain reports and data for other projects (if possible).
- As far as possible quantify the effect of all projects on key bird species local populations (will need to be defined and estimated).
- Express the likely impacts associated with the proposed project as a proportion of the overall impacts on key species.
- A reasoned overall opinion will be expressed on the suitability of the proposed development against the above background (i.e. whether the receiving environment can afford to accommodate additional similar impacts). This will include a cumulative impact assessment statement.

Mitigation Considerations

- Construction 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 priority species.
- Measures to control noise and dust should be applied according to current best practice in the industry.
- Development in the remaining high sensitivity grassland must be limited as far as possible. Where possible, infrastructure must be located near margins, with shortest routes taken from the existing roads.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- Development in the remaining high sensitivity grassland must be limited as far as possible. Where possible, infrastructure must be located near margins, with shortest routes taken from the existing roads
- It is recommended that suitable pro-active mitigation be implemented at all turbines, which could include shut down on demand or other proven mitigation measures. This is recommended for the following reasons:
  - Due to the overlapping of the site to the IBA, it is possible that some highly mobile priority species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be at risk of collisions they leave to forage or breed beyond the borders of the IBA at the project site.
  - Cape Vultures have been recorded at the site. The species could occur sporadically, and they are highly vulnerable to turbine collisions.
  - The habitat at the site is used by a variety of Red List priority species. This includes not only natural grassland, but also agriculture e.g., Southern Bald Ibis forage extensively in agricultural fields
- A raptor-friendly pole design must be used, and the pole design must be approved by the avifaunal specialist
- All internal medium voltage lines must be marked with Eskom approved Bird Flight Diverters according to the Eskom standard.

Recommended EIA Phase Studies

The EIA Phase will entail the implementation of four avifaunal surveys and a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring, in line with the monitoring protocols. Refer to **Section 7** of this Report for the Plan of Study for the Avifauna Impact Assessment.

7.12 BATS

The following potential impacts of the proposed Dalmanutha WEF on bats were identified:

Construction Phase Impacts

Loss of foraging habitat by clearing of vegetation

Foraging habitat will be permanently lost by construction of turbines, crane pads, infrastructure, and access roads. Temporary foraging habitat loss will occur during construction due to storage areas and movement of heavy vehicles.

Roost destruction during earthworks

Destruction of bat roosts due to earthworks and blasting. During construction, the earthworks and especially blasting can damage bat roosts in rock crevices. Any type and duration of blasting in close proximity to a rock crevice roost or man-made structure (barns, sheds, abandoned houses, pump houses etc.), can cause mortality to the inhabitants of the roost.

Operational Phase Impacts

Bat mortalities during foraging

Bat mortalities due to direct blade impact or barotrauma during foraging activities (not migration). If the impact is too severe (e.g., in the case of no mitigation) local bat populations may never recover from mortalities.

Bat mortalities during migration

Mortalities of bats due to wind turbines during migratory activities can have significant ecological consequences as the bat species at risk are insectivorous and thereby contribute significantly to the control of nocturnal flying insects. On a project specific level, insect numbers in a certain habitat can increase if significant numbers of bats are killed off. But if such an impact is present on multiple projects in close vicinity to each other, insect numbers can increase regionally and possibly cause outbreaks of colonies of certain insect species. Additionally, if migrating bats are killed it can have detrimental effects on the ecology of the caves that a specific colony utilises. This is because bat guano is the primary form of energy input into a cave ecology system, given that no sunshine that allows photosynthesis exists in cave ecosystems.

Increased bat mortalities due to light attraction and habitat creation

During operation, artificial lights that may be used at the turbine base or immediately surrounding infrastructure will attract insects and thereby also bats to the turbines. This will significantly increase the likelihood of mortality from collision with turbine blades of bats foraging around such lights.

Cumulative Impacts

Cumulative impacts might occur due to the additional Dalmanutha West WEF which is adjacent to the study area. The footprint of these two developments will likely be cumulative.

Mitigation Considerations

- Adhere to the sensitivity map criteria. Rehabilitate cleared vegetation where possible at areas such as laydown yards.
- Apply necessary buffers for roost sites and sensitive bat features, avoiding the construction of turbines and access roads in these areas. Roads must follow existing farm roads as far as possible.
- Avoid placement of turbines near sensitive bat features and roosts, adaptive mitigation measures according to post-construction monitoring results (counted strikes) informed by environmental correlates of bat activity.
- Increase turbine cut in speed as this has been shown to reduce collisions.

- Turbine layout adjustments to adhere to the sensitivity map, and where needed, reducing blade movement at selected turbines during high-risk bat activity times/weather conditions. Acoustic deterrents are developed well enough to be trialled.
- It is recommended that NO development (including the full rotor swept zone of wind turbines) takes place in BOTH Very High and High bat sensitivity areas. Take note that these areas still need to be defined and will be shown in the final EIA report. Minimise impacts to natural and artificial wetlands and water bodies by implementing the appropriate buffer areas where no development may take place.
- With the exception of compulsory civil aviation lighting, minimise artificial
- lighting at night, especially high-intensity lighting, steady-burning, or bright lights such as sodium vapour, quartz, halogen, or other bright spotlights at sub-station, offices and turbines.
- Cut in speeds needs to be increased and possible curtailment during times when bats migrate.
- Only use lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools. This will be at turbine bases (if applicable, and other infrastructure buildings). For buildings, avoid tin roofs and roof structures that offer entrance holes into the roof cavity.

Recommended EIA Phase Studies

The pre-construction bat monitoring has now been completed and will inform the EIA phase; passive bat activity data has been gathered, which will provide comparative bat activity and species assemblages across all seasons as well as various habitats, terrain and/or areas of the site.

The EIA Phase will also entail a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring that has been completed. Refer to **Section 7** of this Report for the Plan of Study for the Bat Impact Assessment.

7.13 VISUAL AND LANDSCAPE

Construction Phase Impacts

During the construction phase of the proposed Dalmanutha WEF and associated infrastructure, there will be some visual impacts on motorists and inhabitants during the construction and decommissioning periods resulting from laydown areas, construction vehicles, dust and equipment. These impacts will be transitory in nature for the duration of construction /decommissioning and include the following:

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction laydown areas and material stockpiles.
- Potential impacts of increased dust emissions from construction activities and related traffic;
- Potential visual scarring of the landscape as a result of site clearance and earthworks; and
- Potential visual pollution resulting from littering on the construction site

Operational Phase Impacts

The operation of the Dalmanutha WEF will have a visual impact on the following receptors:

- The visibility of the facility from, and potential visual impact on observers travelling along the National (N4), arterial (R33, R540, R541, and R36) and secondary (local) roads within the study area.
- The visibility of the facility from, and potential visual impact on built-up centers and populated places (i.e., the towns of Machadodorp, Belfast and Carolina) within the study area.

- The visibility of the facility, and potential visual impact on farmsteads and homesteads (rural residences) within the study area.
- The potential visual impact of the facility on the visual character and sense of place of the region, with specific reference to the pastoral landscape and the scenic mountains.
- The potential visual impact of the facility on tourist routes or tourist destinations (e.g., protected areas and other tourist attractions), namely: The Greater Lakenvlei Protected Environment, Langkloof Private Nature Reserve, Pauline van Niekerk Private Nature Reserve, Cecilia Private Nature Reserve, and Nooitgedacht Dam Nature Reserve.
- The potential visual impact of the construction of ancillary infrastructure (i.e., internal access roads, buildings, BESS, etc.) on observers in close proximity to the facility.
- The visual absorption capacity of the natural vegetation (if applicable).
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in proximity to the facility.
- The potential visual impact of shadow flicker.
- The potential to mitigate visual impacts and inform the design process.
- Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area.
- Potential visual clutter caused by substation and other associated infrastructure on-site.
- Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.

Cumulative impacts

- 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; and
- Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially exacerbate visual impacts on visual receptors.

Mitigation Considerations

- Steep slopes should be avoided, erosion control measures, and revegetation procedures implemented.
- Carefully plan to minimise the construction period and avoid construction delays.
- Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Vegetation clearing should take place in a phased manner.
- 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.
- Maintain a neat construction site by removing litter, rubble and waste materials regularly.
- Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum.
- Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work).
- If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact.

