



GEOHYDROLOGY

GEOTECHNICAL

ENVIRONMENTAL

SOCIAL DEVELOPMENT



Draft EIA Report

14/12/16/3/3/2/2301



PROPOSED 275kV POWERLINE FOR THE CONNECTION OF FIVE MOPANE SOLAR PV PARKS (MOPANE CLUSTER) TO THE ESKOM CARMEL SUBSTATION, LOCATED IN THE MERAFAONG CITY LOCAL MUNICIPALITY, WEST RAND DISTRICT MUNICIPALITY, GAUTENG PROVINCE

Short name: MOPANE POWERLINE

June 2023

**Commissioned by: Voltalia South Africa (Pty) Ltd
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Compiled by: A von Well**



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June 2023

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RESOLUTION OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND INVITATION TO COMMENT

Voltaia South Africa (Pty) Ltd has appointed AGES Limpopo (Pty) Ltd as the Environmental Assessment Practitioner (EAP) to undertake the Scoping & Environmental Impact Assessment (EIA) for the Mopane Powerline. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations, as amended in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

This Draft EIA Report represents the findings of the EIA process and contains the following chapters:

- **Section 1** – Objective of the EIA Process
- **Section 2** – Details of the Environmental Assessment Practitioner (EAP)
- **Section 3** – Location of Activity
- **Section 4** – Plan of the Proposed Activity
- **Section 5** – Scope of the Proposed Activity
- **Section 6** – Legal and Policy Requirements
- **Section 7** – Need/Desirability of the Project
- **Section 8** – Motivation for Preferred Development Footprint in the Preferred Site
- **Section 9** – Consideration of Alternatives
- **Section 10** – Description of the proposed process to identify and rank environmental impacts that the activity, associated structures and infrastructure will impose on the preferred location through the life of the activity
- **Section 11** – Summary and findings and recommendations of specialist reports and how findings have been included in the assessment report
- **Section 12** – Environmental Impact Statement
- **Section 13** – Final Proposed Alternatives Responding to Impact Management Measures, Avoidance and Mitigation Measures Identified in Assessment
- **Section 14** – Aspects which were conditional to the findings of the assessment by the EAP or Specialists which are to be included as conditions of Authorisation
- **Section 15** – Assumptions uncertainties and gaps in knowledge
- **Section 16** – Reasoned opinion for authorisation of activity and conditions in respect of that authorisation
- **Section 17** – Period of Environmental Authorisation and Date of Conclusion of Activity
- **Section 18** – Undertaking Under Oath or Affirmation by the EAP
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EXECUTIVE SUMMARY

Voltalia South Africa (Pty) Ltd is proposing the development of a new 275kV powerline for the connection of five Mopane solar parks to the Eskom Carmel substation which is located on Portion 23 of the farm Doornfontein 118 IQ, located within Merafong City Local Municipality, West Rand District. **Gauteng Province.**

The proposed powerline (preferred option) will be approximately 14,4 km in length.

Evaluation of the Mopane Powerline

The chapters of the Draft EIA Report together with the specialist studies contained in the attached Annexures provide a detailed assessment of possible impacts that the proposed Mopane Powerline may have on the environment. This chapter contains the environmental assessment of the powerline development by providing a summary of the results and conclusions of the assessment of the project site and development footprint. In so doing, it draws on the information gathered as part of the EIA process, knowledge gained by the environmental specialists and the EAP and presents a combined and informed opinion of the environmental impacts associated with the proposed development.

No environmental fatal flaws or unacceptable impacts were identified by the environmental specialists, provided that recommended mitigation measures are implemented during construction and operational phases. These mitigation measures include, amongst others, the avoidance of sensitive areas in the development footprint.

The potential environmental impacts associated with the Mopane Powerline identified and assessed through the EIA Scoping process include:

- Impacts on Terrestrial Ecology;
- Impacts on Aquatic Ecology;
- Impacts on Avifauna;
- Visual Impacts;
- Socio-economic Impacts;
- Impacts on Land Use, Soil and Agricultural Potential;
- Impacts on Heritage Resources.

Impacts on Terrestrial Ecology

A Terrestrial Biodiversity Impact Assessment was conducted to describe the ecology present on site, to assess its ecological sensitivity and to indicate the most suitable areas

for the proposed powerline to identify the preferred powerline route. After the site visit the following was concluded:

- Low sensitivity areas include, old fields, planted pastures and exotic bush clumps.
- Medium Sensitivity areas include the natural grassland and microphyllous woodland areas.
- Medium-high sensitivity areas include other sensitive habitats in the mountainous areas of the site (outcrops).
- High sensitivity areas are located in wetland areas.

After the assessment, it was concluded that a detailed terrestrial biodiversity, plant species theme and animal species theme assessment should be conducted, which was conducted during November 2022 to identify specific fauna habitats, and to compare these habitats with habitat preferences of different fauna groups (birds, mammals, reptiles, amphibians) occurring in the quarter degree grid. The seasonal survey was considered as sufficient due to adequate early rains that fell in the area during October and Early November 2022.

An important aspect relating to the proposed development site should be to protect and manage the biodiversity (structure and species composition) of the vegetation types which are represented on the proposed development site. Mitigation measures and monitoring must be implemented should the development be approved.

Impacts on Aquatic Ecology

The site assessment confirmed the presence of two channeled valley bottom freshwater ecosystems that are traversed by the proposed powerline alternatives.

Following the freshwater ecosystem assessment, the DWS Risk Assessment Matrix was applied to determine the significance of impacts of the proposed powerline on the receiving freshwater environment. Activities associated with the construction and operation of the proposed powerline options 1 and 2 pose a "Low" risk significance to freshwater ecosystems in the study areas, provided that the supporting structures are placed outside the demarcated 10m buffer zone around the freshwater ecosystem boundaries. All mitigation measures in Section 6 and Appendix G of the Aquatic Biodiversity Report, must be implemented to prevent edge effects and cumulative impacts from occurring on freshwater ecosystems in the study areas. Option 1 of the proposed powerline is the preferred alternative from a freshwater ecological management perspective. Option 1 (preferred route) is located along an existing powerline and if new support towers are constructed adjacent to existing support towers, the potential risks associated with construction of supporting structures will be significantly reduced.

Impacts on Avifauna

An Avifaunal Assessment was conducted in order to determine whether the proposed development would have negative impacts on avifauna.

The field survey area covered the entire farm of 1 902 ha. The assessment included a thorough desktop study which encompassed a wider geographical range than the field survey. The field survey was conducted on 28-30 October 2022.

The desktop analysis recorded 316 species from more than 500 full protocol cards registered during SABAP2 in 12 pentads surrounding the proposed Mopane Powerline. The data revealed that, on average, independent of the month, one can observe ± 202 species. Of these, 164 were confirmed during the point survey count, another 19 species were recorded during incidental recordings within the study period, and a further 70 are likely to occur.

The species richness analysis for the proposed Mopane Powerline would hold ± 186 species based on the species accumulation curve. The species accumulation curve suggested adequate sampling for the proposed area was reached and therefore did not require further sampling. Sampling was conducted at the beginning of the wet season when migrator species had returned. Only two species recorded during the field survey were not recorded here previously, suggesting that the number of species within the area has been saturated and could make accurate conclusions from the desktop analysis.

Grassland Species confirmed include Spike-heeled Lark, Cloud Cisticola, Capped Wheatear, *etc.* The field survey observed endemic/near-endemic species, such as Cape Sparrow, Fiscal Flycatcher, Sabota Lark, *etc.* Twenty threatened or near-threatened species were recorded in the greater region during a desktop survey, and two confirmed during a field survey. The proposed Mopane Powerline pose a significant threat regarding habitat loss, collisions, and electrocution with the infrastructure.

Assessment of impacts identified by Birdlife SA as significant connection lines has revealed that most of the impacts fall in the low to moderate-risk category. The proposed powerline might have a negligible effect on the overall bird community, as more than 38% of the landscape has already undergone some anthropogenic disturbance. The proposed development allows institutions to conduct valuable and relevant research into threats posed to avifauna by powerlines and how to avoid these threats, especially to high-priority species.

The proposed Mopane Powerline will generate environmental impacts on avifauna. Based on the present desktop study, the author's opinion is that the negative avifaunal impacts associated with the proposed Mopane Powerline can largely be mitigated.

Visual Impacts

Impact on the visual environment during the construction phase is assessed to have a low intensity over a localized area and would occur over the short-term resulting in a low consequence. The probability of the unmitigated impact is LOW resulting in a predicted significance of impact to be LOW. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain LOW.

The visual impacts associated with the Mopane Powerline, are of a nature, scale and duration that will require some mitigation to maintain the impacts at LOW during operational phase. The Project is deemed acceptable from a visual perspective, given a predicted moderate impact. Impacts associated with construction, operation and decommissioning phases can be mitigated to acceptable levels provided recommended measures are effectively implemented and managed in the long term.

Impacts on Land Use, Soil and Agricultural Potential

An Agricultural Potential Impact Assessment on soils potential was conducted. A thorough investigation of the soil types of the proposed development site is necessary for an accurate classification of the soils. The main aim of the study was to identify soil types on site and evaluate their specific characteristics to determine the agricultural potential of the soils. The assessment of agricultural potential and land capability of the study area was based on a combination of desktop studies and a site visit for soil sampling, characterization, and also validation of generated information.

The proposed development site shows some variations in terms of soil characteristics and soil types identified during the survey. The classification of soils on the farm was based on land type description and the Binomial System for South Africa, which classifies soils into forms and families based on the diagnostic horizon of the soil profile. Exposed soil profile characteristics created by road cuttings in the field were also used in describing the local soil form. Soil identification and classification of dominant soil types were done.

The soils were classified into broad classes according to the dominant soil form and family as follows:

- Deep, red apedal soils of the Hutton soil form.
- Shallowish, red apedal soils of the Hutton / Glenrosah soil form with scattered Mispah soils.
- Shallow, gravelly to rocky soils of the Glenrosa / Mispah soil form.
- Black clayey soils of the Katspruit / Arcadia soil forms.

Geological formations and vegetation patterns showed a strong correlation to major soil units mapped in the study area.

Provided that the proposed development and layout plans is consistent with the agro-ecosystem sensitivity map and take all the mitigation measures into consideration stipulated in this report, the planned development can be supported.

Impacts on Heritage Resources (archaeology and palaeontology)

The topography of the study area is undulating with no major topographic features (such as pans or shelters) that would have been focal points for human activity in antiquity. However, chert outcrops mean that readily available raw material for lithic manufacture resulted in a background scatter (Orton 2016) of expediently knapped Stone Age artefacts to be present across the greater area attesting to some human occupation from the MSA onwards.

During the survey no Earlier Stone Age material was noted and although few diagnostic pieces were recorded in the low-density open-air scatters, the lithics suggest human occupation of the area from the MSA onwards of the area the powerline traverse.

Identified features affected by Option 2 are stone-walled enclosures.

The palaeontological sensitivity of the study area is very high, and an independent study was conducted for this aspect (Bamford 2023). A site visit and walk through in December 2022 by the palaeontologist confirmed that weathered dolomites and cherts were fairly common. NO FOSSILS, such as stromatolites, were seen in the dolomite outcrops but a Fossil Chance Find Protocol must be added to the EMPr. Based on the information it is recommended that no further palaeontological assessments are required unless fossils are found by a contractor, developer, environmental officer or designated responsible person once excavations for pole foundations have commenced. As the impact will be low, as far as the palaeontology is concerned, the project may be authorised.

From a heritage perspective both Power Line options are viable.

Noise Impact

A screening report assessed the potential noise impact due to the proposed development of Mopane Powerline. Generally, noises associated with a power line relates to construction activities associated with the pylons, though such noises are generally of a short duration and normally only associated with the day-time period (reducing the probability of a noise impact occurring).

Excluding powerline option 2, considering the distance between noise-sensitive receptors (NSR) and the locations where pylons may be developed, the temporary to short nature of construction noise impacts, the development of the Mopane Power Line will not influence ambient sound levels at the NSR in the vicinity of the project site.

When considering power line alternative option 2, power pylons may be developed within 50 m from a number of NSR. When considering the low to medium intensity of the noise level, the temporary nature of the activities, as well as the expected low probability of a noise impact occurring, the significance of the noise impact associated with power line alternative option 2 will be low.

It is therefore the opinion of the author that no further Scoping or other acoustical studies would be required for the proposed development of the Mopane Powerline, and it is recommended that the project be authorized (in terms of acoustics).

Recommendations

Ecological Impacts

- On site biodiversity should be protected and managed.
- Vegetation removal should be kept to a minimum during the construction phase of the development and only vegetation on footprint areas may be removed.
- Mitigation measures and monitoring must be implemented if the development is approved.

Aquatic Ecological Impacts

The proposed powerline poses no significant quantum of risk to freshwater ecosystems in the area, the study area has been assessed to have a low aquatic biodiversity sensitivity.

Avifauna Impacts

The proposed Mopane Connection Power line Option 1 (preferred) would have a low to medium impact on the bird communities. It will cause a slight impact on the ecological process of the overall bird community. However, with existing power lines set up along this route, it is the best route to minimise the cumulative effect and set up a new feature within the landscape. The issuing authority must consider all prescribed mitigation measures and recommendations when reviewing the application.

- Mitigation measures proposed by avifauna specialist must be adhered to and implemented.
- The proposed project must be made available for studies and monitoring order to better understand threats to birds and other wildlife posed by PV facilities which are currently poorly understood. This project has the potential to provide an ideal platform for monitoring the impact of powerlines on avifaunal communities in grasslands close to wetlands and a river system.

Visual Impacts

Visual impacts associated with the proposed 275kV powerline, are of a nature, scale and duration that will require some mitigation to maintain the impacts at MODERATE during the operational phase. The project is deemed acceptable from a visual perspective, given a predicted moderate impact¹. The specialist believes that the impacts associated with the construction, operation and decommissioning phases can be somewhat mitigated to acceptable levels provided the recommended measures are effectively implemented and managed in the long term.

Impacts on Land Use, Soil and Agricultural Potential

- The proposed development and layout plans must be consistent with the agro-ecosystem sensitivity map.
- All the mitigation measures indicated in the agricultural potential report must be taken into consideration.

Archaeological and palaeontological Impacts

- Regular monitoring of the development footprint by the ECO to implement Chance Find Procedure for heritage and palaeontology resources in case heritage resources are uncovered during the course of construction;
- Any changes to the layout is subject to a heritage walkdown prior to development.
- Recommendations in the archaeological impact report must be adhered to.
- Approval must be obtained from SA Heritage Resource Authority (SAHRA).
- Fossil Chance Find Protocol must be added to the EMPr.
- No further palaeontological impact assessment is required unless fossils are found once excavations have commenced.

Noise Impact

Considering the distance of potential noise sources from (Noise Sensitive Receptors), the temporary nature of construction noise impacts as well as the low magnitude of operational noises, the development of the Mopane Powerline is unlikely to influence ambient sound levels at the NSR in the vicinity of the project site.

- It is the opinion of the author that no further Scoping or other acoustical studies would be required for the proposed development of the Mopane Powerline, and it is recommended that the project be authorised (in terms of acoustics).

¹ A partial loss of or alteration to key elements / features / characteristics of the baseline are anticipated. i.e. The pre-development landscape or view and / or introduction of elements that may be prominent but may not necessarily be problematic when set within the attributes of the receiving landscape, within the context of the sub-region.