- As far as possible, limit the number of maintenance vehicles which are allowed to access the site.
- 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 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.
- Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter.
- The operations and maintenance (O&M) buildings should not be illuminated at night.
- The O&M buildings should be painted in natural tones that fit with the surrounding environment.

Recommended EIA Phase Studies

The scoping phase Visual Assessment report has assessed the visual impacts of the proposed Dalmanutha WEF. However, a comprehensive Visual Impact Assessment (VIA) will be required and include the following:

- Determine potential visual exposure
- Determine visual distance/observer proximity to the facility
- Determine viewer incidence/viewer perception (sensitive visual receptors)
- Determine the visual absorption capacity (VAC) of the landscape
- Calculate the visual impact index
- Determine impact significance
- Propose mitigation measures
- Reporting and map display
- Site visit
- Photo simulations

The EIA Phase study will entail updating the scoping phase VIA report, and will include a review of the findings of the VIA in accordance with detailed site layouts and a comparative assessment of the layout alternatives provided. Following comments from the relevant stakeholders, the final report will be updated and submitted with the final EIA report. Refer to **Section 7** of this Report for the Plan of Study for the Scoping Visual Assessment.

7.14 HERITAGE AND CULTURAL RESOURCES

Construction Phase Impacts

Disturbance to Known Cultural Resources

Construction activities may lead to disturbance or destruction of cultural resources (archaeological and historical remains and sacred sites e.g. graves) should the development footprint encroach on identified cultural/heritage sites.

Chance find of Cultural Resources

Earthworks may accidentally expose unidentified subsurface fossil remains. This will result in a lost opportunity to preserve local cultural heritage and historical records should appropriate management measures not be in place (e.g. Chance Find Procedure).

Operational Phase Impacts	No impacts anticipated.
Mitigation Considerations	— Chance Find Procedure must be included in the EMPr. — Areas of potential heritage sensitivities that are identified in the EIA phase, should be demarcated.
Recommended EIA Phase Studies	A field-based Heritage Impact Assessment, as defined in section 38 of the NHRA, will be undertaken during the EIA phase of the assessment. Refer to **Section 7** of this Report for the Plan of Study for the Scoping Heritage Assessment.

7.15 PALAEONTOLOGY

Construction Phase Impacts	The construction phase will entail surface clearance as well as excavations into the superficial sediment cover and underlying bedrock. The development may adversely affect potential fossil heritage within the study area by destroying, damaging, disturbing or permanently sealing-in fossils preserved at or beneath the surface of the ground that are then no longer available for scientific research or other public good.
Operational Phase Impacts	No impacts anticipated.
Mitigation Considerations	If a chance find is made then all work must cease in the immediate vicinity of the find. The Environmental Control Officer must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). Mitigation of chance fossil finds reported by the Environmental Control Officer would involve the recording, sampling and / or collection of chance fossil finds and associated geological data by a professional palaeontologist during the construction phase of the development. The palaeontologist concerned with potential mitigation work would need a valid fossil collection permit from the relevant Heritage Agency and any material collected would have to be curated in an approved depository (e.g., museum or university collection).
Recommended EIA Phase Studies	The study area is of insignificant to moderate to very high paleontological sensitivity and according to the SAHRIS palaeontological sensitivity map must be subjected to a palaeontological assessment in the EIA phase. Refer to **Section 7** of this Report for the Plan of Study for the Palaeontological Impact Assessment.

7.16 TRAFFIC

Construction Phase Impacts	The construction phase of the facility will generate the only notable traffic that requires assessment. Construction traffic will include vehicles for material and component deliveries, construction staff and all other associated personnel. Trips will include the delivery of over-sized components such as the rotor blades, mast sections and generators. The route/s between the origin of the material and components and the facility may be National, Provincial or Local roads, and each authority will be required to provide the necessary permits for the transportation of any oversized or weight components. The construction phase traffic will be estimated based on the assumptions listed per traffic generator source.

CONSTRUCTION STAFF TRANSPORT TRIP GENERATION

- An estimated construction period of 24 months, with a variable number of staff required depending on the construction phase.
- An estimated maximum of 250 workers will be on-site every day during the peak construction period.
- Workers will not be accommodated on-site.
- 85% of the work force (unskilled and semi-skilled workers) will utilise public transport to site from neighbouring towns, most notably Belfast which is less than 10 km away.
- Skilled personnel will travel by private car with an average occupancy of 1.5 persons.
- The availability of bus services for staff transport cannot be confirmed, therefore it is conservatively assumed that all Public Transport trips will be with mini-bus taxis, with a 16 person per vehicle occupancy.
- Staff will not utilise non-motorised transport (NMT) to travel to site due to the excessive distances to the closest towns.
- It is assumed that the public transport vehicles will not remain on-site during the workday, therefore all these vehicles will arrive and again depart during the AM and PM peaks.

CONSTRUCTION MATERIAL DELIVERY TRIP GENERATION

- It is proposed to construct a maximum of 77 wind turbines and support buildings.
- The turbine towers are expected to have a hub height of up to 200m, with a rotor diameter of up to 200m.
- Each 200m diameter turbine rotor will require 3 blades of up to 100m long each (maximum). Rotor blades will be manufactured abroad and imported via the most suitable Port. The dimensions of the blades, their point of origin and the resultant route between the Port and the site will determine the vehicle type and special permits that may be required for the transportation of these blades.
- The most feasible import point is the Port of Richards Bay, approximately 515km away via the N4, R33, N17 and N2.
- The tower masts will be constructed of tubular steel, manufactured off-site in sections up to 30m, and are lifted into place on site. Similar to the blades, the type of tower mast components (steel, concrete, hybrid) will determine their origin, port of entry (if imported) and delivery route to the site.
- The route/s between the origin (port of entry) of the oversize/weight components and the site may be National, Provincial or Local roads. The transportation of any oversized or overweight freight along these routes will require authorisation from all the relevant road authorities.
- It is recommended that an abnormal vehicle route management plan be undertaken when the port/s of entry are confirmed. This plan will cover all aspects such as horizontal and vertical vehicle requirements, bridges along the route, speed limits, etc. These plans and the application for the abnormal permits is normally the responsibility of the logistics company that will transport the components to site.

Operational Phase Impacts

The operational phase of the facility will require a low number of permanent staff. The vehicle trips that will be generated by the personnel accessing the site will therefore be low, and the associated transport impact on the surrounding road network will be negligible.

Mitigation Considerations

- The movement of vehicles into and out of the site must be managed such as ensuring that abnormal loads are moved outside of peak traffic hours.
- Stagger component delivery to the site.
- All drivers should comply with the relevant traffic laws and regulations.

- Abnormal vehicle routes and management plans may be required dependant on the type and route of the abnormal vehicle loads. Abnormal vehicles may require special permits and route plans from the relevant road authority. These permits are the responsibility of the developer and its logistics/freight companies.
- Undertake regular maintenance of gravel roads during the construction phase.

Recommended EIA Phase Studies

A Traffic Impact Statement will form part of the EIA phase. The Traffic Specialist study will assess potential impacts of the proposed route during the construction phase and identify potential and suitable alternatives for construction vehicle access to the site. Refer to **Section 7** of this Report for the Plan of Study for the Traffic Impact Statement.

7.17 SOCIO-ECONOMIC

Construction Phase Impacts

Creation of local employment, training, and business opportunities

The construction phase will create employment opportunities that will benefit members from the local communities in the area, specifically Belfast. These opportunities will include opportunities for low, semi and highly workers. Most of the employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area, specifically Belfast. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The capital expenditure associated with the construction phase will also create opportunities for local businesses. Due to the presence of the mining and energy sector, there are likely to qualified companies in Belfast that can provide the required services and products. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

The hospitality industry in the area will also benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

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 way 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.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local

community. The potential impact on the local community is therefore likely to be negligible.

Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed above. Given the location of the project the potential for large scale economically motivated in-migration and subsequent labour stranding is likely to be negligible.

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. 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.

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.

Nuisance impacts associated with construction related activities

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local and can be effectively mitigated.

Impacts associated with loss of farmland

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. In addition, the landowner will be compensated for the loss of land.

Operational Phase Impacts

Improve energy security and support the renewable energy sector

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. The proposed development also reduces the carbon footprint associated with energy generation. The project should therefore be viewed within the

context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPP.

Creation of employment and business opportunities

The proposed development will create full time employment opportunities during the operational phase that will be available to the local community. The operational phase will also create business and procurement opportunities which will benefit local companies in the area.

Generate income for affected landowners

The proponent will enter into rental agreements with the affected landowners for the use of the land for the establishment of the proposed projects. In terms of the rental agreement the affected landowners will be paid an annual amount dependent upon the number of wind turbines located on the property. The additional income will reduce the risk to his livelihoods posed by droughts and fluctuating market prices for livestock, crops, and farming inputs, such as fuel, feed etc. Given the risks posed by climate change the additional income represents a significant benefit for the affected landowner.

Benefits associated with the socio-economic development contributions

The REIPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership. Socio-economic development (SED) contributions are an important focus of the REIPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area.

Visual impact and impact on sense of place

The proposed development has the potential to impact on the areas existing rural sense of place. 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.

Potential impact on property values

The potential visual impacts associated with the proposed Renewable Energy Facility (REF) have the potential to impact on property values. Based on the results of a literature review undertaken for other REFs the potential impact on property values in rural areas is likely to be limited. A study undertaken in Australia in 2016 (Urbis Pty Ltd) found that:

- Appropriately located wind farms within rural areas, removed from higher density residential areas, are unlikely to have a measurable negative impact on surrounding land values.
- There is limited available sales data to make a conclusive finding relating to value impacts on residential or lifestyle properties located close to wind farm turbines, noting that wind farms in NSW have been constructed in predominantly rural areas.

Potential impact on tourism

The potential visual impacts associated with the proposed REF have the potential to impact on tourism facilities and tourism in the area. Based on the findings of the literature review there is limited evidence to suggest that the proposed WEF would impact on the tourism in the area at both a local and regional level. The findings will be confirmed during the Assessment Phase.

Cumulative Impacts

Cumulative impact on sense of place

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. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms 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).

As indicated above, 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. The visual impacts will however be assessed by the visual specialist in the EIA phase.

Cumulative impact on local service and accommodation

The establishment of several REFs has the potential to place pressure on local services and accommodation, specifically during the construction phase. The objective will be to source as many low and semi-skilled workers for the construction phase from the Emakhazeni and Chief Albert Luthuli Local Municipalities, specifically Belfast and Carolina. This will reduce the potential pressure on local services and accommodation in Ermelo. In addition, due to the size of the town of Ermelo the potential impact on local services is likely to be limited. The capacity of accommodate workers will be addressed during the assessment phase.

The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and other potential renewable energy projects in the Emakhazeni and Chief Albert Luthuli Local Municipalities. These benefits will create opportunities for investment in both Municipalities, including the opportunity to up-grade and expand existing services and the construction of new houses.

Cumulative impact on local economy

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEF, will also create several socio-economic opportunities for the Municipality. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The review of the REIPPPP (June 2020) indicates that the SED contributions associated with 68 operational projects has amounted to R 1.2 billion to date. In terms of Enterprise Development (ED), R 7.2 billion has been committed for BW1 to BW4, 1S2 and 2S2. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R360 million per annum. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of June 2020 a total of R 384.2 million had already been made to the local

communities located in the vicinity of the 68 operating IPPs. This represents 93% of the total R384.2 million enterprise development contributions made to date).

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

Mitigation Considerations

- Ensuring local communities (through formal channels such as ward councillors and Department of Labour) are made aware of the potential opportunities available during construction in order for expectations to be managed appropriately.
- Prioritisation of local labour through implementing contractor policies.
- Undertake a survey of industries and businesses in the local area to identify potential suppliers.
- The developer and contractors must make HIV/AIDS awareness and prevention program development and implementation a condition of contract for all suppliers and sub-contractors.

Recommended EIA Phase Studies

Based on the Scoping Assessment, most social issues have been identified. A site visit will be undertaken during the EIA Phase of the Scoping Impact Assessment (SIA). The site visit will include interviews with key stakeholders and interested and affected parties. Refer to **Section 7** of this Report for the Plan of Study for the SIA.

7.18 CLIMATE CHANGE

Construction Phase Impacts

Greenhouse Gas Emissions

A GHG is any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere. By increasing the heat in the atmosphere, greenhouse gases are responsible for the greenhouse effect, which ultimately leads to global warming and contributes to the negative effects of climate change.

The manufacturing of the materials associated with the project, and associated transportation of materials to and from the construction areas will result in indirect GHG emissions. The exhaust emissions will contribute to the presence of GHGs in the atmosphere.

Measures could be considered in respect of the construction phase i.e. attempting to implement GHG emissions reductions measures within the EPC contractor's activities. However, given the site locality, it is anticipated that typical measures (such as stipulating that the EPC contractor measure and report on their GHG emissions during construction and try to incentivise a reduction via the use of energy efficient trucks etc.) are unlikely to be practical or worth the effort (or cost).

Climate Risks and Vulnerability

Loss of topsoil and vegetation community due to soil erosion can be exacerbated by climate change as soil erosion is mostly the result of extreme but short rainfall events. Therefore, changes of precipitation intensity and frequency could exacerbate soil erosion processes.

Operational Phase Impacts

Reduced Greenhouse Gas Emissions

Carbon dioxide (CO_2) is one of the major GHGs under the UN Framework Convention on Climate Change, and a priority GHG in terms of the National Environmental Management: Air Quality Act - Declaration of Greenhouse Gases as Priority Air Pollutants (GN. R710, 2017). CO_2 is emitted from the combustion of fossil fuels. There will be no GHG

emissions directly associated with power generation from the facility in the operational phase due to the nature of the technology.

Contribution of cleaner energy to the National Grid

The project may be regarded as having a positive impact in terms of GHG emissions associated with the development of power generation capacity in South Africa i.e. less GHG emissions per unit of power contributed when compared to conventional fossil fuel derived power.

Mitigation Considerations

Due to the fact that the proposed development will have no impact on climate, mitigation measures are not deemed necessary. The implementation of the project can be regarded as having a mitigatory effect in terms of contributing to the curbing of South African's CO_2 emission increases.

Recommended EIA Phase Studies

No further studies are recommended.

7.19 SHE RISK

Construction Phase Impacts

The construction impacts of the BESS facility will be associated with the typical construction impacts as well as specifics related to large battery installations.

Operational Phase Impacts

Operational impacts associated with the BESS facility include:

- Possible explosions and fires
- Spillages of electrolyte into watercourses.

Mitigation Considerations

Ideally the BESS facility should be 500m from the closest farmsteads / private businesses

Recommended EIA Phase Studies

A comprehensive SHE Risk assessment will form part of the EIA phase. The SHE Specialist study will assess potential impacts of the proposed facility during the construction phase, operational and decommissioning phases and prescribe suitable mitigation. Refer to **Section 8** of this Report for the Plan of Study for the Risk Assessment Statement.

7.20 SUMMARY OF IMPACT SIGNIFICANCE SCREENING

This section provides an overview of the **likely** significance of construction phase (**Table 7-1:**), operational phase (**Table 7-2)**and initial cumulative impacts (**Table 7-3**) presenting the results of the impact screening tool based on two criteria, namely probability and consequence (outlined in **Section 4.5**). This is used as a guide to determine whether additional assessment may be required in the EIA phase. Impacts will be refined and assessed during the EIA phase.