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Annexure P – Screening Report

Annexure Q – Curriculum Vitae (EAP)

ABBREVIATIONS AND ACRONYMS

AGES	Africa Geo-Environmental and Engineering Services (Pty) Ltd
BID	Background Information Document
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CSP	Concentrating Solar Power
DALRRD	Department of Agriculture, Land Reform and Rural Development
DFFE	National Department of Forestry, Fisheries and the Environment
DMR	Department of Mineral Resources
DME	Department of Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environment Impact Assessment Report
EMPr	Environmental Management Programme
GHG	Green House Gases
GIS	Geographic Information Systems
GN	Government Notice
GWh	Giga Watt hour
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
kV	kilovolt
MW	Mega Watt
MWp	Mega Watt peak
NEMA	National Environmental Management Act - Act no. 107 of 1998
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act - Act no. 25 of 1999
NWA	National Water Act - Act no. 36 of 1998
PoS	Plan of Study
Property	Rem of Douglasdale 95 IQ, Portion 2 of Rooidraai 85 IQ (JB Marks Local Municipality, Dr Kenneth Kaunda District, North-West Province) and Portion 12 of Blaauwbank 125 IQ (Merafong City Local Municipality, West Rand District, Gauteng Province)
Project Site	Ptn 12 of Blaauwbank 125 IQ, Rem & Ptn 1 of Welverdiend 754 IQ, Ptn 2, 3, 4, 12, 18, 19 of Varkenslaagte 119 IQ and Ptn 23 & 28 of Doornfontein 118 IQ (Merafong City Local Municipality, West Rand District, Gauteng Province)
PV	Photovoltaic
RFP	Request for Qualification and Proposals for New Generation Capacity under the IPP Procurement Programme
REIPPPP	Renewable Energy IPP Procurement Programme
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SANS	South African National Standard
UPS	Uninterruptible Power Supply
Volitalia SA	Volitalia South Africa (Pty) Ltd (Applicant)

1 OBJECTIVE OF THE EIA PROCESS

According to Regulation No R 326 of 7 April 2017, of the EIA Regulations, 2014, as amended, the objective of the EIA process is to, through a process of consultation:

- a. Identify the policies and legislation relevant to the study and how the study complies with the policies and legislation.
- b. Motivate the need and desirability of the proposed activity including the need and desirability of the activity in the context of the preferred location.
- c. Identify the location of the development footprint within the preferred site, based on an impact assessment and risk ranking process which includes cumulative impacts and a ranking process of all the identified alternatives focussing on the geographical, physical, biological, social, economic and cultural aspects of the environment.
- d. Determine the
 - a. Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform preferred alternatives; and
 - b. Degree to which these impacts
 - i. Can be reversed;
 - ii. May cause irreplaceable loss of resources, and
 - iii. can be avoided, managed or mitigated.
- e. Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment.
- f. Identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity.
- g. Identify suitable measures to avoid, manage or mitigate identified impacts.
- h. Identify risks that need to be managed and monitored.

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name of EAP: AGES – Anton von Well

Contact details of EAP:

Physical Address: 120 Marshall Street,
Polokwane, 0699

Telephone number: 015 291 1577

Fax number: 015 291 1577

Expertise of EAP: The EAP is registered as an Environmental Assessment Practitioner at EAPASA and has 23 years of experience with management and conducting of EIA's. Curriculum Vitae of EAP is included in Annexure Q.

3 LOCATION OF ACTIVITY

3.1 SURVEYOR GENERAL 21 DIGIT CODES OF DEVELOPMENT AREAS

The following properties fall in the "powerline study corridor for EIA Assessment" (500m wide)

and will be crossed by one (1) powerline, subject to the final alignment:

- Portion 12 of the farm Blaauwbank 125 IQ,
- Remainder of the farm Welverdiend 754 IQ,
- Portion 1 of the farm Welverdiend 754 IQ,
- Portion 2 of the farm Varkenslaagte 119 IQ,
- Portion 3 of the farm Varkenslaagte 119 IQ,
- Portion 12 of the farm Varkenslaagte 119 IQ,
- Portion 18 of the farm Varkenslaagte 119 IQ,
- Portion 19 of the farm Varkenslaagte 119 IQ,
- Portion 4 of the farm Varkenslaagte 119 IQ,
- Portion 5 of the farm Varkenslaagte 119 IQ,
- Portion 28 of the farm Doornfontein 118 IQ, and
- Portion 23 of the farm Doornfontein 118 IQ.

The powerline corridor assessed in the EIA is 500m, but the servitude width for a 275kV powerline is 65 m (32.5 m on either side of the powerline). Thus, the study area is much greater than the development footprint area.

The farms are located in Merafong City Local Municipality, West Rand District, Gauteng.

Site location - Surveyor-general 21-digit site code:

T	0	I	Q	0	0	0	0	0	0	0	0	0	1	2	5	0	0	0	1	2
T	0	I	Q	0	0	0	0	0	0	0	0	0	7	5	4	0	0	0	0	0
T	0	I	Q	0	0	0	0	0	0	0	0	0	7	5	4	0	0	0	0	1
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	0	2
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	0	3
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	1	8
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	1	9
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	0	4
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	0	5
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	8	0	0	0	2	8
T	0	I	Q	0	0	0	0	0	0	0	0	0	1	1	8	0	0	0	2	3
1	2		3				4					5								

3.2 PHYSICAL ADDRESS AND FARM NAME

VOLTALIA SOUTH AFRICA (PTY) LTD is proposing the establishment of one (1) new 275kV powerline for the connection of five (5) renewable energy generation facilities (Photovoltaic Power Plants) with associated infrastructure and structures on the Remainder of the farm Douglasdale 95 IQ and Portion 2 of the farm Roodraai 85 IQ, JB Marks Local Municipality, Dr Kenneth Kaunda District Municipality, North-West Province and Ptn 12 of the farm Blaauwbank125 IQ, Merafong City Local Municipality, West Rand District Municipality, Gauteng Province.

The five (5) renewable Photovoltaic (PV) Power Plants will be connected to the Eskom grid via one new 275kV powerline (Mopane Powerline) between the five (5) proposed solar parks and the Eskom Carmel Main Transmission Substation (MTS). The Eskom Carmel MTS is located 11.5km South-East of the project site, on Portion 23 of the Farm Doornfontein 118 IQ.

The name of the proposed facility will be MOPANE 275kV POWERLINE.

The geographical co-ordinates of the preliminary alignments of the 275kV powerline, within the project site of the solar park and the 500 m wide powerline study corridor, are as follows:

Table 1. Geographical co-ordinates of the preliminary powerline alignments

Point	Latitude [degrees, minutes, seconds]	Longitude [degrees, minutes, seconds]	Progressive Length[km]
P01 Powerline starting point from the new on-site collector	26°22'55.02"S	27°11'41.79"E	0.00 km
P02 Powerline turning point	26°22'55.80"S	27°11'40.45"E	0.04 km
P03 Powerline turning point	26°23'0.92"S	27°11'43.56"E	0.22 km
P04 Powerline turning point	26°22'16.45"S	27°12'37.27"E	2.22 km
P05 Powerline turning point	26°22'17.89"S	27°12'38.11"E	2.27 km
P06 Powerline turning point	26°22'20.98"S	27°13'38.42"E	3.95 km
P07 Powerline turning point	26°23'46.24"S	27°14'30.21"E	6.95 km
P08 Powerline turning point	26°24'00.45"S	27°15'53.40"E	9.3 km
P09 Powerline turning point	26°24'38.95"S	27°17'07.50"E	11.6 km
P10 Powerline turning point	26°25'25.83"S	27°17'59.34"E	13.60 km
P11 Powerline turning point	26°25'23.06"S	27°18'06.36"E	13.82 km
P12 Powerline turning point	26°25'28.58"S	27°18'11.20"E	14.05 km
P13 Powerline turning point	26°25'29.32"S	27°18'16.39"E	14.21 km
P14 Powerline turning point (Within Carmel MTS)	26°25'26.76"S	27°18'19.20"E	14.36 km
P15 point of connection to a new 275kV bus-bay at the Eskom Carmel MTS	26°25'26.68"S	27°18'21.05"E	14.4 km

4 PLAN OF THE PROPOSED ACTIVITY

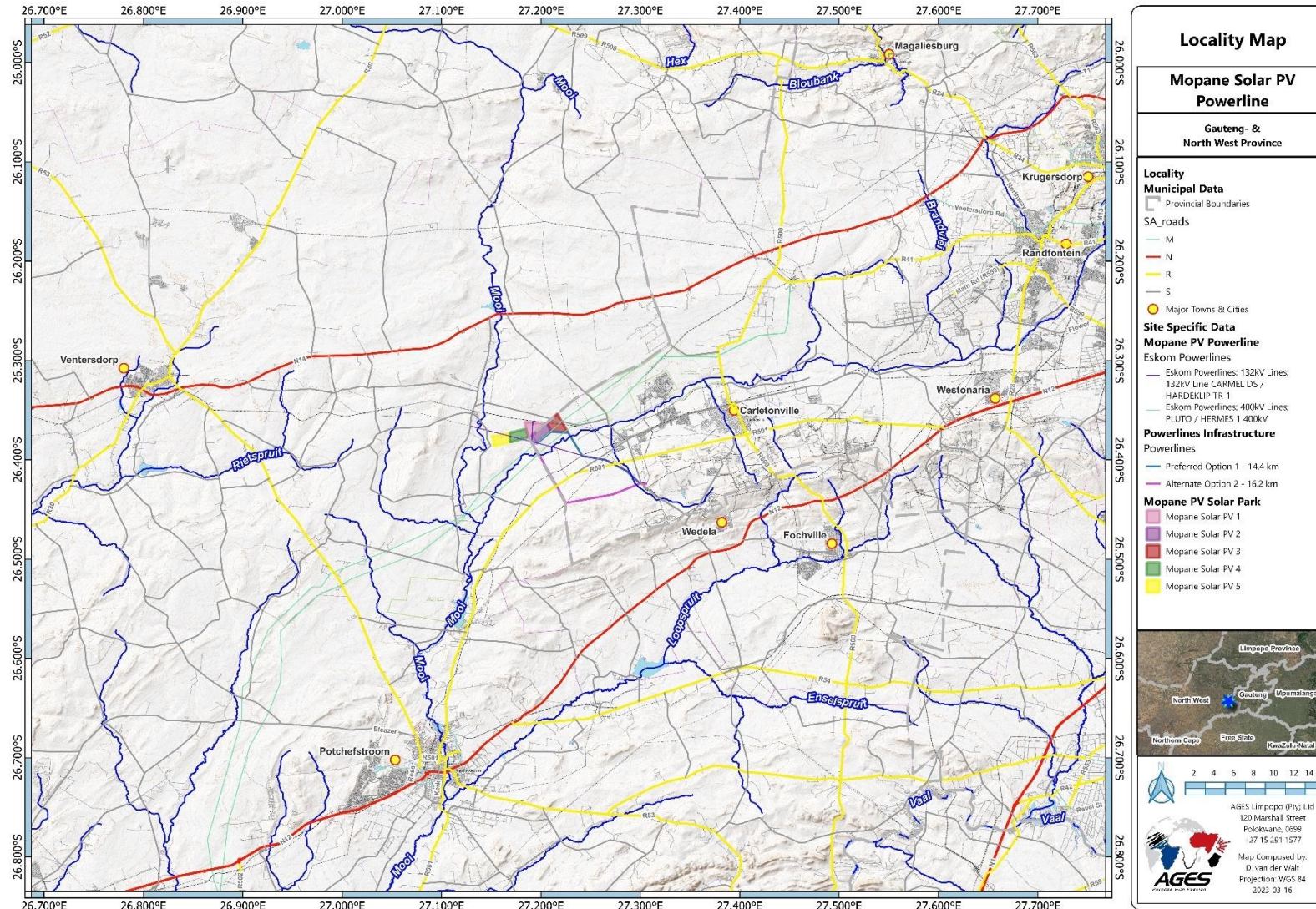


Figure 1. Regional Locality Map

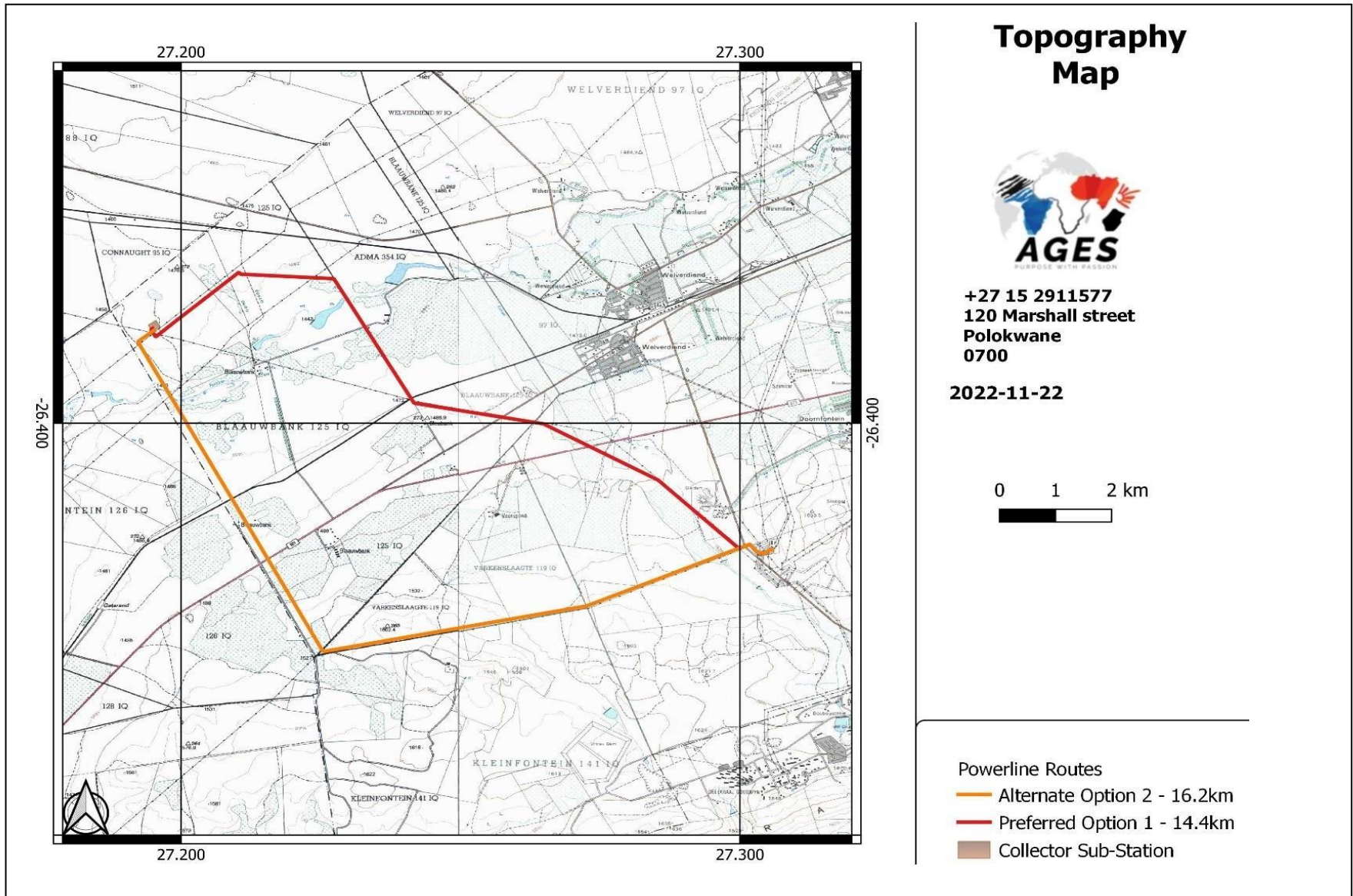


Figure 2. Topographical Map

5 SCOPE OF THE PROPOSED ACTIVITY

5.1 LISTED ACTIVITIES TRIGGERED IN TERMS OF NEMA

The listed activities in terms of sections 24 and 24D of NEMA, included in **Listing Notices 1, 2 & 3 of the EIA Regulations, 2014, as amended**, identified for the proposed development, are detailed in table below.

Table 2. Listed Activities i.t.o. EIA Regulations 2014, as amended, triggered by the proposed development.