Table 7-1: 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 Emissions	Negative	3	1	**Low**	**No**
Geology	The displacement of natural earth material and overlying vegetation leading to: — Exposure of upper soil layer by removal of vegetation. — Increase in stormwater velocity. — Soil will be washed downslope, as well as into surrounding drainage channels leading to sedimentation. — The erosion of these slopes will be exacerbated during periods of heavy rainfall.	Negative	4	3	**High**	**No**
	Contamination of ground and surface water resources from heavy plant leading to quality deterioration of the water resources.	Negative	4	3	**High**	
Soils, Land Capability and Agricultural Potential	Soil erosion	Negative	4	3	**High**	**Yes**
	Soil compaction	Negative	3	3	**Medium**	
	Soil contamination	Negative	3	3	**Medium**	
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**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	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	5	3	**High**	**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**	
Terrestrial & Aquatic Biodiversity	Direct Loss of natural habitat and associated flora SCC	Negative	3	4	**High**	**Yes**
	Disturbance of natural habitat and associated flora SCC	Negative	3	2	**Medium**	
	Establishment and spread of AIS	Negative	3	2	**Medium**	
	Injury and mortality of fauna SCC- moles, mole rat	Negative	3	3	**Medium**	
	Injury and mortality of fauna SCC- Badplaas Black Millipede	Negative	3	4	**High**	
	Disturbance and fragmentation of faunal habitat	Negative	3	2	**Medium**	
	Catchment land use changes and activities	Negative	3	2	**Medium**	
Avifauna	Displacement due to disturbance during the Construction Phase	Negative	4	2	**Medium**	**Yes**
	Habitat destruction	Negative	4	2	**Medium**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Bats	Loss of foraging habitat by clearing of vegetation	Negative	4	3	**High**	**Yes**
	Roost destruction during earthworks	Negative	4	3	**High**	
Visual and Landscape	Potential visual intrusion resulting from large construction vehicles and equipment	Negative	3	2	**Medium**	**Yes**
	Potential visual effect of construction laydown areas and 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**
Traffic	Noise, dust & exhaust pollution due to vehicle trips on-site	Negative	4	1	**Medium**	**Yes**
	Noise, dust & exhaust pollution due to additional trips on the national and district roads	Negative	4	1	**Medium**	
Socio-Economic	Creation of local employment, training, and business opportunities	Positive	2	3	**Medium**	**Yes**

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Impact of construction workers on local communities	Negative	3	3	**Medium**	
	Influx of job seekers	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**	
Climate Change	Greenhouse Gas Emissions	Negative	2	1	**Very Low**	**No**
	Climate Risks & Vulnerabilities	Negative	2	1	**Very Low**	

Table 7-2: Operational Phase Impacts

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Noise and Vibrations	Acoustic impacts on surrounding sensitive receptors, namely Rec 02, Rec 30 and Rec 49	Negative	4	3	**High**	**Yes**
Geology	Displacement of natural earth material during maintenance	Negative	3	1	**Low**	**No**
	Potential oil spillages from service vehicles and heavy plant.	Negative	3	3	**Medium**	
Soils, Land Capability and Agricultural Potential	Enhanced agricultural potential through increased financial security for farming operations	Positive	3	3	**Medium**	**Yes**

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Prevention of crop spraying by aircraft over land occupied by turbines.	Negative	4	3	**High**	
	Interference with farming operations	Negative	4	3	**High**	
Surface Water	Increased runoff, sedimentation and erosion	Negative	3	3	**Medium**	**Yes**
Waste Generation	Generation of General Waste	Negative	3	2	**Medium**	**Yes**
	Generation of Hazardous Waste	Negative	3	2	**Medium**	
	Sanitation Waste	Negative	3	2	**Medium**	
Terrestrial & Aquatic Biodiversity	Proliferation of alien invasive plant species	Negative	3	3	**Medium**	**Yes**
	Catchment land use changes and activities	Negative	3	2	**Medium**	
	Habitat quality reductions due to stormwater runoff, land use changes	Negative	3	2	**Medium**	
	Spread of AIS	Negative	3	2	**Medium**	
	Fragmentation of habitats, barriers to movement	Negative	3	2	**Medium**	
	Injury and mortality of fauna SCC	Negative	3	2	**Medium**	
	Reduced habitat quality and availability for fauna SCC	Negative	2	3	**Medium**	
Avifauna	Displacement due to habitat loss	Negative	2	1	**Very low**	**Yes**
	Disturbance of bird species	Negative	2	1	**Very low**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Electrocution on the medium voltage network	Negative	4	3	**High**	
	Collisions with the medium voltage network	Negative	4	3	**High**	
Bats	Bat mortalities during foraging	Negative	4	3	**High**	**Yes**
	Bat mortalities during migration	Negative	4	3	**High**	
	Increased bat mortalities due to light attraction and habitat creation	Negative	4	3	**High**	
Visual	Potential alteration of the visual character of the area;	Negative	4	3	**High**	**Yes**
	Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area	Negative	4	3	**High**	
	Potential visual clutter caused by substation and other associated infrastructure on-site	Negative	3	3	**Medium**	
	Potential visual effect on surrounding farmsteads	Negative	4	3	**High**	
	Visual impact of shadow flicker impact, and motion-based visual intrusion	Negative	4	3	**High**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines	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**	
	Benefits associated with the socio-economic development contributions	Positive	3	3	**Medium**	
	Visual impact and impact on sense of place	Negative	4	3	**High**	
Climate Change	Reduced GHG Emissions	Positive	4	3	**High**	**No**
	Contribution of cleaner energy to the National Grid	Positive	4	3	**High**	

Table 7-3: Initial Cumulative Impacts

RECEPTOR	DESCRIPTION	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Noise and Vibrations	Cumulative Noise Emissions	Negative	4	3	**High**	**Yes**
Soils, Land Capability and	Cumulative Agricultural Impacts	Negative	4	3	**High**	**Yes**

RECEPTOR	DESCRIPTION	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Agricultural Potential						
Geology	The displacement of natural earth material and overlying vegetation leading to: — Exposure of upper soil layer. — Increase in stormwater velocity. — Soil washed downslope into drainage channels leading to sedimentation. The erosion of these slopes will be exacerbated during periods of heavy rainfall.	Negative	3	3	**Medium**	**No**
	Contamination of ground and surface water resources from heavy plant leading to quality deterioration of the water resources.	Negative	4	3	**High**	
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**	
Bats	Cumulative Mortalities	Negative	4	3	**High**	**Yes**
Visual	Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially alter the sense of place and	Negative	4	3	**High**	**Yes**

RECEPTOR	DESCRIPTION	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	visual character of the area					
	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**
	Cumulative impact on local service and accommodation	Positive	3	3	**Medium**	
	Cumulative impact on local economy	Positive	3	3	**Medium**	

8 PLAN OF STUDY FOR EIA

8.1 PLAN OF STUDY FOR EIA TERMS OF REFERENCE

Table 8-1: outlines the structure of the plan of study as required in terms of Annexure 2 of GNR 982.

Table 8-1: Plan of Study Requirements

PLAN OF STUDY CHAPTER	INFORMATION REQUIREMENT AS PER GNR 982
Description of EIA Tasks	— A description of the tasks that will be undertaken as part of the environmental impact assessment process.
Description of Alternatives	— A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity.
Aspects to be Assessed in the EIA Process	— A description of the aspects to be assessed as part of the environmental impact assessment report process.
Specialist Studies	— Aspects to be assessed by specialists.
Impact Assessment Methodology	— 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. — A description of the proposed method of assessing duration and significance.
Environmental Impact Report	— Contents of EIAR as specified in GNR 982 (as amended) Annexure 2
Stakeholder and Authority Engagement	— An indication of the stages at which the competent authority will be consulted. — Particulars of the public participation process that will be conducted during the environmental impact assessment process.

8.2 OVERVIEW OF THE EIA PHASE TASKS

The EIA phase will consist of a number of tasks; each of these tasks is detailed separately in the following sub-sections:

- Specialist studies;
- Continuation of authority and stakeholder engagement;
- Assessment of the significance of potential impacts; and
- Preparation of the EIA Report.

8.3 REVISED PROJECT DESCRIPTION FOR EIA PHASE

Table 8-2 outlines the revised project details to be considered during the EIA phase.

Table 8-2: Revised project details

INFRASTRUCTURE	DETAILS
Extent:	Approximately 9400ha
Buildable area:	Approximately 400ha
Capacity:	Up to 300MW
Number of turbines:	Up to 70
Turbine hub height:	Up to 200m
Rotor diameter:	Up to 200m
Foundation:	Each foundation of approximately 25m diameter (500m^2 area and requiring ~2 500m^3 concrete each) x 3m deep. Excavation of approximately 1000m^2, in sandy soils due to access requirements and safe slope stability requirements. Permanent hard standing area for each wind turbine (approximately 5ha).
Operations and maintenance (O&M) building footprint:	Operations and maintenance (O&M) building infrastructure will be required to support the functioning of the WEF and for services required by operations and maintenance staff. The O&M building infrastructure will be located in close proximity to the onsite substation and will include: Operations building of approximately 20m x 10m = 200m^2; Workshop area of approximately 15m x 10m= 150m^2; Stores area of approximately 15m x 10m = 150m^2; Septic/conservancy tanks with portable toilets to service ablution facilities.
Construction camp laydown:	Temporary laydown or staging area-Typical area 220m x 100m = 22000m^2. Laydown area could increase to 30000m^2 for concrete towers, should they be required. Sewage: septic and/or conservancy tanks and portable toilets. Temporary cement batching plant, wind tower factory & yard of approximately 7ha, comprising amongst others, a concrete storage area, batching plant, electrical infrastructure and substation, generators and fuel stores, gantries and loading facilities, offices, material stores (rebar, concrete, aggregate and associated materials), mess rooms, workshops, laydown and storage areas, sewage and toilet facilities, offices and boardrooms, labour mess and changerooms, mixers, moulds and casting areas, water and settling tanks, pumps, silos and hoppers, a laboratory, parking areas, internal and access roads - Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. The maximum height of the silo will be 20m.

Temporary laydown or staging area:	Typical area 220m x 100m=2200m^2. Laydown areas could increase to 30000m^2 for concreate towers, should they be required.
Cement batching plant (temporary):	Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. The footprint will be approximately 0.5ha. the maximum height of the silo will be 20m.
Internal roads:	Internal and access roads with a width of between 8m and 10m, which can be increased to approximately 12m on bends. The roads will be positioned within a 20m wide corridor to accommodate cable trenches, stormwater channels and bypass /circles of up to 20m during construction. Length of the internal roads will be approximately 60km.
Cables:	The medium voltage collector system will compromise of cables up to and include 33kV that run underground, except where a technical assessment suggests that overhead lines are required, connecting the turbines to the onsite IPP substation.
Independent Power Producer (IPP) site substation and battery energy storage system:	The total footprint will be up to 4ha in extent. The substation will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The associated BESS storage capacity will be up to 300MW/1200MWh with up to four hours of storage. It is proposed that Lithium Battery Technologies or Vanadium Redox flow technologies will be considered the preferred battery technology. The main components of the BESS include the batteries, power conversion system, and transformer which will all be stored in various rows of containers.

8.4 DESCRIPTION OF ALTERNATIVES

The EIA process identifies two types of project alternatives:

- Concept Level Alternatives, which relate to the site, technology, and process alternatives
- Detailed Level Alternatives which relate to working methods and mitigation measures

The feasibility of the higher-level concept alternatives has been considered and assessed within **Section 2.4** of the DSR. The Detailed Level Alternatives will be addressed within the EIA Report.

8.5 ASPECTS TO BE ASSESSED IN THE EIA PROCESS

Table 8-3 outlines the key aspects that were identified in the scoping phase; these aspects will be subject to further assessment in the EIA Phase

Table 8-3: Summary of aspects to be addressed in the EIA Phase

ENVIRONMENTAL ASPECT	IMPACT
Noise and vibrations	Noise and vibration emissions during construction
	Noise disturbance and nuisance to sensitive receptors during operational phase
	Cumulative impacts
Soils, Land Capability and agricultural Potential	Loss of agricultural potential by soil degradation
	Loss of agricultural potential by occupation of land
	Reduction in land available for cultivation and grazing animals
	Prevention of crop spraying by aircraft over land occupied by turbines. Enhanced agricultural potential through increased financial security for farming operations
	Cumulative impacts
Surface water	Loss of aquatic species of special concern
	Damage or loss of riparian and wetlands systems and disturbance of the waterbodies during construction
	Potential impact on localised surface water quality
	Impact on habitat change and fragmentation related to hydrological regime changes
	Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.
	Cumulative impacts
Biodiversity	Loss and Fragmentation of Vegetation and Habitat
	Impacts on CBAs and broad-scale ecological processes
	Loss and Displacement of Fauna
	Proliferation of alien invasive plant species
	Impact on provincial biodiversity frameworks
	Cumulative impacts
Avifauna	Displacement due to disturbance during construction
	Displacement of priority species due to habitat transformation as a result of the operation of the wind turbines and associated infrastructure

ENVIRONMENTAL ASPECT	IMPACT
	Mortality of priority species due to collisions with wind turbines
	Cumulative impacts
Bats	Loss of foraging habitat by clearing of vegetation
	Roost destruction during earthworks
	Bat mortalities during foraging (not migration)
	Bat mortalities during migration
	Increased bat mortalities due to light attraction and habitat creation
	Cumulative impacts
Visual and Landscape	Visual impact during construction and decommissioning
	Potential alteration of the visual character of the area
	Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area
	Potential visual clutter caused by substation and other associated infrastructure on-site.
	Potential visual effect on surrounding farmsteads
	Visual impact of shadow flicker impact, and motion-based visual intrusion
	Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.
	Cumulative visual impacts
Heritage and Cultural Resources	disturbance or destruction of cultural resources
Palaeontology	Physical disturbance of palaeontological sites
Traffic	Increased traffic generation around the study area by construction vehicles
	Deterioration of the surrounding road network due to an increase of traffic around the site
	Transportation of abnormal loads during the construction phase
Socio-economic	Creation of local employment, training, and business opportunities

ENVIRONMENTAL ASPECT	IMPACT
	Impact of construction workers on local communities
	Influx of job seekers
	Risk to safety, livestock, and farm infrastructure
	Increased risk of grass fires
	Nuisance impacts associated with construction related activities
	Impacts associated with loss of farmland
	Generate income for affected landowners
	Benefits associated with the socio-economic development contributions
	Visual impact and impact on sense of place
	Potential impact on property values
	Potential impact on tourism
	Cumulative impact on sense of place
	Cumulative impact on local service and accommodation
	Cumulative impact on local economy
SHE Risk	Lithium-ion BESS: – noxious smoke possibilities and associated impacts, – fires/explosions possibilities and associated impacts.
	Vanadium redox flow BESS: – suitable secondary spill containment for the large volume of electrolyte.
	General: – extremely isolated arid area – no commercial locations of interest. – location of isolated farmsteads and watering holes

8.6 SPECIALIST STUDIES TO BE UNDERTAKEN

The following specialist assessments have been commissioned for the EIA Phase:

- Soils and Agricultural Potential Assessment;
- Archaeological and Cultural Heritage Assessment;

- Palaeontology Impact Assessment;
- Visual Impact Assessment[8] ;
- Terrestrial biodiversity Impact Assessment
- Plant species Impact Assessment
- Animal species Impact Assessment
- Surface water Assessment;
- Avifauna Impact Assessment;
- Bat Impact Assessment;
- Environmental Acoustic (Noise) Impact Assessment;
- Social Impact Assessment;
- Qualitative Risk Assessment (specific to the BESS);
- Desktop Traffic Assessment.

It should be noted that the specialist studies will be undertaken according to the procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of Sections 24(5)(a) and (h) and Section 44 of the NEMA (GNR 320, dated 20 March 2020), where applicable.

8.6.1 SOIL AND LAND CAPABILITY IMPACT ASSESSMENT

The terms of reference for the EIA phase is to produce Agricultural Agro-Ecosystem Specialist Assessment that complies with all the requirements of the agricultural protocol. These assessments will require fieldwork and collection of agricultural data.

- Site visits were conducted during the summer season between the 22nd and 24th March, and during the autumn season between the 17th and 20th May 2022. A final site visit will be undertaken during the winter season in order to classify the soils on the remainder of the study area which has not yet been visited. A free format soils classification survey of the study area will be undertaken on foot, using a spade, a hand-held bucket auger and a hand-held Dutch auger to identify soil forms present on site. Current activities at the site and specific areas of land use will be noted. The soil types encountered will be reported upon and mapped.
- The soils still to be identified in the field will be classified by form in accordance with the South African soil taxonomic system (Soil Classification Working Group, 1991) and the area's land capability will be assessed and mapped based on the results of the classification study.
- The South African land capability classification system by Scotney et al. (1987) will be used to classify and map land capability (**Figure 5-14**). This system is useful in that it is able to quickly provide an overview of the agricultural capability and limitations of the soils in question and is useful for land capability comparisons. This system, however, is agriculturally focussed, offering little information about the soil potential for alternative uses.
- For this reason, a soil suitability assessment tool for alternative uses developed in-house by WSP and informed by the IEMA Land and Soils in EIA Guide (IEMA, 2021) will also be applied to the site (**Figure 8-1**) A key aspect of this method is that input is gathered in an interdisciplinary manner. As the proposed use of the land for this study is WEF turbines and associated infrastructure, the geotechnical expert working on the project will be consulted.