<p>GN R.327 Item 12 The development of – (ii) infrastructure or structures with a physical footprint of 100m² or more; (c) within 32m of a watercourse, measured from the edge of a watercourse.</p>	<p>The proposed 275kV Mopane Powerline will cross a stream on Portion 12 of Blaauwbank 125 IQ.</p>
<p>GN R.327, Item 24 (ii) The development of - (ii) a road with a reserve wider than 13,5m, or where no reserve exists where the road is wider than 8m.</p>	<p>A new access road will be constructed in the power line servitude, for construction activities. This road will be ± 4 m wide. Turning points, (road reserve) will be up to 14 m in order to allow the transportation of abnormal loads (monopoles).</p>
<p>GN R.325, Item 9 The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.</p>	<p>The proposed infrastructure (Mopane Powerline) will consist of one (1) 275kV powerline which will connect the Mopane Solar Parks to Eskom Carmel Main Transmission Substation (MTS). The Eskom Carmel Main Transmission Substation (MTS) is located on Portion 23 of Doornfontein 118 IQ, Merafong City Local Municipality, West Rand District, Gauteng Province, 14.4 km South-East of the planned Mopane Solar Parks. The proposed 275kV Mopane Powerline will be 14.4 km long, depending on the exact location of the on-site substation of the solar parks.</p>
<p>GN R.324 Item 12(c)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.</p>	<p>The construction of the Mopane Powerline will require clearance of indigenous vegetation, where the total area to be transformed will be more than 300 square meters within a critical biodiversity area in the Gauteng Province.</p>

There are layout and site plans included in Annexure B, which are based on results of the Environmental Screening Tool as well as inputs and recommendations from specialists. It was subject to a public participation process and thus far, no comments were received which led to a change in the site layout plans from the Scoping Report to the Draft EIA Report. The Draft EIA Report will be made available for comments and the site layout plans will be finalized thereafter in the Final EIA Report. All information acquired was analysed to determine the proposed development layout and site plans.

5.2 DESCRIPTION OF ASSOCIATED STRUCTURES AND INFRASTRUCTURE RELATED TO THE DEVELOPMENT

The new powerline will consist of a series of steel or aluminium monopole structures to be installed approximately 200 – 260 m apart, with supporting electrical cables. The proposed structures will be between 18 m and 25 m high, and the basement of each pole will have a footprint of approximately 0.6 m².

The construction phase will last approximately 6 months and will involve a team of 10 to 15 people. Monopole structures installation will not require the establishment of a permanent construction site, but will be done step-by-step, to only affect small stretches of corridor and for a short time.

An access road (dirty road), approximately 4.0 m wide, will be constructed within the power line servitude, for construction and maintenance activities. In correspondence of the turning points, the road reserve will be up to 14 m in order to allow the transportation of abnormal loads (steel monopoles).

Site preparation will consist of the clearing of the powerline servitude and vegetation removal will be done only within the servitude, for the minimum width required by the installation activities and by Eskom security rules. Vegetation must not be allowed to interfere with the high-voltage cables.

The proposed 275kV powerline (double circuit) will be built and developed by Voltalia South Africa (Pty) Ltd but will be owned and operated by Eskom Distribution. This will depend on the Eskom grid code in relation to the IPP's (Independent Power Producers) and on the Connection Agreement to be finalized prior to or simultaneously with the conclusion of the PPA (Power Purchase Agreement) in respect of the options of retaining ownership of the connection works once completed.

5.3 PROJECT LAYOUT

The Mopane Powerline route was based on the locality of the proposed Mopane Solar Plants and the locality of the Eskom Carmel Substation. The proposed route / powerline study corridor (500 m wide) is also based on current Eskom infrastructure as well as the natural topography of the area.

The proposed 275kV Mopane Powerline will be approximately 14.4 km long, depending on the exact location of on-site substations of the PV solar parks with a servitude of 65m.

5.4 TECHNICAL DETAILS OF THE PROPOSED FACILITY

The applicant has identified the proposed development area as a technically feasible site which has the potential for the development of a powerline. The length of the proposed powerline will be approximately 14,4 km.

The full extent of the development area for the proposed powerline was considered by the specialist assessments during the Scoping Phase, to determine the suitability from an environmental and social perspective and identifying areas that should be. Areas which are environmentally sensitive within the development area were identified by the specialist assessments during the Scoping Phase and no development will take place in these areas.

Table 3. A summary of the details and dimensions of the proposed infrastructure associated with the project is provided below:

Infrastructure	Dimensions
Double circuit powerline:	It is proposed that the solar PV facilities will connect to the Carmel MTS, through a powerline up to 275kV (either single or double circuit). The powerline will be approximately 14.4 km in length. (Preferred option).
Powerline Capacity:	275kV
Powerline development corridor width:	A 500m wide grid development connection corridor (250m on either side of the centre line) is being assessed within which the grid connection infrastructure will be constructed and operated.
Powerline length:	14.4 km
Powerline servitude:	Up to 65 m
On-site substation capacity (Eskom portion):	275kV
On-site substation footprint:	The Eskom portion of the site substation will be 3ha. The substation will consist of a high voltage substation yard to allow for multiple (up to) 275kV feeder bays and transformers, control building, telecommunication infrastructure, access roads.
Access Roads:	Width of internal road – Between 5m and 6m. Length of internal road TBC.
Height of power line:	Between 18 m and 25 m
Type of pylons:	Steel monopile (double circuit)
Number of pylons:	60 - 66 (up to 66)
Distance between each pylon:	Between 200 m and 260 m

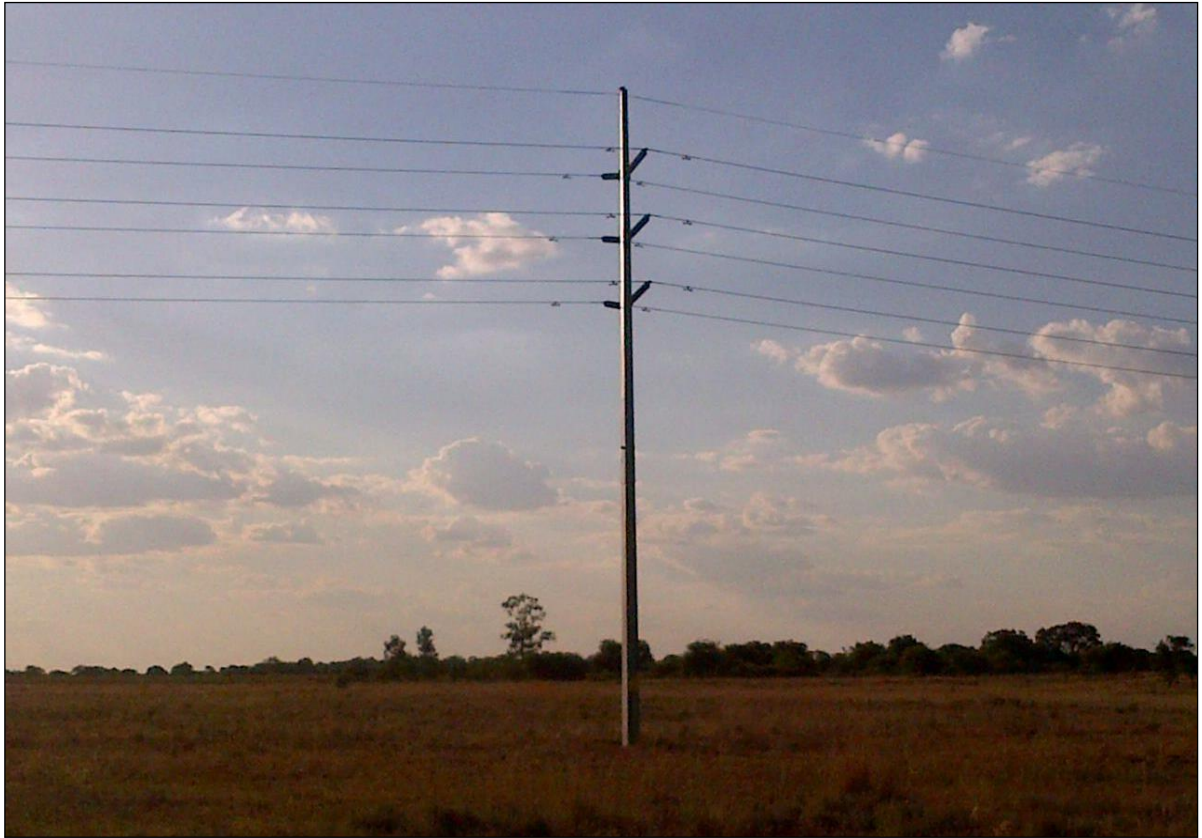


Figure 3. Steel monopole structure for a 275kV powerline (double circuit)

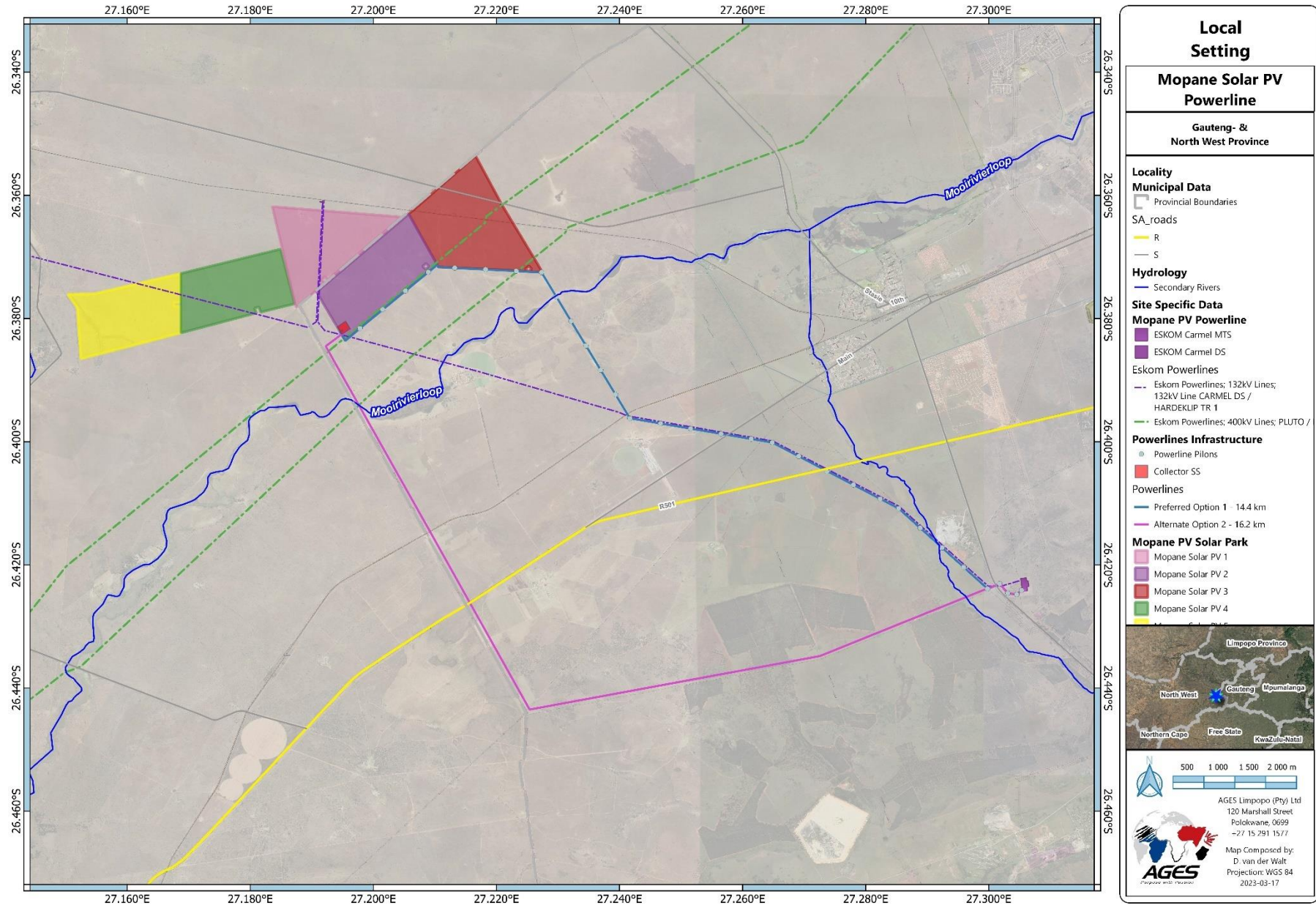


Figure 4. Proposed Draft Layout Plan of the Mopane Powerline

5.5 PRIMARY COMPONENTS

The new powerline will consist of a series of steel or aluminium monopole structures to be installed approximately 200 – 260 m apart, with supporting electrical cables. The proposed structures will be between 18 m and 25 m high, and the basement of each pole will have a footprint of approximately 0.6 m².

The construction phase will last approximately 6 months and will involve a team of 10 to 15 people. Monopole structures installation will not require the establishment of a permanent construction site, but will be done step-by-step, to only affect small stretches of corridor and for a short time.

An access road (dirty road), approximately 4.0 m wide, will be constructed within the power line servitude, for construction and maintenance activities. In correspondence of the turning points, the road reserve will be up to 14 m in order to allow the transportation of abnormal loads (steel monopoles).

6 LEGAL AND POLICY REQUIREMENTS

The legislative and regulatory framework of reference for the solar power plant project includes statutory and non-statutory instruments by which National, Provincial and Local authorities exercise control throughout the development of the same project.

The development and the environmental assessment process of a solar power plant project involve various authorities dealing with the different issues related to the project (economic, social, cultural, biophysical etc.).

6.1 REGULATORY AUTHORITIES

6.1.1 NATIONAL AUTHORITIES

At national level, the main regulatory authorities and agencies are:

- *Department of Mineral Resources and Energy (DMRE)*: the Department is competent and responsible for all policies related to energy, including renewable energy. Solar energy is contemplated and disciplined under the White Paper for Renewable Energy and the Department constantly conducts research activities in this respect;
- *National Department of Forestry, Fisheries and the Environment, (DFFE)*: the Department is competent and responsible for all environmental policies and is the controlling authority under the terms of NEMA and EIA Regulations. The DFFE is also the competent authority for the proposed project, and is entrusted with granting the relevant environmental authorisation;
- *National Energy Regulator of South Africa (NERSA)*: the Regulator is competent and responsible for regulating all aspects dealing with the electricity sector and, in particular, issues the licence for independent power producers;
- *South African Heritage Resources Agency (SAHRA)*: The Agency is responsible for the protection and survey, in association with provincial authorities of listed or proclaimed sites, such as urban conservation areas, nature reserves and proclaimed scenic routes under the terms of the National Heritages Resources Act (Act no. 25 of 1999).
- *South African National Roads Agency Limited (SANRAL)*: the Agency is responsible for all National road routes.

6.1.2 PROVINCIAL AUTHORITIES

At provincial level, the main regulatory authority is the *Gauteng Department of Agriculture and Rural Development (GDARD)*; this Department is responsible for environmental policies and is the Provincial authority in terms of NEMA and the EIA Regulations and is also the commenting authority for the proposed project.

6.1.3 LOCAL AUTHORITIES

At a local level, the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Gauteng Province, Municipalities and District Municipalities are involved in various aspects of planning and the environment related to solar energy facilities development. The Local Municipality is the *Merafong City Local Municipality* which is part of the *West Rand District Municipality*.

Under the terms of the Municipal System Act (Act no. 32 of 2000), all municipalities are deemed to go through an Integrated Development Planning (IDP) process to devise a five-year strategic development plan for the area of reference.

The identification of priority areas for conservation and their positioning within a planning framework of core, buffer, and transition areas is the subject of bioregional planning. Priority areas are individuated and defined with reference to visual and scenic resources and their identification and protection is granted through visual guidelines drafted for the area included in bioregional plans.

Local authorities also provide specific by-laws and policies to protect visual and aesthetic resources with reference to urban edge lines, scenic drives, special areas, signage, communication masts etc. Finally, there are also various non-statutory bodies and environmental groups, who are involved in the definition of various aspects of planning and the protection of the environment, which may influence in the development of the proposed project.

6.2 LEGISLATION, REGULATIONS AND GUIDELINES

A review of relevant legislation involved in the proposed development is in table 4 below.

Table 4. Review of relevant legislation

National Legislation	Sections applicable to the proposed project	Compliance with legislation
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	<ul style="list-style-type: none"> • Prohibition of the spreading of weeds (S5) • Classification of categories of weeds & invader plants and restrictions in terms of where these species may occur (Regulation 15 of GN R0148) • Requirement and methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R0148) 	<ul style="list-style-type: none"> • Classification of alien invasive plants in Section 9.4.8.2 and 9.4.8.5 in the EIA Report. • Management measures in the EMPr.
National Water Act, 1998 (Act No. 36 of 1998)	<ul style="list-style-type: none"> • Entrustment of the National Government to the protection of water resources (S3) • Entitlement to use water (S4) - Schedule 1 provides the purposes which entitle a person to use water (reasonable domestic use, domestic gardening, animal watering, fire-fighting and recreational use) • Duty of Care to prevent and remedy the effects of water pollution (S19) • Procedures to be followed in the event of an emergency incident which may impact on water resources (S20) 	<ul style="list-style-type: none"> • Need for the application of a Water Use License (WUL) in terms of the Act, indicated in Section 5.5.8 of the EIA Report. • Several Impact Management Actions listed in the EMPr pertaining to the prevention of water pollution including procedures to follow in the event of an emergency incident.

<p>National Forests Act, 1998 (Act No. 84 of 1998)</p>	<ul style="list-style-type: none"> Protected trees 	<ul style="list-style-type: none"> NFA must always be considered in case a permit application needs to be submitted for the removal of protected trees in terms of Act. Possibility of protected trees on site is discussed in section 9.4.8.4 of the EIA Report.
<p>National Environmental Management Act, 1998 (Act no. 107 of 1998)</p>	<ul style="list-style-type: none"> EIA Regulations 2014 (GN R. 326, 324, 325, 327 of 7 April 2017), as Amended Requirement for potential impact on the environment of listed activities to be considered, investigated, assessed and reported on to the competent authority (S24 - Environmental Authorisations) Duty of Care (S28): requirement that all reasonable measures are taken in order to prevent pollution or degradation from occurring, continuing and recurring, or, where this is not possible, to minimise and rectify pollution or degradation of the environment 	<ul style="list-style-type: none"> Section 24 (2) of the Act indicates: The Minister, or an MEC with the concurrence of the Minister, may identify— (a) activities which may not commence without environmental authorisation from the competent authority; An application for environmental authorisation was submitted to the competent authority and the application process commenced. Duty of care principle applied throughout the EMPr as included in the EIA Report.
<p>National Heritage Resources Act, 1999 (Act no. 25 of 1999)</p>	<ul style="list-style-type: none"> Provision for the protection of all archaeological objects, paleontological sites and material and meteorites entrusted to the provincial heritage resources authority (S35) Provision for the conservation and care of cemeteries and graves by SAHRA, where this is not responsibility of any other authority (S36) 	<ul style="list-style-type: none"> Heritage and Archaeological impact assessment was conducted and discussed in detail in the EIA Report in Section 9.4.14. Impacts identified and discussed in Section 11.5 of the EIA report. Assessment report included in Annexure G of the EIA report.

	<ul style="list-style-type: none"> List of activities which require notification from the developer to the responsible heritage resources authority, with details regarding location, nature, extent of the proposed development (S38) 	<ul style="list-style-type: none"> Specific impact management actions listed in the EMPr of the EIA report.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<ul style="list-style-type: none"> Provision for the MEC for Environmental Affairs/Minister to publish a list of threatened ecosystems and in need of protection (S52) Government notices: GN R150 (Commencement of Threatened and Protected Species Regulations, 2007); GN R151 (Lists of critically endangered, vulnerable & protected species) and GN R152 (Threatened Protected Species Regulations) 	<ul style="list-style-type: none"> Biodiversity according to the NEM:BA was specifically assessed in the EIA report. No threatened ecosystems were identified in site. No threatened, vulnerable, critically endangered or protected species were identified on the site.
National Environmental Management: Air Quality Act, 2004 (Act no. 39 of 2004)	<ul style="list-style-type: none"> Provision for measures in respect of dust control (S32) Provision for measures to control noise (S34) 	<ul style="list-style-type: none"> No activities on site will require any permits and/or licenses in respect of dust control or noise management. Atmospheric pollution (dust) and noise is discussed in Section 10.2.1 of the EIA report. Mitigation measures are included in the EMPr in order to mitigate for any impacts as a result of increased dust during the construction phase as well as measures to control noise during the construction phase.
National Environmental Management: Waste Management Act, 2008 (Act no. 59 of 2008)	<ul style="list-style-type: none"> Waste management measures Regulations and schedules Listed activities which require a waste licence 	<ul style="list-style-type: none"> No listed activities, require a waste license and are triggered as a result of the proposed facility. Waste management is discussed throughout the EIA report and refers to refuse, wastewater (sewage) and other waste, especially during the construction phase.

		<ul style="list-style-type: none"> • A high number of impact mitigation measures are included in the EMPr in order to mitigate for any impacts as a result of increased occurrence of waste, on site.
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)	<ul style="list-style-type: none"> • Health and safety of all involved before and after construction must be protected. 	<ul style="list-style-type: none"> • No licenses or permits are required in terms of the Act but must be considered, during the construction phase. • A number of impact mitigation measures are included in the EMPr in order to ensure compliance with the Act.

Policies and White Papers	Sections applicable to the proposed project	Compliance
Integrated Resource Plan (IRP1) Integrated Resources Plan 2010-2030 (IRP 2010).	<ul style="list-style-type: none"> • The first Integrated Resource Plan was published in 2009. DoE decided to undertake a detailed process to compile South Africa’s 20-year electricity plan, Integrated Resources Plan 2010-2030 (IRP 2010). • The IRP1. IRP 2010 and IRP 2019 outline the Government’s vision, policy and strategy in matter of the use of energy resources and the current status of energy policies in South Africa. • In the IRP 2019, published in October 2019, provision has been made to procure an additional 6 000 MW of solar PV and 14 400 MW of wind between 2022 and 2030. 	<ul style="list-style-type: none"> • This application for a renewable energy project is a direct result of the publication of the IRP and specifically the IRP which was published in 2019.
Renewable Energy IPP Procurement Programme (REIPPPP)	<ul style="list-style-type: none"> • The IPP Procurement Programme, issued on 3rd August 2011 by the DoE, envisages the commissioning of 3 725 MW of renewable projects (1 450 MW with Solar PV technology) capable of beginning commercial operation before the end of 2020. • A number of BID Windows have been published and the next submissions will be in terms of BID Window 7. 	<ul style="list-style-type: none"> • This application for a renewable energy project is a direct result of the REIPPPP for renewable energy projects.

Regulations, Tools and Protocols	Sections applicable to the proposed project	Compliance
<p>EIA Regulations, 2014 as amended 7 April 2017: Government Notice R326, R324, R325 and R327.</p>	<ul style="list-style-type: none"> • The EIA Regulations of 2014 was published on 4 December 2014 in Government Notice No. 982. • The EIA Regulations of 2014 was amended, and amendments were published on 7 April 2017 in Government Notice No. 326. • Amendments to the EIA Regulations, Listing Notices 1, 2 and 3, published on 11 June 2021 in Government Notice No. 517. 	<ul style="list-style-type: none"> • From December 2014, these Regulations were used for applications for environmental authorisation for activities triggered in listing notices included in these regulations. • From April 2017 these Regulations were applied when applying for environmental authorisation for activities triggered in listing notices included in these regulations. • For new applications, amended listing notices were checked for new activities triggered.
<p>Procedures for assessment and minimum criteria for reporting on identified environmental themes in terms of NEMA, when applying for environmental authorisation, published on 20 March 2020 in Government Notice No. 320</p>	<ul style="list-style-type: none"> • Environmental Themes for: <ul style="list-style-type: none"> ○ Agriculture ○ Avifauna ○ Biodiversity ○ Noise ○ Defence ○ Civil Aviation 	<ul style="list-style-type: none"> • The following themes were applied in the EIAr: <ul style="list-style-type: none"> ○ Agriculture ○ Avifauna ○ Biodiversity ○ Noise ○ Defence ○ Civil Aviation
<p>Procedures for assessment and minimum criteria for reporting on identified environmental themes in terms of NEMA, when applying for environmental authorisation, published on 30 October 2020 in Government Notice No. 1150</p>	<ul style="list-style-type: none"> • Environmental Themes for: <ul style="list-style-type: none"> ○ Terrestrial Animal Species ○ Terrestrial Plant Species 	<ul style="list-style-type: none"> • The following themes were applied in the report: <ul style="list-style-type: none"> ○ Terrestrial Animal Species ○ Terrestrial Plant Species
<p>Notice of requirement to submit a report generated by the National Web Based Environmental Screening Tool i.t.o. NEMA and EIA Regulations, 2014, as amended, published on 5 July 2019 in Government Notice No. 960.</p>	<ul style="list-style-type: none"> • The EIA is based on results from The Environmental Screening Tool. 	<ul style="list-style-type: none"> • The results of the Environmental Screening Tool were used to appoint the applicable specialists

Other Documents	Sections applicable to the proposed project	Compliance
<p>Identification procedures to be followed when applying for or deciding on an EA application for the development of electricity transmission and distribution infrastructure when occurring in renewable energy development zones, published on 26 February 2021 in Government Notice No. 145.</p>	<ul style="list-style-type: none"> • Application form was submitted according to the REDZs and Strategic Transmission Corridors, March 2017. • The map including the Expanded Eastern and Western Corridors were also consulted. 	<ul style="list-style-type: none"> • The Scoping and EIA process was followed as the proposed development site does not fall within the REDZs. • The proposed development site, also doesn't fall within the Expanded Eastern and Western Corridors.
<p>Department of Environmental Affairs, 2015. Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa. CSIR Report Number: CSIR/CAS/EMS/ER/2015/0001/B. Stellenbosch</p>	<ul style="list-style-type: none"> • General background information • In the Strategic Environmental Assessment (SEA) as included in this document, the Limpopo Province was not assessed in a number of sections. The Limpopo Province was not considered a Focus Area. 	<ul style="list-style-type: none"> • Used as additional background information in EIA Report.

7 NEED/DESIRABILITY OF THE PROJECT

The Mopane Powerline will form part of the Mopane PV Solar Park project which is proposed to the Department of Forestry, Fisheries and the Environment (DFFE).

If this project is selected by the Department of Mineral Resources and Energy under the Independent Power Producer Procurement Programme (REIPPPP), it will fit into the National Development Plan for 2030. The Plan states that South Africa should invest in and help exploit the wide range of opportunities for low-carbon energy from hydroelectric and other clean energy sources in Southern Africa, procuring at least 20,000 MW of renewable electricity by 2030, importing electricity from the region, decommissioning 11,000 MW of ageing coal-fired power stations and stepping up investments in energy-efficiency. The proposed Project will contribute towards the goals of the National Development Plan.

In the IRP 2019, published in October 2019, provision has been made to procure an additional 6 000 MW of solar PV and 14 400 MW of wind between 2022 and 2030.

Frequent shortages in electricity, fluctuations in supply and low voltages are currently experienced in South Africa. Therefore, the presence of new Photovoltaic Power Plants and associated infrastructure (Mopane Powerline) in the Welverdiend area, could contribute towards increasing the availability and improving the reliability of the Eskom network. The proposed solar project and associated Mopane Powerline will assist the Eskom grid to meet the high energy demand in the Welverdiend area, where township development has increased rapidly over the last few years.

The purpose of the proposed solar projects and associated Mopane Powerline is to add new capacity for the generation of renewable electric energy to the national electricity supply in compliance with the REIPP Procurement Programme.

8 MOTIVATION FOR PREFERRED DEVELOPMENT FOOTPRINT IN THE PREFERRED SITE

8.1 THE CHOICE OF THE NORTH-WEST PROVINCE AND SITE LOCATION

The Mopane Powerline will be located near the city of Waverdend, in the Gauteng Province. During the previous Rounds of the REIPP Procurement Programme, very few projects were selected by the Department of Energy (now Department of Mineral Resources and Energy) in the Gauteng Province. Therefore, the macro-area where the project is planned never received the benefits - in terms of socio-economic development and local content, arising from the previous Rounds of the REIPP Procurement Programme.

The Gauteng Province has been identified by Voltalia South Africa as an ideal area for establishing a solar PV plant on the basis of several important considerations:

- there are few green projects currently operating in the Gauteng Province and it is clear that the "green energy quota" can be achieved mainly by means of solar projects, considering the high solar resources and the availability of lands with low ecological and agricultural value;
- available Eskom grid capacity;
- other infrastructure nearby to develop a renewable energy project.

In addition to these favourable conditions in terms of desirability of renewable solar energy projects in the Gauteng Province, the site of the Mopane Powerline has been chosen on the basis of several elements:

- the chosen site is suitable for the installation of a PV power plant due to its appropriate morphologically (flat terrain) and regarding favourable radiation conditions;
- the available radiation allows a high rate of electric energy production, as a combination of latitude-longitude and climatic conditions;
- the low to medium ecological sensitivity of the proposed project site (old fields, degraded / modified land) and
- available Eskom grid connectivity.

9 CONSIDERATION OF ALTERNATIVES

9.1 DETAILS OF ALTERNATIVES CONSIDERED

The EIA Regulations, 2014, as amended, Section 28(1)(c) and NEMA, Section 24(4), require investigation and consideration of feasible and reasonable alternatives for any proposed development as part of the EIA process. Therefore, a number of possible alternatives for accomplishing the same objectives must be identified and investigated. In particular:

- the property on which, or location where, it is proposed to undertake the activity;
- the location within the current identified site;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity (schedule, process);
- the sustainability of other alternatives, and
- the option of not implementing the activity (No Go Alternative).

9.1.1 SITE ALTERNATIVES

Two powerline routes were identified as location alternatives, see Figure 4 in the report. Both alternatives can connect the proposed five (5) Mopane Solar Parks with the Eskom grid in the area, specifically to the Carmel MTS which is the closest available point of connection.

The grid connection will be in the form of one 275kV powerline, ±14.4 km long, depending on selected location of the project footprints. The proposed powerline comprises two servitude route options. Option 1 consists of a 14.4 km overhead powerline which runs in a generally north-westerly direction and mostly adjacent an existing powerline. Option 1 cross over farm portion 12 of the Farm Blaauwbank 125 IQ, the remaining extent of the farm Welverdiend 754 IQ, portion 1 of the farm Welverdiend 754 IQ, portion 2, 3, 4, 5, 12, 18 and 19 of the farm Varkenslaagte 119 IQ, and portion 23 and 28 of the Farm Doornfontein 118 IQ.

Option 2 consists of a 16.2km overhead powerline which runs generally southwest along an informal gravel road before turning northwest along the provincial border between Gauteng and North-West to connect to the proposed solar energy generation facilities. Option 2 crosses over farm portions 12, 13 and 15 of the farm Blaauwbank 125 IQ; portions 1, 4, 5, 11 and 12 of the farm Varkenslaagte 119 IQ and portions 23 and 28 of the farm Doornfontein 118 IQ.

The preferred route is approximately 14.4 km long and the alternative route is approximately 16.2 km long.

The power line routes were chosen to follow existing powerline servitudes, close to the boundaries of various properties. The preferred route will follow an existing powerline route where corridors have already been established with no trees/vegetation and where formal servitudes have already been secured for powerlines.