[8] The Visual Impact Assessment will consider the impact of flicker associated with the Dalmanutha WEF development.

PROPOSED USE	(ENTER USE HERE)	COMMENTS
Limitations	(enter use-specific limitations here)	
Capability Class	**Limitations To Proposed Use**	
1 Very good	None or Marginal	(explain capability class decision here)
2 Good	Slight	
3 Fair	Moderate	
4 Poor	Considerable, Long-Term	
5 Very Poor	Severe, Long-term, Irreversible	

Figure 8-1: Alternative land capability classification system

8.6.2 AQUATIC BIODIVERSITY ASSESSMENT

A separate aquatic biodiversity assessment will be undertaken during the EIA stage. The high flow survey is complete. The survey results, together with the low-flow survey results (survey to be conducted in Sept/Oct 2022) will be detailed in the Aquatic Biodiversity (riparian ecosystems) Specialist Study.

The field studies are complete; PES and EIS scores will be reported for delineated wetland habitat in the Aquatic Biodiversity (Wetlands) Specialist Study which is currently being compiled.

- Consider the potential impact of the development on CBAs and broad-scale ecological processes at the site. This should consider the habitats affected by the current development as well as the overall impact of renewable energy development in the area at a broader scale.
- A comprehensive site visit and field assessment in order to characterise the aquatic systems present at the site in greater detail. This includes habitat mapping, developing species lists and descriptions of the typical and dominant species within the site and the potential impact of the development on these habitats and plant communities.
- Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the layout to be provided by the developer.

8.6.3 TERRESTRIAL BIODIVERSITY ASSESSMENT

The relative sensitivity of habitats in different parts of the study area differs from location to location. The sensitivity assessment was done as a screening exercise primarily through interpretation of aerial imagery in combination with habitat assessments that were not within specific footprint areas. Although footprint areas have been designated as sensitive in some cases, it is important to assess footprint areas in detail to ascertain whether local conditions justify the sensitivity categorisation or not.

Terrestrial fauna surveys (focussing on mammals, reptiles and inverts) were completed in late June 2022 (dry season) and have been repeated in late October 2022 (wet season) (mammals, reptiles and inverts as before, amphibian surveys will also be conducted); vegetation mapping and flora surveys were done during late October/early November 2022 (wet season).

A detailed terrestrial ecology assessment will be carried out in the EIA phase and will include the following:

- A comprehensive site visit and field assessment in order to characterise the vegetation and plant communities present at the site in greater detail. This includes habitat mapping, developing species lists and

descriptions of the typical and dominant species within the site and the potential impact of the development on these habitats and plant communities.

- Identification and quantification of the abundance and distribution of species of conservation concern within the site and especially within the development footprint.
- Evaluate the possible impact of the development on landscape connectivity in the field based on the likely use of the area as a corridor for movement by fauna as well as any local impacts on faunal communities. This should include the identification of any corridors that should be kept clear of development at the site and any buffers required around such features.
- Identify sensitive faunal habitats that should be avoided and measures that should be implemented to reduce impacts on fauna in general.
- Consider the potential impact of the development on CBAs and broad-scale ecological processes at the site. This should consider the habitats affected by the current development as well as the overall impact of renewable energy development in the area at a broader scale.
- Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the layout to be provided by the developer.

8.6.4 SURFACE WATER IMPACT ASSESSMENT

The assessment will include the following aspects related to aquatic features associated with the site:

- A detailed assessment of the study area. This will cover the development footprint in relation to available information related to wetland / riverine ecosystems functioning, river classification, flow regime, water quality, physical, biota, and riparian habitat within the region.
- Identification of aquatic features and assessing impacts on, specifically, NFEPA features, important wetlands and rivers.
- Undertake a wetland delineation and classification.
- A functional assessment of the identified wetlands.
- A risk assessment of the identified wetlands.
- Wetland Mitigation measures.
- A map demarcating the relevant local drainage area of the respective waterbodies, and the respective catchments within a 500m radius of the study area. This will demonstrate, from a holistic point of view the connectivity between the site and the surrounding regions, i.e. the zone of influence.
- The determination of the ecological state of any aquatic systems, estimating their biodiversity, conservation and ecosystem function importance with regard ecosystem services.
- Recommend buffer zones and No-go areas around any delineated wetland areas based on the relevant legislation, e.g. Conservation Plan guidelines or best practice.
- Assess the potential impacts, based on the supplied methodology.
- Provide mitigations regarding project related impacts on the identified aquatic features
- Provide the relevant aspects with regard compiling the Environmental Management / Monitoring Plans.
- Supply geo-referenced GIS shape files of the aquatic areas.

The Surface water Impact Assessment must be undertaken to align with the requirements for a WULA/GA.

8.6.5 AVIFAUNA IMPACT ASSESSMENT

The following are proposed for the EIA Phase:

- The implementation of four avifaunal surveys, utilising transects, vantage point watches, focal points and incidental counts, to inform the assessment of the potential impacts of the planned infrastructure within the development footprint. The monitoring protocol is guided by the following:

- 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 NEMA when applying for Environmental Authorisation (Gazetted October 2020)
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on avifaunal species by onshore wind energy generation facilities where the electricity output is 20MW or more (Government Gazette No. 43110 – 20 March 2020).
- Jenkins, A.R., Van Rooyen, C.S., Smallie, J.J., Anderson, M.D., & A.H. Smit. 2015. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa. Produced by the Wildlife & Energy Programme of the Endangered Wildlife Trust & Bird Life South Africa. Hereafter referred to as the wind guidelines.
- The second year of pre-construction bird monitoring will be completed.
- Pre-construction bird monitoring data will be used in more detail.
- Sensitivity mapping will be refined. If necessary, wetland mapping will be compared with wetland specialist, and buffers determined.
- Mitigation measures will be designed for each identified impact.
- The cumulative impact assessment will be completed.

The avifaunal specialists report will be structured around the following terms of reference:

- Description of the affected environment from an avifaunal perspective.
- Discussion of gaps in baseline data and other limitations.
- Description of the methodology that was used for the field surveys.
- Comparison of the site sensitivity recorded in the field with the sensitivity classification in the DFFE National Screening Tool and adjustment if necessary.
- Provision of an overview of all applicable legislation.
- Provision of an overview of assessment methodology.
- Identification and assessment of the potential impacts of the proposed development on avifauna including cumulative impacts.
- Provision of sufficient mitigation measures to include in the Environmental Management Programme (EMPr).
- Conclusion with an impact statement whether the facility is fatally flawed or may be authorised.

- For each anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.

8.6.6 BAT IMPACT ASSESSMENT

The pre-construction bat monitoring has now been completed and will inform the EIA phase; passive bat activity data has been gathered, which will provide comparative bat activity and species assemblages across all seasons as well as various habitats, terrain and/or areas of the site. The EIA phase studies will comprise of the following:

- Confirmation of sensitivities impacts and mitigation measures.
- Study bat species assemblage and abundance on the site.
- Study temporal distribution of bat activity across the night as well as the four seasons of the year in order to detect peaks and troughs in activity.
- Determine whether weather variables (wind, temperature, humidity and barometric pressure) influence bat activity.
- Determine the weather range in which bats are mostly active.
- Develop long-term baseline data for use during operational monitoring.
- Identify which turbines need to have special attention with regards to bat monitoring during the operational phase and identify if any turbines occur in sensitive areas and need to be shifted into less sensitive areas or removed from the layout.

- Detail the types of mitigation measures that are possible if bat mortality rates are found to be unacceptable, including the potential times/ circumstances, which may result in high mortality rates.

8.6.7 ACOUSTIC (NOISE) IMPACT ASSESSMENT

The environmental acoustic specialist study for the Dalmanutha WEF as part of the EIA phase will comprise the following:

PRELIMINARY MODELLING

A preliminary modelling exercise will be carried out using a simple model which assumes hemispherical propagation of noise from each turbine. Such modelling will focus on receptors located within a 2 km radius of the turbines.

If the preliminary model suggests that turbine noise at all sensitive receptors is likely to be below an LA90 level of 35 dB(A) at a wind speed of 10 m/s at 10 m height during day and night times, then this preliminary modelling is likely to be sufficient to assess noise impact of the proposed project. If LA90 levels at any receptor location are above 35 dB(A) then a more detailed acoustic study will need to be carried out which includes comprehensive baseline monitoring. Alternatively input into micro-siting of the turbines will be provided to avoid unwanted impacts or further detailed studies.