9.1.2 TECHNOLOGY ALTERNATIVES

Structure Alternative 1: steel or aluminium monopole (preferred alternative)

The new 275kV powerline will consist of a series of steel or aluminium monopole structures (double circuit, one as spare) supporting the electrical cables and a communication cable, to be installed approximately 200 – 260 m apart. The proposed structures will be between 18 m and 25 m high and the basement of each pole will have a footprint of approximately 0.6 m².

Structure Alternative 2: wood poles (not preferred)

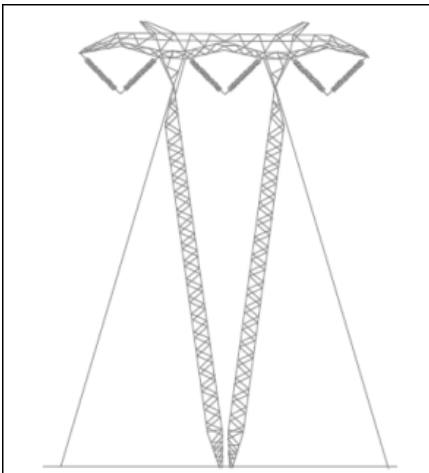
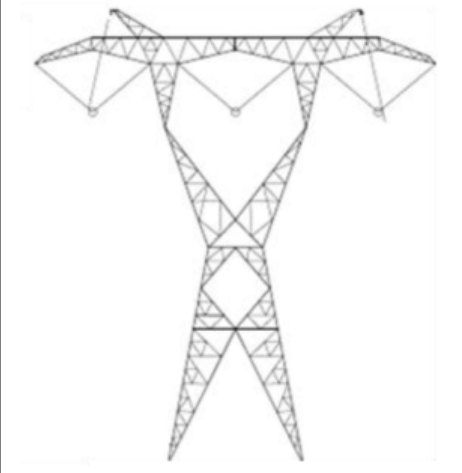
The new powerline may be built with wooden poles (e.g. H-poles). However, wooden poles are not used anymore by Eskom for powerlines of 132kV and more, because of the shorter lifetime of these poles (as opposed to steel poles). New steel monopole structures were designed with the aim to reduce the risk of electrocution of avifauna, thanks to the position of cables.

Voltage Alternative 1: 132kV powerline (not preferred)

Powerlines transmit large quantities of electricity over long distances via wires carried on a system of metal towers (pylons) and large substations. The proposed Mopane PV Power Plant cannot be connected to a 132kV bus-bar at the Eskom Carmel MTS. The most effective connection solution for relatively small renewable projects (≤ 75 MW), is the connection to the distribution network (≤ 132 kV), so that the electric energy can be used directly to feed the local network at distribution level.

Voltage Alternative 2: 275kV powerlines (preferred alternative)

The proposed 5 Mopane Solar Parks varies from 120 MW – 130 MW and must be connected to the 275kV bus-bar of Eskom Carmel MTS. The 275kV pylons will be "Guyed V tower" type, as this type of structure requires a servitude of only 32.5 m from each side of the centre line and it is the least intrusive in terms of visual impact. Where the power line alignment changes direction, "Self-supporting" structures must be used as per Eskom standards. Refer to figure below.

<p>Self-support tower (voltage: 275kV – maximum tower height: up to 40 m a.g.l. with leg extensions) on the left.</p>	<p>Guyed V tower (voltage: 275kV – maximum tower height: 40 m a.g.l.) on the right.</p>
	

9.1.3 NO-GO ALTERNATIVE

The no-go alternative is the option of not establishing a powerline. The environment will remain in its current state (status quo). This means that there will be no connection available to the Mopane Solar PV cluster, to the Eskom substation. The PV solar parks cannot feed its energy into the Eskom grid without a powerline connection and will render the development of the PV solar parks redundant. In turn, this will not create any new employment opportunities, and therefore the anticipated economic benefits of the project will accrue to the study area. Should this alternative be selected the socio-economic and environmental benefits related to the powerline will not be realised with prejudice to the development of the area.

The benefits related to the establishment of a renewable energy power plant are for example analysed in detail in the REFIT Regulatory Guideline published by NERSA (March 2009):

- Enhanced and increased energy security: renewable energy plays an important role in terms of power supply, improving grid strength and supply quality and contemporarily reducing transmission and distribution costs and losses.
- Resource economy and saving: the energy production by coal fired plants consumes a significant amount of water, this amount of water will be saved if a renewable energy facility like the proposed one is put in operation. This will be beneficial on the large scale for the water conservation measures that the country is currently undertaking.
- Support of new technologies and new industrial sectors: the development and establishment of renewable energy power plants contribute to the growth of new technologies and new industrial sectors with benefits for its economy.
- Exploitation and capitalization of South Africa’s renewable resources: with the aim of increasing energy security.
- Employment creation and career opportunities: the construction and operation of a renewable energy power plant contributes to job creation and new career opportunities.

- Pollution reduction: the use of renewable energy resources decreases the demand and the dependence from coal and oil for electricity generation.
- Contrast to Global warming and climate mitigation: the development of renewable energy contributes to reduce global warming through the reduction of greenhouse gas (GHG) emissions.
- Protection of natural foundations of life for future generations: the development and establishment of renewable energy power plants offers the opportunity of consistently reducing the risks related to climate change caused by CO₂ and CO emissions, therefore preserving life for future generations.
- Acceptability to society and community: the use of renewable energy is largely accepted by society and community as a mean to reduce pollution concerns, improve human health and wellness, protect the environment, the ecosystem and climate.
- Commitment to and respect of international agreements: in particular in light of the possible commitment to the Kyoto Protocol.

9.2 DETAILS OF PUBLIC PARTICIPATION PROCESS UNDERTAKEN

All relevant I&AP's have been identified and involved in the public participation process from the beginning of the project as per sections 54, 55, 56 and 57 of the EIA regulations 2014, as amended. The public participation process offers the opportunity to become actively involved through constant sharing of information. The main purposes of the public participation process are to ensure that:

- all relevant information in respect of the application is made available to I&APs for their evaluation and review;
- reasonable opportunity is given to I&AP's to comment and to submit queries related to the proposed project;
- comments and queries by the I&APs to the Draft Scoping and to the EIA Reports are submitted and evaluated in a reasonable timeframe and in predetermined terms.

Notifications to I&APs adjacent the two proposed powerlines were done. The public was informed of the proposed development and a database of I&APs was populated.

In Annexure C (Comments & Responses Report), there is a list of all components of the public participation process. The public was informed of the project by means of:

- Site notices put up at the proposed development site at two (2) areas on the fences at the proposed development area on 09 November 2022.
- Background Information Documents (BIDs) were emailed to most of the Authorities involved on 15 & 16 November 2022.
- A Notice/Advertisement was published in the Carletonville Herald of 10 November 2022 and the Noordwester of 11 November 2022, which is distributed in the general area.

- Emails of the BID were sent to other most of the relevant Authorities possible interested and affected parties/stakeholders (other I&APs).
- **The first part and initial Public Participation Process was run from 16 November 2022 until 09 January 2023.**
- BIDs were sent to:
 - Merafong City Local Municipality
 - Local Municipality Ward Councillor
 - West Rand District Municipality
 - Department of Water & Sanitation
 - Gauteng Department of Agriculture and Rural Development (GDARD)
 - Eskom
 - Department of Minerals and Energy
 - DMR (Department of Mineral Resources).
 - Department of Science & Technology
 - South African Astronomical Observatory (SAAO) and Southern African Large Telescope (SALT)
 - South African Radio Astronomy Observatory (SARAO) and SKA
 - Council for Scientific and Industrial Research (CSIR)
 - SANRAL
 - Department of Agriculture, Forestry & Fisheries: Provincial
 - South African Civil Aviation Authority - SACAA
 - DFFE: Directorate: Climate Change & Air Quality, Biodiversity & Conservation, Protected Areas Systems Management
 - Transnet
 - SAHRA
 - Endangered Wildlife Trust (EWT)
 - Bird Life SA
- An I&AP Register was opened which will be maintained and updated as required.
- Registrations of I&APs'
- Few people registered as I&APs, and no comments were received during the public participation process from any interested and/or affected parties.
- The Draft Scoping Report (in electronic format) was made available for a 30-day commenting period for comments from 7 February 2023 until 14 March 2023.

The Final Scoping Report and the Plan of Study for EIA was submitted to the DFFE for review and approval on 17 March 2023. It was accepted by the competent authority on 21 April 2023.

The Draft EIA Report will now be submitted to the competent authority for review and will be available for comments for a 30-day period.

9.3 SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Organ of state & IAPs	Date	Comments and/recommendations	Response from EAP
09 November 2022 Site Notice			
10 November 2022 Carletonville Herald & 11 November 2022 Noordwester Newspaper			
BID forwarded via email 15 and 16 November 2022			
Andrew Salomon - SAHRA	16/11/2023	Sent response to upload reports to SAHRIS	16/11/2023 AGES responded that heritage specialist would submit documents
Central Point - Department of Water and Sanitation	16/11/2022	Acknowledged BID notification	
Raymond Takuba - Juwi Renewable Energies	16/11/2022	Registered as I&AP	16/11/2022 AGES acknowledged
Kim Pontac - Legacy Environmental Consulting	25/11/2022	Registered as I&AP	25/11/2022 AGES acknowledged
Winnie Lekabe - ATNS	01/12/2022	Requested information	01/12/2022 Correspondence from Aviation specialist Tobie du Toit
Itani Mashamba – Merafong City Local Municipality	01/12/2022	Registered as I&AP	01/12/2022 AGES acknowledged
Theo Kotze - Developlan Town Planners	02/12/2022	Registered as I&AP	05/12/2022 AGES acknowledged
Barnie Pretorius - Adjacent Landowner	13/12/2022	Registered as I&AP	14/12/2022 AGES acknowledged
Lizell Stoh - CAA	01/02/2023	Responded that Air Traffic and Navigation Services (ATNS) will evaluate applications	01/02/2023 AGES acknowledged
Application and Draft Scoping Report submitted to DFFE 09 February 2023			
Draft Scoping Report circulated for comments via email (link or PDF) 09 February to 09 March 2023			
John Geeringh - Eskom	15/02/2023	Requested kmz files	03/02/2023 AGES sent kmz files
Theo Kotze - Developlan Town Planners	09/02/2023	Requested link.	09/02/2023 Link emailed
Ria Barkhuizen - SANRAL	09/02/2023	Acknowledge DSR will send comments	
Ria Barkhuizen - SANRAL	20/02/2023	Sent comments, they have NO objection	
Amy Hill - Atlantic Energy	24/02/2023	Registered as I&AP and requested link	02/03/2023 AGES sent links, links downloaded
Lydia Kutu - Integrated Environmental Authorisations DFFE	09/03/2023	Sent comments on DSR	
Mr Seoka Lekota - Biodiversity Conservation DFFE	16/03/2023	Sent comments on DSR	

9.4 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROPOSED POWERLINE

The receiving environment has been described using a combination of specialist inputs, on-site observations, a review of existing literature and utilizing Geographic Information Systems (GIS) planning tools.

9.4.1 PROPERTY DESCRIPTION AND CURRENT LAND USE

The proposed development will be on Portion 12 of the farm Blaauwbank 125 IQ located in the Merafong City Local Municipality, West Rand District Municipality, Gauteng Province. Access to the Mopane Powerline will be from both the D859 (Preferred) and R501 (alternative).

Table 5. Site location and Property details

Site location and Property details	
Farm	Blaauwbank 125 IQ
Portion	12
LPI code	T0IQ0000000012500012
Overall Extent	1902.3300 hectares
Landowner	Vaaldam Prop (Pty) Ltd
Diagram deed number	CC28580/962
Title deed number	T28580/1962
Registration date	1962/12/14
Current land use	Grazing, cattle farming

9.4.2 ENVIRONMENTAL FEATURES

Environmental Screening Report – Annexure P.

Table 6. Environmental Screening Tool Table

Theme	Very high	High	Medium	Low	Specialist studies conducted	Motivation for no Specialist Studies
Agriculture		X			X	
Animal species			X		X	
Aquatic biodiversity	X				X	
Archaeological and Cultural Heritage				X	X	
Avian		X			X	
Civil Aviation				X	X	
Defence				X	X	
Landscape					X	Not listed in Screening Tool Report, but study included
Paleontology	X				X	
Plant Species			X		X	
RFI				X	X	
Terrestrial Biodiversity	X				X	

The following environmental sensitivities are identified for the project area:

- **Agriculture Theme**

Sensitivity - High land capability.

Major land use of the study area as classified by the Environmental Potential Atlas of South Africa (2000) is vacant land and dissected plains and is currently used for grazing and classified as partially arable. Investigation of soil types of the development site is necessary for a more accurate classification of the agricultural potential (Annexure K).

- **Animal species Theme**

Sensitivity - Medium.

A sensitivity analyses was conducted to identify the most suitable site for the development. Results and mitigation measures are included in Terrestrial Biodiversity Impact Assessment (Annexure D).

- **Aquatic Biodiversity Theme**

Sensitivity - Very high

The project area is not located within any Strategic Water Source Area. There are no wetland features located in the proposed development area. Drainage lines were demarcated with buffer areas See Aquatic Statement in Annexure F.

- **Avian Species Theme**

Sensitivity - High

The avifaunal assessment indicates (Annexure E) that no significant bird flight paths, migratory routes or roosting sites were identified but modified farmlands attract nomadic species for transitory feeding and breeding purposes. No sensitive avian habitats occur on site and the area is not located in an Important Birding Area (IBA).

- **Civil Aviation Theme**

Sensitivity - Low

A Civil Aviation impact assessment was done, and the report is included in Annexure L of this Draft EIA Report. An application for approval will be submitted to the CAA.

- **Defence Theme**

Sensitivity - Low

Combined Defence and Radio Frequency Assessment was done and this report is included in the Draft EIA Report attached in Annexure M.

- **Paleontological Theme**

Sensitivity - High

The palaeontologist concluded that it is extremely unlikely that fossils will be exposed as a result of the proposed development. If fossils are uncovered in the course of the development, the developer should immediately call a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils (Annexure H).

- **Plant Species Theme**

Sensitivity - Medium

The ecologist concluded that the development can be supported provided that the mitigation measures and sensitivity map are taken into consideration (Terrestrial Biodiversity Impact Assessment - Annexure D).

- **RFI Theme**

Sensitivity - Low

Combined Defence and Radio Frequency Assessment was done, and the report is attached in Annexure M.

- **Terrestrial Biodiversity Theme**

Sensitivity - Very High because Alternative Option 2 falls within CBA 2 and due to the presence of indigenous grassland.

The degraded grassland associated with the old fields has a low sensitivity. The natural grassland has a Medium Sensitivity and development can be supported in the area provided certain mitigation measures are implemented (see Annexure D).

9.4.3 WIND AND SOLAR DEVELOPMENTS WITH ENVIRONMENTAL AUTHORISATION OR APPLICATIONS UNDER CONSIDERATION WITHIN 30 KM OF THE PROPOSED AREA

According to the DFFE database, **no wind and solar projects were proposed within 30 km** from the project site or applied for an Environmental Authorisation.

9.4.4 CLIMATE

The climate for the region can be described as warm-temperate. In terrestrial environments, limitations related to water availability are always important to plants and plant communities. The study area is situated within the summer and autumn rainfall region with very dry winters and frequent frost that occurs during the colder winter months. The mean annual temperature for the area is 16.1°C, and the mean annual frost days is 37 days. Mean Annual Potential Evaporation is 2407mm, with Mean Annual Soil Moisture Stress of 78%.

9.4.5 TOPOGRAPHY AND DRAINAGE

The study area lies completely within the Upper Vaal Water Management Area (WMA) and entirely within the Highveld ecoregion (Kleynhans *et al.*, 2005).