ENVIRONMENTAL ACOUSTIC IMPACT ASSESSMENT REPORT

A detailed Environmental Acoustic Impact Assessment report will be provided detailing findings of the preliminary modelling, associated impacts, any inputs into micro-siting, as well as detailed recommendations, including mitigation measures if deemed necessary.

8.6.8 HERITAGE AND PALAEONTOLOGICAL IMPACT ASSESSMENT

The scoping study did not identify any fatal flaws for the proposed Dalmanutha WEF. To comply with the National Heritage Resources Act (Act 25 of 1999) it is recommended that a Phase 1 HIA & VIA must be undertaken for the study area.

During these assessments the potential impact on heritage resources will be determined as well as levels of significance of recorded heritage resources.

The HIA & VIA will also provide management and mitigation measures should any significant sites be impacted upon, ensuring that all the requirements of the SAHRA are met.

The study area is of insignificant to moderate to very high paleontological sensitivity and according to the SAHRIS palaeontological sensitivity map must be subjected to a palaeontological assessment in the impact assessment phase.

During the Public participation and stakeholder consultation process (advertisements & site notices) must reference the National Heritage Resources Act.

8.6.9 TRAFFIC IMPACT ASSESSMENT

The Traffic Impact Assessment will be conducted as follows:

A site visit will be undertaken to obtain the following information:

- Existing layouts and traffic control measures of intersections considered in the study.
- Accesses to various properties surrounding the proposed development site.
- Appropriateness of proposed site accesses.
- Condition of the road network.
- Presence of existing public transport and non-motorised transport facilities.

A weekday 12-hour traffic counts (6am to 6pm) will be conducted at affected intersections in relation to the potential access positions off the major local road, National Road N4.

The access positions via local roads from the N4 and Provincial Roads will be assessed in terms of safety, operation and capacity, if requires as per TMH16 standards. These accesses will be confirmed during the preparation of the study.

The South African Trip Data Manual (TMH17) does not contain estimates for expected trip generation of a wind power facility of this nature. The trip generation during the Construction, Operation and Decommissioning phases will be estimated from Client provided information and assumptions

A capacity analysis will be undertaken of the affected local intersections for the baseline conditions using SIDRA 8 software, to determine the current traffic conditions using the traffic volume information.

A capacity analysis will be conducted for the operating conditions of new and affected intersections using SIDRA 8 software, and to propose mitigating measures where required.

An environmental assessment rating will be undertaken for the construction, operational and decommission phase in relation to traffic impact.

From the site inspections, SIDRA analysis and assessment as described above, conclusions and recommendations will be made in order to mitigate any possible traffic impacts of the proposed development on the local road network and environment.

8.6.10 VISUAL IMPACT ASSESSMENT

The scoping phase VIA report has assessed the visual impacts of the proposed Dalmanutha WEF. The focus of the EIA phase assessment will be to update the scoping phase VIA report. The VIA is determined according to the nature, extent, duration, intensity or magnitude, probability and significance of the potential visual impacts, and will propose management actions and/or monitoring programs and may include recommendations related to the solar energy facility layout.

The visual impact is determined for the highest impact-operating scenario (worst-case scenario) and varying climatic conditions (i.e., different seasons, weather conditions, etc.) are not considered.

The VIA considers potential cumulative visual impacts, or alternatively the potential to concentrate visual exposure/impact within the region.

This will entail:

— **Determine potential visual exposure**

The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if (or where) the proposed facility and associated infrastructure were not visible, no impact would occur.

The viewshed analyses of the proposed facility and the related infrastructure are based on a 30m SRTM digital terrain model of the study area.

The first step in determining the visual impact of the proposed facility is to identify the areas from which the structures would be visible. The type of structures, the dimensions, the extent of operations and their support infrastructure are considered.

— **Determine visual distance/observer proximity to the facility**

To refine the visual exposure of the facility on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for this type of structure.

Proximity radii for the proposed infrastructure are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment.

The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly (anticipated) negative visual perception of the proposed facility.

— **Determine viewer incidence/viewer perception (sensitive visual receptors)**

The identification of areas of high viewer incidence (i.e. main roads, residential areas, settlements, etc.) that may be exposed to the project infrastructure.

This is done in order to focus attention on areas where the perceived visual impact of the facility will be the highest and where the perception of affected observers will be negative.

Related to this data set, is a land use character map that further aids in identifying sensitive areas and possible critical features (i.e. tourist facilities, protected areas, etc.) that should be addressed.

— **Determine the visual absorption capacity (VAC) of the landscape**

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing, sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form, and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases

— **Calculate the visual impact index**

The results of the above analyses are merged in order to determine the areas of likely visual impact and where the viewer perception would be negative. An area with short distance visual exposure to the proposed infrastructure, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This focusses the attention to the critical areas of potential impact and determines the potential magnitude of the visual impact.

Geographical Information Systems (GIS) software is used to perform all the analyses and to overlay relevant geographical data sets in order to generate a visual impact index.

— **Determine impact significance**

The potential visual impacts are quantified in their respective geographical locations in order to determine the significance of the anticipated impact on identified receptors. Significance is determined as a function of extent, duration, magnitude (derived from the visual impact index) and probability. Potential cumulative and residual visual impacts are also addressed. The results of this section are displayed in impact tables and summarised in an impact statement.

— **Propose mitigation measures**

The preferred alternative (or a possible permutation of the alternatives) will be based on its potential to reduce the visual impact. Additional general mitigation measures will be proposed in terms of the planning, construction, operation and decommissioning phases of the project.

— **Reporting and map display**

All the data categories, used to calculate the visual impact index, and the results of the analyses will be displayed as maps in the accompanying report. The methodology of the analyses, the results of the visual impact assessment and the conclusion of the assessment will be addressed in the VIA report.

— **Site visit**

Undertake a site visit in order to collect a photographic record of the affected environment, to verify the results of the spatial analyses and to identify any additional site specific issues that may need to be addressed in the VIA report.

— **Photo simulations**

Photographs will be used to simulate a realistic post construction view of the WEF. This will aid in visualising the perceived visual impact of the proposed WEF and place it in spatial context.

8.6.11 SOCIAL IMPACT ASSESSMENT

The approach to undertaking the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Identifying the key potential social issues associated with the proposed project (construction, operational, and decommissioning phase). This requires a site visit to the area and consultation with affected individuals and communities.
- Assessing and documenting the significance of social impacts associated with the proposed development. Section 7.6 below summarises the assessment methodology that will be used to assign significance ratings during the assessment process.
- Identifying alternatives and enhancement and mitigation measures.

The site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties.

8.6.12 SHE RISK

The SHE risk specialist study for the Dalmanutha WEF as part of the EIA phase will comprise the following:

- A description of the region and local features.
- A study of the battery technologies to be used.
- Identification of sensitive receptors in the area.
- Assessing (identifying and rating) the potential impacts on the health and safety of employees, contractors and public persons.
- Identify potential SHE hazardous events associated with the installation, during construction, operation, and eventual decommissioning phases.
- For the proposed installations compile all the information, analysis, assessments, and conclusions as detailed above into a technical risk assessment report.
- Suggest risk reduction measures- (mitigation) that should typically be applied, e.g., National Standards, best practices, and monitoring requirements. Preventative measures will be to reduce the likelihood and mitigative measures to reduce the consequences. These measures should be incorporated into the EMPR.
- Identification of relevant legislation and legal requirements; and Providing recommendations on possible preventative and mitigation measures for inclusion in the Environmental Management Program (EMPR).

8.7 IMPACT ASSESSMENT 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,[9] indirect,[10] secondary[11] as well as cumulative[12] impacts.

[9] Impacts that arise directly from activities that form an integral part of the Project.
[10] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[11] Secondary or induced impacts caused by a change in the Project environment.
[12] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

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[13] presented in **Table 8-4**.

Table 8-4: 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	4-16	16-30	31-60	61-80	81-100
Significance Rating (Negative (-)	**Very Low**	**Low**	**Moderate**	**High**	**Very high**
Significance Rating (Positive (+)	**Very low**	**Low**	**Moderate**	**High**	**Very high**

8.7.1 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 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.