The topography is characterised by slightly undulating plains. The topography of the site can be described as generally favourable, when considering that most of the area consists of slopes of less than 1:5. The site is located at an altitude of 1460 meters above mean sea level (AMSL).

Most properties situated within a 500m radius are being used for livestock grazing and crop cultivation. The proposed development land is used for livestock farming at present. The natural vegetation of the site varies from intact to planted pastures.

The site is located within the C23G quaternary catchment and is situated in the Upper Vaal Water Management Area. Drainage occurs as sheet-wash into the drainage channels and wetlands on site that eventually drains into the major river namely the Mooi River and Mooiriviersloop River that occurs to the west and south of the site respectively.

The land-use of the proposed development site is livestock, and the surrounding areas for crop cultivation and grazing. The major land use of the study area as classified by the Environmental Potential Atlas of South Africa (2000) is **vacant land**.

9.4.6 SOILS AND GEOLOGY

Geology is directly related to soil types and plant communities that may occur in a specific area (Van Rooyen & Theron, 1996). A land type unit is a unique combination of soil pattern, terrain and macroclimate, the classification of which is used to determine the potential agricultural value of soils in an area. The land type unit represented within the study area include the Fa14 land type (Land Type Survey Staff, 1987) (ENPAT, 2001). The land type, geology and associated soil types is presented in Table 5 below as classified by the Environmental Potential Atlas, South Africa (ENPAT, 2000).

Table 7. Land types, geology, and dominant soil types of the proposed development site

Landtype	Soils	Geology
Fa14	Glenrosa and/or Mispah forms (other soils may occur), lime rare or absent in the entire landscape	Dolomite and chert of the Chuniespoort Group; chert gravels are abundant on middle and footslopes including valley bottoms.

Soils associated with the site vary between slightly deeper, loamy red apedal soils, to shallow rocky soils.

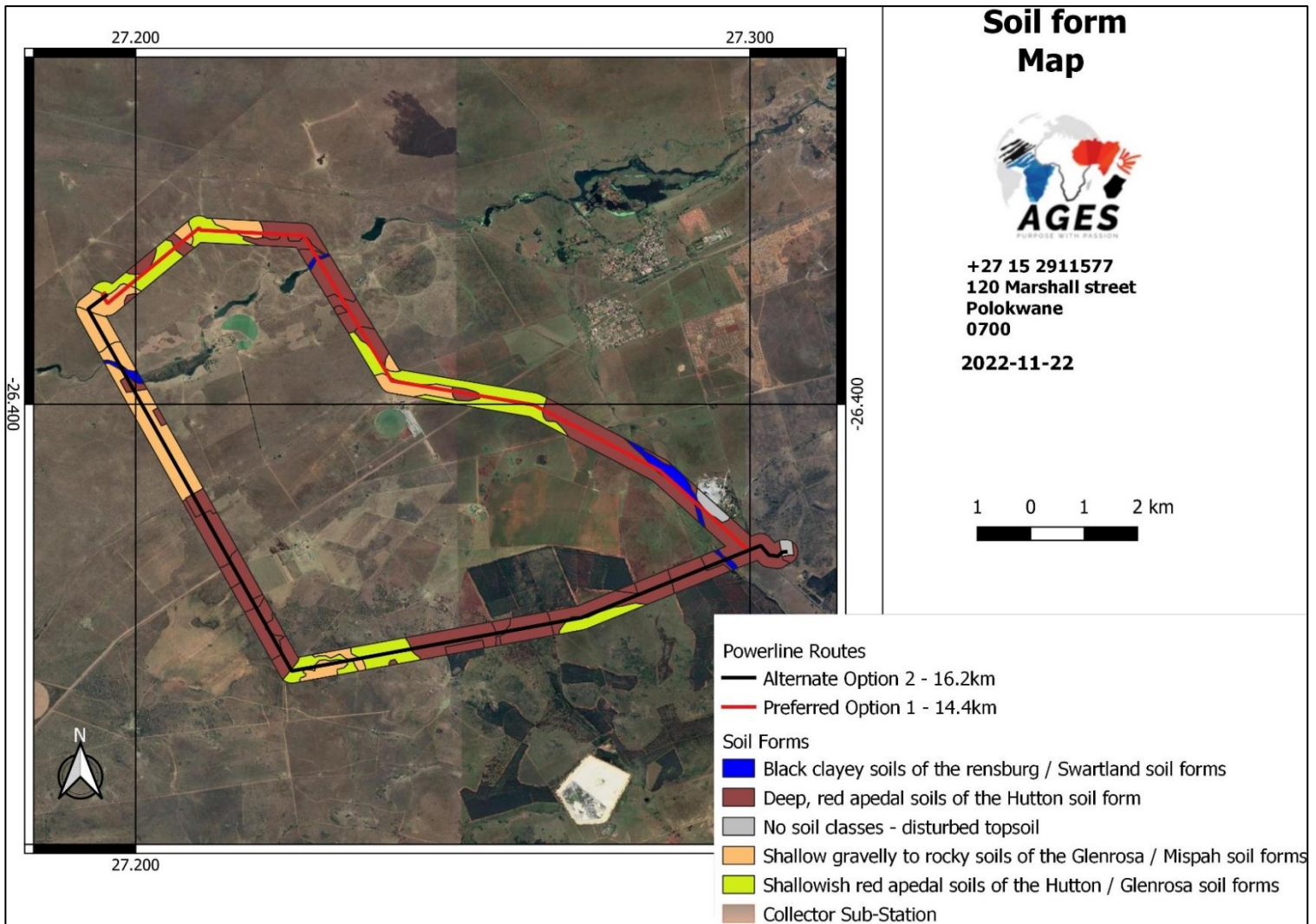


Figure 5. Soil Form Map

9.4.7 REGIONAL GEOLOGICAL SETTING

A Preliminary stage geotechnical investigation was done, and the report is attached as Annexure I.

9.4.7.1 Stratigraphy

Published geological map indicates the site to be wholly underlaid by dolomite and chert of the Malmani Subgroup that forms part of the Chuniespoort Group and Transvaal Supergroup. Individual formations have not yet been mapped in the area. Alluvial deposits, in places diamondiferous, occur along the flood plain of the Mooi River and Mooirivierloop Stream.

9.4.7.2 Structural geology

Weakly defined east-west & north-south trending linear structures, inferred to represent dyke intrusions and/or faults, cut through the area. It is expected that the surrounding strata could have undergone a degree of vertical and/or lateral displacement and/or alteration that could have led to the formation of localized zones of weakness along which the presence of voids is common.

9.4.7.3 Status w.r.t. dolomite land

The whole study area classifies as dolomite land. Several instances of relatively small to medium-sized surface instability have been reported in the area, with the Carletonville area to the southeast especially notorious for large to very large sinkholes.

9.4.7.4 Undermining

The available geological information does NOT provide any indication of underground mining activities in the area. However, diamond-bearing gravels does occur at surface in the area.

9.4.8 ECOLOGY (FAUNA & FLORA)

A Terrestrial Biodiversity Impact Assessment (Annexure D) was conducted by AGES to describe the ecology (fauna and flora) present in the site, to assess its ecological sensitivity and to indicate the most suitable areas for the proposed development. A pre-screening site visit was conducted to determine if the assessment was accurate and if the studies recommended should be conducted. After the site visit the following was concluded:

- The site has a HIGH Sensitivity from a terrestrial biodiversity perspective due to the presence of drainage features.
- The site has a Medium – High Sensitivity due to the presence indigenous grassland with red listed species habitat.
- The site has a Medium Sensitivity from a Plant Species Theme Perspective due to the presence of indigenous grassland.
- The site has a Low Sensitivity due to the presence or degraded and/or modified land.

After the assessment, it was concluded that a detailed terrestrial biodiversity, plant species theme and animal species theme assessment should be conducted. A survey was conducted during November 2022 to identify specific fauna habitats, and to compare these habitats with habitat preferences of the different fauna groups (birds, mammals, reptiles, amphibians) occurring in the quarter degree grid. This report is included in Annexure D of the draft EIAR.

9.4.8.1 Vegetation Types

The most recent classification of the area by Mucina & Rutherford (2006) shows that the site is classified as Carletonville Dolomite Grassland, which is predominantly found in the North-West Province, in the regions around Potchefstroom, Ventersdorp and Carletonville. Vegetation and Landscape Features Carletonville Dolomite Grasslands occur on slightly undulating plains which are typically intersected by rocky chert ridges. They are species rich and according to Mucina and Rutherford (2006), dominated by many plant species.

The proposed development site occurs on a slightly undulating landscape. The importance to survey the area to have a better understanding of the ecosystem and the potential impact of the powerline development on the natural environment was identified as a key factor, and the footprint areas was completely surveyed.

The site forms part of a larger farm used for livestock farming. The vegetation units on the site vary according to soil characteristics, topography, and land-use. Vegetation units were identified on the footprint development sites and can be divided into 4 distinct vegetation units according to soil types and topography.

The vegetation communities identified on the proposed development site are classified as physiographic physiognomic units, where physiognomic refers to the outer appearance of the vegetation, and physiographic refers to the position of the plant communities in the landscape. The physiographic-physiognomic units will be referred to as vegetation units in the following sections. These vegetation units are divided in terms of the land-use, plant species composition, topographical and soil differences that had the most definitive influence on the vegetation units. Each unit is described in terms of its characteristics and detailed descriptions of vegetation units are included in the following section. A species list for the site is included in Appendix B of the specialist report, while a plant species list for the quarter degree grid square (QDS) is included in Appendix A also of the specialist report. Photographs of each unit is included in the next section of the specialist report to illustrate the grass layer, woody structure, and substrate (soil, geology etc.).

The following vegetation units were identified during the survey.

1. *Schizachyrium – Trachypogon – Seriphium* rocky grassland
2. Open grassland with *Searsia pyroides* clumps
 - Variation on red apedal soils
 - Variation on gravelly soils
3. *Seriphium – Aristida – Schizachyrium* grassland
4. *Cynodon dactylon* old fields
5. Quarries
6. Exotic bush clumps / plantations.
7. Mining area
8. Mixed woodland
9. Old fields / planted pastures
10. *Vachellia* karroo woodland
11. Valleybottom wetland with channel

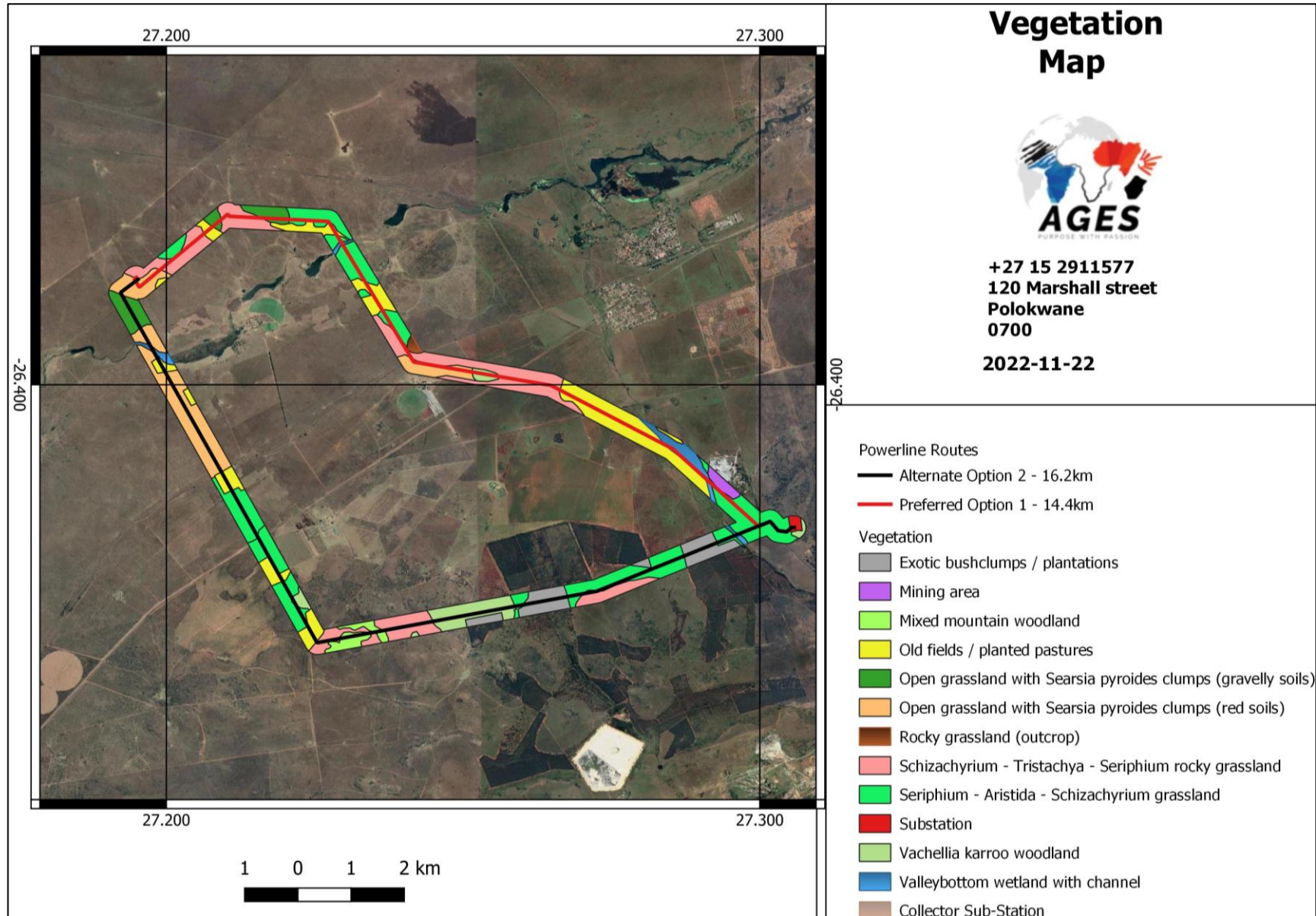


Figure 6. Vegetation Unit Map of the proposed development area (From Biodiversity Report)

- *Schizachyrium – Trachypogon – Seriphium* rocky grassland

This vegetation unit comprises an isolated section of the project area on undulating terrain. The soil is shallow and red soils of the Glenrosa and Hutton soil forms derived from quartzite. There are little to no trees present with the grasses having the highest cover. The grass layer is dominated by species such as *Schizachyrium sanguineum*, *Trachypogon spicatus*, *Tristachya leucothrix*, and *Elionorus*, while the dwarf shrub *Seriphium plumosum* is also prominent indicating that the area was probably overgrazed in the past.

The following specific recommendations for the vegetation unit regarding the proposed development should be adhered to:

- The vegetation unit is classified as having a medium sensitivity due to the due to the widespread status of this vegetation unit within the larger project area.
- The eradication of protected plant species *Boophane distycha* would need a permit from local authorities in the Free State.
- The development of the solar development is considered suitable in this area.

- Open grassland with *Searsia pyroides* clumps

A large section of the proposed development footprint forms medium tall grassland with scattered bushclumps of the woody species *Searsia pyroides* on red- apedal soils of the Hutton soil form. The grass layer is well developed and dominated by species such as *Elionorus muticus*, *Hyparrhenia hirta* and *Schizachyrium sanguineum*.

The following specific recommendations for the vegetation unit should be adhered to:

- The vegetation unit is classified as having a Medium sensitivity due its widespread occurrence in the Grassland Biome.
- The eradication of protected plant species *Boophane* would need a permit from local authorities in the North-West.
- The development of the solar development is considered suitable in this area.

- *Seriphium – Aristida – Schizachyrium* grassland

This vegetation unit comprises the central section of the project area an represent degraded grassland that has severely become invaded by the dwarf shrub *S plumosum*. The soil is red soils of the Hutton soil forms derived from quartzite and/or dolomite. There are little to no trees present with the grasses and dwarf shrub *Seriphium* having the highest cover. Grass layer is dominated by species such as *S sanguineum*, *A congesta* and *E muticus*, while a dwarf shrub *S plumosum* is very prominent indicating that the area was probably overgrazed in the past.

The following specific recommendations for the vegetation unit should be adhered to:

- The vegetation unit is classified as having a medium sensitivity due to the due to the widespread status of this vegetation unit within the larger project area.
- The development of the solar development is considered suitable in this area.

- *Cynodon dactylon* old fields

A small section of the project area represents previously cultivated areas on the proposed site. The area is characterised by grass species such as *C dactylon*, *A congesta*, *S africanus*, *E curvula* and *M repens*, while the area also became invaded by various exotic weeds such as *B pilosa*, *T minuta* and *C hypochoeridae*.

The following specific recommendations and conclusions were made for this vegetation unit:

- The degraded variation of this vegetation unit is classified as having a Low Sensitivity due to the high density of pioneer grasses and alien invasive weeds in the area. The development in this area is highly suitable.

- Quarries

A small section of the area represents old gravel quarries north of the railway line. Area represents depressions that will collect water during the summer, although it represents man-made dams with little or no functionality in the larger hydrological regime of the area. The area surrounding the quarries is dominated by the woody species *V karroo*. The vegetation associated with the wet sections of the quarries is mostly sedges and bulrushes depending on the depth of the water and the substrate. Species such as *P serullata*, *T capensis*, *S corymbosus*, *L stolonifer* and *L hexandra* mostly grow along the shallow edges of dams and pans in the project area on a muddy substrate.

The following specific recommendations and conclusions were made for this vegetation unit:

- The degraded variation of this vegetation unit is classified as having a Low Sensitivity. The development in this area is highly suitable provided that the area becomes rehabilitated through backfilling of the quarries.

- Mixed Mountain Woodland

This vegetation unit occurs in the southern section of the alternative power line route and can be easily distinguished by the woody structure. The vegetation is dominated by woody species such as *Senegalia caffra*, *Combretum molle*, *Euclea crispa*, *Searsia zeyheri*, *Vachellia karroo*, *Vachellia robusta*, *Diospyros lycioides* and *Ziziphus mucronata*.

The following specific recommendations and conclusions were made for this vegetation unit:

- The vegetation unit is classified as having a medium – high sensitivity due to the potential red listed species habitat, slopes and rockiness in the area.
- The development of the power line is considered suitable in this area, although the preferred route is still considered more suitable.

- *Vachellia karroo* Woodland

The woody layer is dominated by species such as *Vachellia karroo*, *Senegalia caffra* and *Ziziphus mucronata*. The woody structure varies from being open woodland to slightly denser woodland with bushclumps in some areas. The grass layer is in a slightly degraded state due to previous overgrazing and dominated by *Schizachyrium sanguineum* and *Panicum maximum*.

The following specific recommendations and conclusions were made for this vegetation unit:

- The vegetation unit is classified as having a medium sensitivity due its widespread occurrence in the Grassland Biome.
- The development of the power line development is considered suitable in this area.

- Old fields / planted pastures

The old fields and planted pastures occur on a large section of the proposed development site for the powerline corridors. These fields are still in an early successional state, although somewhat older (older than 5 years) with several grass species like *Aristida junciformis*, *Aristida congesta s. congesta*, *Digitaria eriantha* and *Eragrostis curvula*. The landscape and vegetation features of the primary old fields on the proposed development site include slightly undulating plains with a low tree cover (< 1%) and dense (80%) grass layer. The dominant species include *Cynodon dactylon*, *Digitaria eriantha* and *Aristida spp.* indicating previous agricultural/utilizing activities within these areas, while typical herbs/weeds include *Tagetes minuta* and *Bidens bipinnata*. The planted pastures represent homogenous pastures (Kikuyu, mixed grasses, lucerne etc.) under irrigation along the low-lying area of the project area.

The following specific recommendations for the vegetation unit should be adhered to:

- The vegetation unit is classified as having a low sensitivity due to the degraded state of the herbaceous layer.
- The development of the power line development is considered suitable in this area.

- Exotic bushclumps

The exotic bushclumps in the project area form homogenous stands of *Eucalyptus camaldulensis* trees. Exotic weeds and pioneer grasses often colonize the areas surrounding the exotic stands of trees that was planted many years ago. The vegetation unit is classified as having a Low Sensitivity. The development in this area is highly suitable provided that the area becomes rehabilitated through removal of the exotic trees where necessary.

- Valleybottom wetland with channel

The most dominant drainage feature near the footprint area of the power line route crossing is classified as channelled valley-bottom wetlands with channels in the bisecting the proposed powerline corridors. This wetland vegetation comprises atypical (azonal) vegetation, mainly because of the prolonged moist conditions of the soils. The soils are clayey and do have relatively high, water retention abilities.

The following recommendations should be adhered to for all drainage features:

- The vegetation is mostly in a natural habitat, with all areas in the wetland zone or drainage channels classified as a high sensitivity area with a high conservation priority, while natural vegetation outside the floodline is natural woodland with a Medium Sensitivity. No alteration of these drainage areas is recommended.

- A Water Use Licence application should be submitted to the DWS for the development of the power line crossings or solar plants within 500 meters of the wetland zones.
- Only existing roads should be used to cross drainage lines, and mitigating measures should be implemented to prevent erosion of roads across drainage lines.

9.4.8.2 Red Data Species

Only the red data species *Boophane distycha* was observed during the surveys. The species can be relocated from its current conditions if needed through a rescue and relocation programme should the development activities impact on populations. Ecological monitoring must be implemented during the construction phase and specific sensitive habitats (riparian) needs to be avoided to ensure that any potential red data species potentially missed during the field surveys are preserved and not potentially impacted on.

9.4.8.3 Protected Species (Gauteng Nature Conservation Bill)

Plant species are also protected in the Gauteng Province according to the Gauteng Nature Conservation Bill. According to this ordinance, no person may pick, import, export, transport, possess, cultivate, or trade in a specimen of a specially protected or protected plant species. The Appendices to the ordinance provide an extensive list of species that are protected, comprising a significant component of the flora expected to occur on site. Communication with Provincial authorities indicates that a permit is required for all these species if they are expected to be affected by the proposed project.

After a detailed survey was conducted during November 2022, the listed species *Boophane distycha* confirmed for the site. No eradication should be allowed without a permit.

9.4.8.4 Protected Trees Species (NFA)

The National Forest Act, 1998 (Act No. 84 of 1998) provides a list of tree species considered important in a South African perspective because of scarcity, high utilization, common value, etc. In terms of the National Forest Act of 1998, these tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased, or sold – except under license granted by a delegated authority. Obtaining relevant permits are required prior to any impact on these individuals. Taking cognizance of the data obtained from the field surveys, **no protected tree species** occur in the area.

9.4.8.5 Alien Invasive Species

The following alien invasive and exotic plant species were recorded on site during the surveys as stipulated in the Alien and Invasive Species Regulations (GNR 599 of 2014).

Table 8. Declared weeds and invader plants of the study area.

Species	Category
<i>Argemone ochroleuca</i>	1b
<i>Datura stramonium</i>	1b
<i>Eucalyptus camaldulensis</i>	1b
<i>Verbena brasiliensis</i>	1b
<i>Xanthium strumarium</i>	1b

According to the amended regulations (No. R280) of March 2001 of the Conservation of Agricultural Resources Act 1983 (Act no. 43 of 1983), it is the legal duty of the land user/landowner to control invasive alien plants occurring on the land under their control.

9.4.8.6 Conclusions

An important aspect relating to the proposed development site should be to protect and manage the biodiversity (structure and species composition) of the vegetation types which surround the project area.

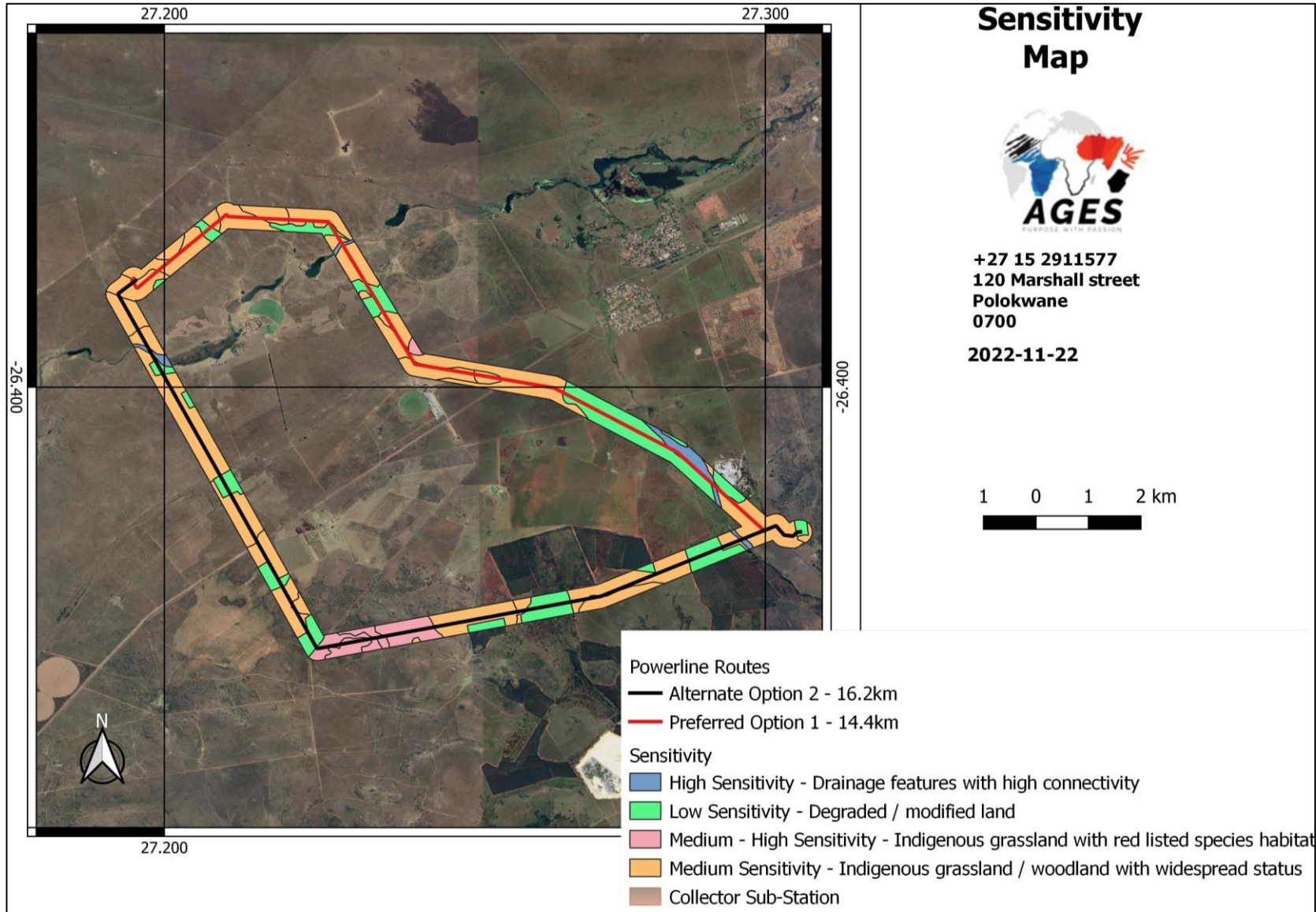


Figure 7. Sensitivity Map

9.4.8.7 Fauna

A survey was conducted during November 2022 to identify fauna habitats, and to compare these habitats with habitat preferences of different fauna groups (birds, mammals, reptiles, amphibians) occurring in the quarter degree grid. During the site visits mammals, birds, reptiles, and amphibians were identified by visual sightings through random transect walks. Mammals were recognized as present by means of spoor, droppings, burrows or roosting sites.

Mammals

Much of the large and medium-sized mammal fauna that previously occurred in the area is locally extinct or occurs in small, fragmented populations in reserves. Most of the habitat types in the area is fragmented. Expected mammalian richness is considered low, although slightly higher richness is expected from more intact grassland, woodland and wetland habitats.

The Highveld Ecoregion contains a high number of mammals, but only the orange mouse is restricted to the ecoregion, and the rough-haired golden mole is near-endemic. The ecoregion supports populations of large mammal species, some of which are rare in southern Africa (Stuart and Stuart 1995). Among these are brown hyena, African civet, leopard, pangolin, honey badger, striped weasel, aardwolf, oribi, and mountain zebra.

Predators that still roam freely in the area include larger predators such brown hyena, while smaller predators such as caracal, serval and honey badger are common throughout the larger area. Antelope species such as duiker and steenbok will roam freely through the area and are not restricted by game fences. Smaller mammal species such as honey badgers and serval can become habituated to anthropogenic influences, while other species such as brown hyena will move away from the construction activities and will seldom use the area.

Connectivity 2 of the project site to the remainder of the larger area is Moderate due to other surrounding areas representing natural grassland and wetlands. Of significance is the role of wetlands and indigenous grasslands as a zoogeographical dispersal corridor in the larger area.

Most mammal species are highly mobile and will move away during construction of the solar development. The most important corridors that need to be preserved for free-roaming mammal species in the area include the wetlands and indigenous grasslands.

Herpetofauna

Twenty-nine amphibians occur within the eco-region but none are endemic (Passmore and Carruthers 1995). Breeding habitat of frogs and toads can be found mostly in the permanent wet zone of the wetlands and dams in the larger area.

² **Connectivity (habitat connectivity)** - Allowing for the conservation or maintenance of continuous or connected habitats, so as to preserve movements and exchanges associated with the habitat.

Amphibian species potentially occurring in the larger area include Common River Frog, Natal Sand Frog, Gutteral Toad, Raucous Toad and Bubbling Kassina. These species are non-threatened and widespread, and as such the development will not have any impact on amphibian conservation within the region.

Relatively few reptile species occur in the Highveld Ecoregion, due to its cool climate. The ecoregion supports some of Africa’s most characteristic reptile species, including Nile crocodile, African rock-python, water monitor and veld monitor. There are two endemic reptiles: giant girdled lizard, and *Agama distanti* (Branch 1998) and other reptile species which are near-endemics, including Drakensberg rock gecko, giant spinytail lizard, and Breyer's whiptail.

In the presence of dead termitaria, the small geckos listed are probably found on the site. A few terrestrial lizards (Yellow-throated Plated Lizard, Variegated Skink), typical for Highveld Grassveld, are expected to be present. A variety of smaller snake species characteristic for Highveld Grassveld will be present (Common Wolf Snake, Brown House Snake).

The only venomous snakes, which has been reported as being present and common, is as expected, the Rinkhals, Mozambique spitting cobra, snouted cobra and the Puffadder for this QDS. All the reptile species are common and widespread, and as such the development will not have any impact on reptile conservation within the region. The sungazer lizard occurs in some of the grassland areas, while the southern spiny agama and the striped harlequin snake may occur in small numbers in suitable habitat.

According to the existing databases and field survey the following number of fauna species included in the IUCN red data lists can potentially be found in the study area:

Table 9. Red data list of potential fauna for the study area

English Name	Conservation Status	Probability of occurrence on site
BIRDS (SABAP 2 LIST SPECIES)		
Pallid Harrier	Near Threatened	Moderate
Greater Flamingo	Near Threatened	Low (wetlands)
Grass Owl	Vulnerable	Moderate
Secretarybird	Vulnerable	Moderate
Cape Vulture	Endangered	Moderate
Macoa Duck	Near Threatened	Low (wetlands)
MAMMALS		
Serval	Near Threatened (2016)	Moderate
African Clawless Otter	Near Threatened (2016)	Low (wetlands)

The **cumulative negative impacts** of the proposed development will have a medium to low impact on the fauna of the area.