[13] 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.

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 mitigation sequence/hierarchy is shown in **Figure 8-2** below.

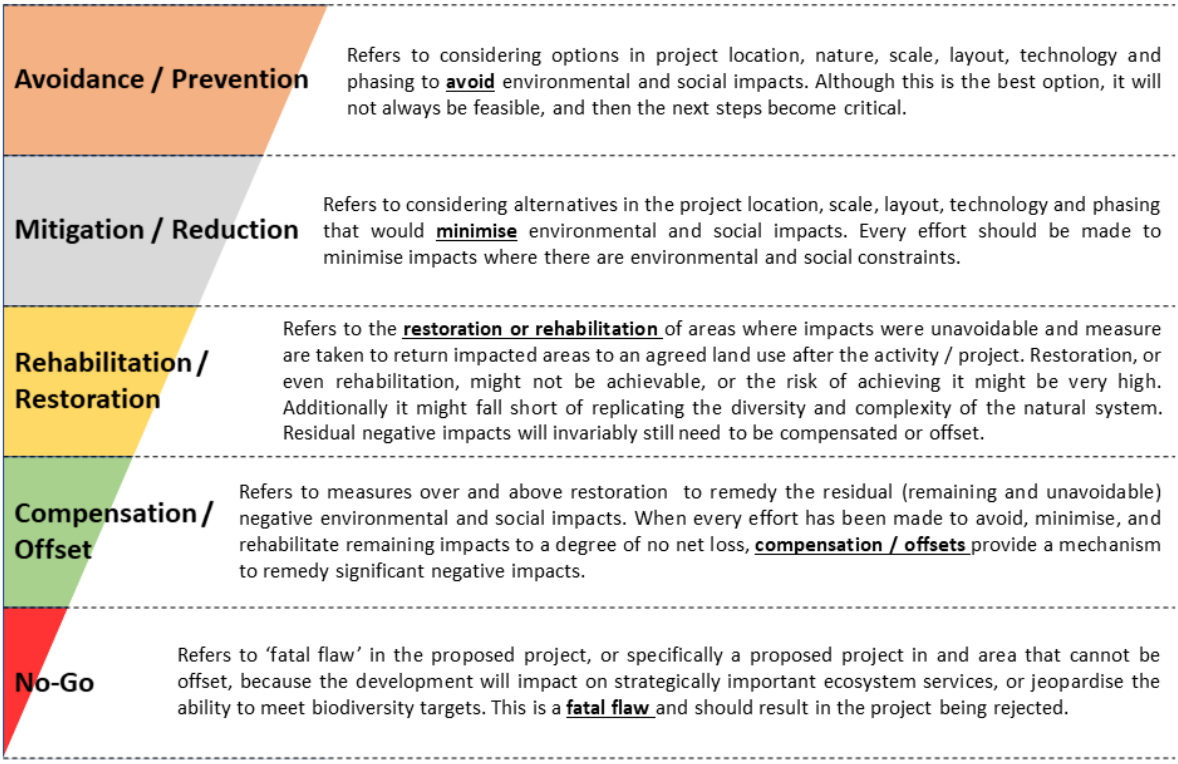


Figure 8-2: Mitigation Sequence/Hierarchy

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.

8.8 ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Once the FSR has been approved the proposed project will proceed into detailed EIA phase, which involves the detailed specialist investigations.

WSP will produce a Draft EIAR after the completion of the required specialist studies. The Draft EIAR will provide an assessment of all the identified key issues and associated impacts from the Scoping phase. All requirements as contemplated in the EIA Regulations, 2014 (GNR 982, as amended) will be included in the Draft EIAR.

The Draft EIAR will contain, inter alia, the following:

- Details of the EAP who prepared the report and the expertise of the EAP to carry out the S&EIR process, including a curriculum vitae;

- The location of the activity, including the 21-digit Surveyor General code of each cadastral land parcel, where available, the physical address and farm name; and the coordinates of the boundary of the property or properties;
- A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale;
- A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the associated structures and infrastructure related to the proposed project;
- A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- 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;
- A motivation for the preferred development footprint within the approved site;
- A full description of the process followed to reach the proposed development footprint within the approved site;
- Details of the public participation process undertaken;
- 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;
- The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
- The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts;
- The methodology used in determining and ranking of potential environmental impacts and risks;
- Positive and negative impacts;
- An assessment of each identified potentially significant impact and risk;
- The possible mitigation measures that could be applied;
- An environmental impact statement;
- A description of any assumptions, uncertainties and gaps in knowledge;
- A reasoned opinion as to whether the proposed activity should or should not be authorised;
- An undertaking under oath or affirmation by the EAP; and
- An EMPr.

8.9 STAKEHOLDER AND AUTHORITY ENGAGEMENT

Public participation during the EIA phase revolves around the review of the environmental impact assessment findings, which will be presented in the Draft EIA Report. All stakeholders will be notified of the progress to date and availability of the Draft EIA Report, via mail, email and/or SMS. A legislated period of 30 consecutive days will be allowed for public comment. Reports will be made available in the following way:

- Distribution for comment at central public places, which were used during the Scoping phase (subject to Covid 19 status quo);
- The document will be made available to download from the WSP website; and
- Copies of CDs will be made available on request.

The EIA phase will provide the following information to I&APs:

- Initial Site Plan;
- Alternatives;
- A description of activities and operations to be undertaken;
- Baseline information;
- Specialist studies;

- Impact assessment;
- Management measures;
- Monitoring and measuring plan; and
- Closure details.

The information outlined above will be presented in one or more of the following:

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

All comments received during the EIA phase will be recorded in the comments and response report (CRR), which will be included in the draft and final EIA Reports. The final EIA Report will incorporate public comment received on the Draft EIA Report and will be made available for public review with hard copies distributed mainly to the authorities and key stakeholders.

All stakeholders will receive a letter notifying them of the authority's decision

8.10 ADDITIONAL PERMITS AND AUTHORISATIONS

Table 8-5 outlines the additional permits and authorisations required for the proposed development, as well as the relevant Competent Authorities responsible.

Table 8-5: 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 38 Notification	National Heritage Resource Act (Act No. 25 of 1999)	Mpumalanga Heritage Resources Authority	In Process
Obstacle Permit	Civil Aviation Act (Act 13 of 2009)	Air Traffic and Navigation Services / Civil Aviation 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 57 permits	National Environmental Management: Biodiversity Act 10 of 2004	DFFE: Protected Areas Directorate	In process
Biodiversity Offsets	Draft National Biodiversity Offset Guideline (Issued Under Section 24j Of The National Environmental Management Act)	DFFE: Biodiversity Conservation	Application process will run concurrently with the EIA Phase.

9 WAY FORWARD

This DSR contains:

- A description of the existing and proposed activities;
- A description of the alternatives considered to date;
- An outline of the proposed process to be followed;
- Information on the EAP and stakeholders who have chosen to participate in the project;
- An outline of the environment in which the project falls;
- Information on the potential environmental impacts to be studied in more detail during the EIAR phase of the project; and
- Information on the proposed specialist studies to be undertaken.

A number of environmental impacts have been identified as requiring some more in-depth investigation and the identification of detailed mitigation measures. Therefore, a detailed EIA is required to be undertaken in order to provide an assessment of these potential impacts and recommend appropriate mitigation measures.

The recommendation of this report is that detailed specialist studies as outlined in **Section 7.4** are undertaken.

This DSR is available for review from **12 December 2022 to 02 February 2023**. All issues and comments submitted to WSP will be incorporated in the CRR of the FSR.

The DSR will be submitted to the delegated competent authorities responsible for authorising this project.

If you have any further enquiries, please feel free to contact:

WSP Group Africa

Attention: Thirushan Nadar

Tel: 011 300-6185

E-mail: Thirushan.Nadar@wsp.com

APPENDIX

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APPENDIX

B EAP DECLARATION

APPENDIX

C SPECIALIST DECLARATIONS

APPENDIX

APPENDIX

D

DFFE SCREENING REPORT

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E APPROVED PRE-APPLICATION MEETING MINUTES AND PUBLIC PARTICIPATION PLAN

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F STAKEHOLDER ENGAGEMENT

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F-1 I&AP DATABASE

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G GEOTECHNICAL SCOPING REPORT

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H

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