Recommendations and mitigating measures still need to be implemented to ensure the survival of these species, other fauna habitats and feeding grounds as stipulated below:

- The development would not have a significant impact on the above-mentioned red data fauna since adequate and natural habitat/vegetation would be available on the peripheral grassland habitats surrounding the development site. The most probable habitat to find any of the red data species in the study area would be in the more natural areas of the grassland and wetlands where little or no disturbances from humans or livestock occur at a regular interval. Fauna will therefore rather move away from the area and utilize adjacent, more natural areas. Importance to preserve wetland habitat to the south of the development footprint must be considered a high priority.
- The removal of vegetation should be confined to footprints of the proposed development site. This will be on small sections in relation to the total available surrounding habitat for fauna. The development will not influence the natural feeding and movement patterns of the existing fauna in the area.
- If one considers the habitat descriptions of the red data species, most of them are not directly threatened by habitat loss. The impact of development on the red data species would therefore be less than predicted.
- The protection of different habitat types in the area will be important to ensure the survival of the different animals due to each species' individual needs and requirements. Sufficient natural corridor sections should be protected around the proposed development footprints to allow fauna to move freely between the different vegetation units on the property. The drainage channels and sections of natural vegetation will be preserved as corridors in the area and mitigation measures should be implemented to ensure that the habitats are protected.
- Taller (>3m) indigenous trees in this area provide resting/perching sites for larger birds like birds of prey, arboreal reptiles and mammals that might occur/pass through the area and should preferably be preserved. The larger trees should be protected as far as possible and be incorporated into the proposed development. The removal of large dead trees is not advised as these trees also provide smaller habitats for the mentioned bat species as well as rodents. The grass layer on the other hand also provides a valuable food source (insects, reptiles, small mammals that occur in/on the grass layer) for fauna.
- A monitoring programme needs to be implemented by a specialist if any rare species are confirmed on the property.

9.4.8.8 Summary and results of the Terrestrial Biodiversity Impact Assessment

Detailed ecological (fauna habitat & flora) surveys were conducted during November 2022 to verify the ecological sensitivity and ecological components of the site at ground level. The timing of the season was considered as adequate due to sufficient rains received in the area during the winter months and early spring. The survey was considered successful.

Most sensitive sections: It is evident from the distribution of biodiversity, presence of threatened species and sites of scientific interest, that the proposed development has the potential for negative impact on the flora and faunal of the study area. This is particularly true of the sensitive vegetation associated with the riverine and wetland ecosystems and the larger project area, although none such habitats occurred on site.

Most sensitive habitats: Many threatened species are grassland specialists, linked to these habitats either for breeding, feeding or shelter. Major impacts on wetland areas to the south of the site should be avoided wherever possible during construction. Where unavoidable impacts will occur on grassland and wetland zones, strict mitigation measures and legislation should be implemented (DAFF licence for eradication of protected trees, IWUL application etc.).

Monitoring of threatened species: Many endemic and protected species have been recorded in region. The EMPr for the development should highlight the conservation status of these species and note that steps must be undertaken in conjunction with conservation authorities to protect or translocate any populations encountered during project actions. Ecological monitoring is recommended for the construction phase of the development considering the presence of potential red data fauna on areas surrounding the site.

The importance of rehabilitation and implementation of mitigation processes to prevent negative impacts on the environment during and after the construction phase of the solar development should be considered a high priority. The proposed site for the development varies from being in a slightly degraded to pristine state.

A sensitivity analyses was conducted to identify the most suitable site for the development. From this investigation and ecological surveys, the following main observations was made:

- Most of the proposed development footprints represent CBA2 areas although most of should rather be classified as ESA1 or ESA2 areas. Management objective for the area is to maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern.
- Officially protected areas, either Provincially or Nationally that occur close to a project site could have consequences as far as impacts on these areas are concerned. For the proposed development and associated infrastructure no protected areas occur in proximity, with the closest being the Abe Bailey Provincial Nature Reserve that occurs to the east of the project area.
- The National Protected Areas Expansion Strategy (NPAES) are areas designated for future incorporation into existing protected areas (both National and informal protected areas). No NPAES occur within the project area, although the Vaal Grasslands NPAES occur to the east and south of the project area.

Only the red data species *Boophane distycha* was observed during the surveys. The species can be relocated from its current conditions if needed through a rescue and relocation programme should the development activities impact on populations.

Ecological monitoring must be implemented during the construction phase and specific sensitive habitats (riparian) needs to be avoided to ensure that any potential red data species potentially missed during the field surveys are preserved and not potentially impacted on.

Some potential rare fauna may also occur in the area, and specific mitigation measures need to be implemented to ensure that the impact of the development on the species' habitat will be low. Specific mitigation relating to red data fauna includes the following:

- Disturbances in close vicinity of the development (periphery) should be limited to the smallest possible area to protect species habitat.
- Corridors are important to allow fauna to move freely between the areas of disturbance.

Several ecological potential impacts were identified and assessed. A few of these were assessed as having potentially medium or high significance, including the following:

- Destruction or disturbance to sensitive ecosystems leading to reduction in the overall extent of a particular habitat;
- Increased soil erosion;
- Impairment of the movement and/or migration of animal species resulting in genetic and/or ecological impacts;
- Destruction/permanent loss rare, endangered, endemic and/or protected species;
- Establishment and spread of declared weeds and alien invader plants;
- Soil and water pollution through spillages;
- Establishment and spread of declared weeds and alien invader plants;
- Impacts of human activities on fauna and flora of the area during construction;
- Air pollution through dusts and fumes from construction vehicles (construction phase).

Mitigation measures are provided that would reduce these impacts from a higher to a lower significance. A monitoring plan is recommended for the construction phase of the development should the proposed application be approved.

The proposed development should allow corridors of indigenous grassland and wetlands on areas outside the development footprint to be preserved. Where sensitive areas of natural vegetation cannot be avoided, mitigation measures are recommended to minimise and/or offset impacts. Negative impacts can be minimised by strict enforcement and compliance with an EMP which considers the recommendations for managing impacts detailed above.

According to the Ecological Specialist, provided that the proposed development and layout plans is consistent with the sensitivity map and take all the mitigation measures into consideration stipulated in this report, the planned development can be supported.

9.4.9 AQUATIC ECOLOGY

Scientific Aquatic Services (SAS) (Pty) Ltd was appointed to undertake a freshwater assessment to verify the presence of freshwater ecosystems within the area demarcated for a proposed PV Power Plant with associated infrastructure. The Aquatic Biodiversity Statement is attached as Annexure F of this report.

On site, it was confirmed that soil in the study area did not display any indicators of a fluctuating water table associated with wetland conditions.

No sign of wetness was found at the site where the depression wetland was suggested by the NFEPA (2011) and National Wetland Map (NBA 2018) databases, and it is confirmed that this site is not a wetland. No other natural freshwater ecosystems were found in the study area. Although there were depressional areas in the topography of the landscape, none of these areas were found to possess vegetative wet responses.

Based on site verification undertaken by Scientific Aquatic Services and findings thereof presented in an attached report, it was confirmed that no natural freshwater ecosystems occur in the study/investigation area. Due to the closest freshwater ecosystem being greater than 500 m distant from the study area, no Zones of Regulation will apply to the study area and proposed development, nor would the development be subject to a Water Use Authorisation in terms of Section 21(c) and (i) of the National Water Act, 1998 (Act No 36 of 1998). The proposed PV Power Plant poses no significant quantum of risk to existing freshwater ecosystems in the area and no risk assessment is required in accordance with GN509 of 2016.

9.4.10 AVIFAUNA

An Avifaunal Assessment (Annexure E) was conducted by Ryno Kemp (Pr.Sci.Nat.) in order to determine whether the proposed development would have negative impact on avifauna. The field survey area covered the entire farm of 191 ha and included a thorough desktop study which encompassed a wider geographical range than the field survey. The field survey was conducted on 28-30 October 2022.

The desktop analysis recorded 316 species from more than 500 full protocol cards registered during SABAP2 in the 12 pentads surrounding the proposed Mopane Solar Park and connection lines. The data also reveal that, on average independent of the month, one can observe 202 ± 21 species. Of these, 164 were confirmed during the point survey count, another 19 species were recorded during incidental recordings within the study period, and a further 70 are likely to occur. Species richness analysis in Estimate S confirmed that the proposed Mopane Solar Park and Connection power line would hold $\sim 186 \pm 8$ species based on the species accumulation curve.

While renewable energy sources such as solar energy are important to the future development of power generation and hold great potential to alleviate the dependence on fossil fuels, they are not without their environmental risks and negative impacts. Poorly sited or designed solar power generating facilities can negatively impact birds and their habitats and the functioning of the entire ecosystem. However, the biggest threat will come from the overhead power lines between the Solar Park and the substation. The proposed development allows institutions to conduct valuable and relevant research into threats posed to avifauna and whether certain mitigations are successful or not that will allow for better implementation of these mitigations for future investigations as described in the Best Practice Guidelines Birds & Solar Energy (Jenkins *et al.* 2017).

The utilisation of detailed online databases (e.g., SABAP) aided a thorough site visit conducting more than 200 surveying points. The proposed Mopane Connection Power line Option 1 (preferred option) would have a low to medium impact on the bird communities. It will cause a slight impact on the ecological process of the overall bird community. With existing power lines set up along the route, it is definitely the best route to minimise the cumulative effect and set up a new feature within the landscape.

9.4.11 VISUAL

A Visual Impact Assessment (Annexure J) was conducted by Graham Young Landscape Architects, (independent visual specialist) to determine the visual impact of the proposed development.

The impact of the Preferred Option on the visual environment during the **construction phase** is assessed to have a low intensity over a localized area and would occur over the short-term, resulting in a low consequence. The probability of the unmitigated impact is low resulting in a predicted significance of impact is LOW. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain LOW.

The impact on the visual environment during the **operational phase** is assessed to have a low intensity over a localized area and would occur over the medium-term resulting in a low consequence. The probability of the unmitigated impact is low resulting in a predicted significance of impact is LOW. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain LOW.

The impact of the alternative option, on the visual environment during the **construction phase** is assessed to have a low intensity over a localized area and would occur over the short-term, resulting in a low consequence. The probability of the unmitigated impact is low resulting in a predicted significance of impact is LOW. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain LOW.

The impact of the alternative option, on the visual environment during the **operational phase** is assessed to have a moderate intensity over a localized area and would occur over the medium-term resulting in a low consequence. The probability of the unmitigated impact is low resulting in a predicted significance of impact is MODERATE. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain LOW.

9.4.12 AGRICULTURAL POTENTIAL

An Agricultural Potential Impact Assessment on soils potential was conducted and is included in this Report in Annexure K. A thorough investigation of the soil types of the proposed development site is necessary for an accurate classification of the soils. The main aim of the study is to identify the soil types on site and evaluate their specific characteristics to determine the agricultural potential of the soils. The assessment of agricultural potential and land capability of the study area was based on a combination of desktop studies to amass general information and then through site visit for status quo assessment, soil sampling and characterization, and also the validation of generated information from desktop studies.

The proposed development site shows some variations in terms of soil characteristics and soil types identified during the survey. The classification of soils on the farm was based on land type description and the Binomial System for South Africa, which classifies soils into forms and families based on the diagnostic horizon of the soil profile. Exposed soil profile characteristics created by road cuttings in the field were also used in describing the local soil form. Soil identification and classification of the dominant soil type were done.

Soils were classified into broad classes according to dominant soil form and family as follows:

- Deep, red apedal soils of the Hutton soil form.
- Shallowish, red apedal soils of the Hutton/Glenrosah soil form with scattered Mispah soils.
- Shallow, gravelly to rocky soils of the Glenrosa / Mispah soil form.
- Black clayey soils of the Katspruit / Arcadia soil forms
- Shallow rocky soils of the Mispah / Glenrosa soil form

The geological formations and vegetation patterns showed a strong correlation to the major soil units mapped in the study area.

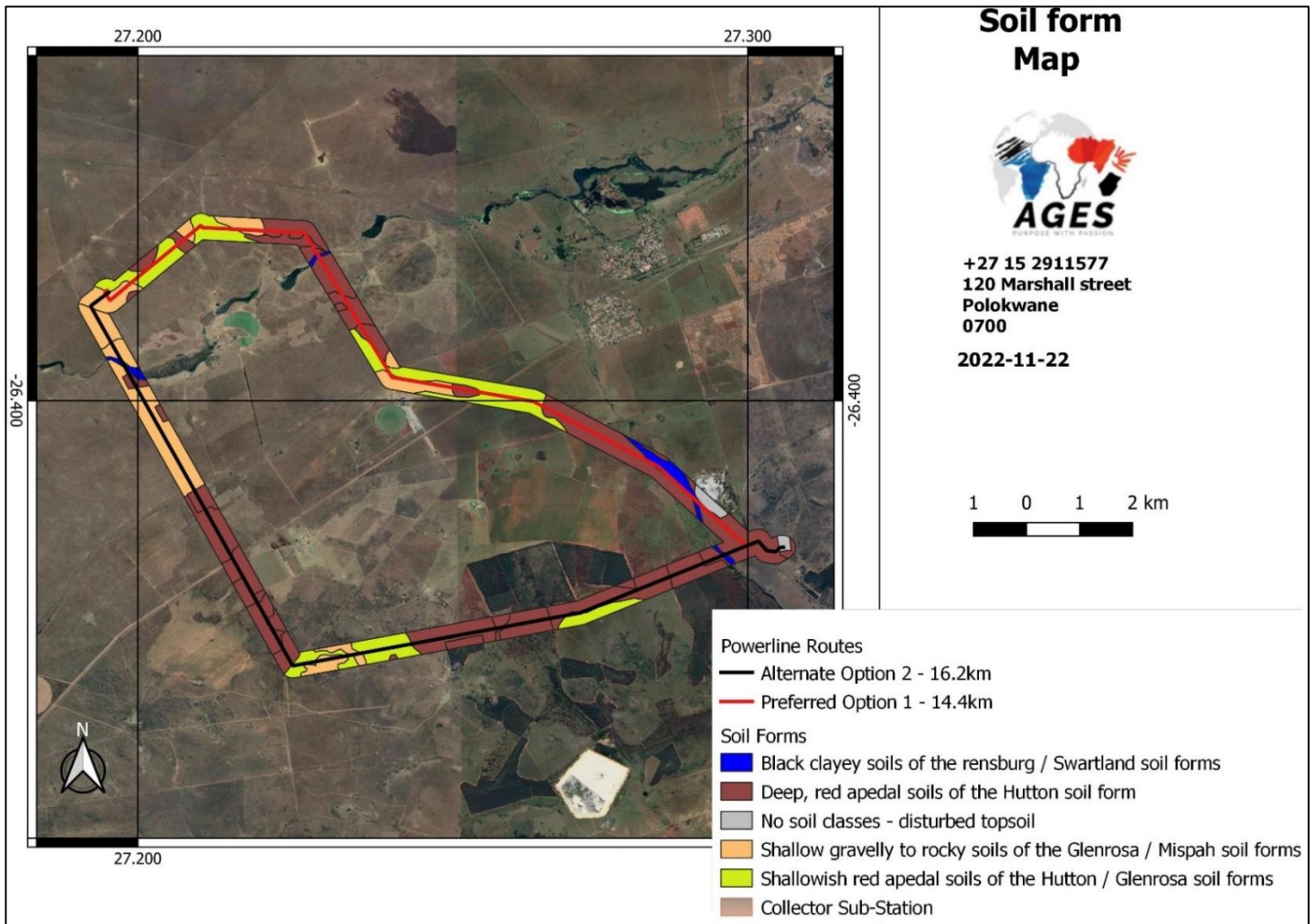


Figure 8. Soil Form Map

Arable Land (Crop Production)

The proposed development site is composed of sandy clay loam to sandy-loam soils. From the soil textural analysis, it can be concluded that the soil has a clay content varying between 10 (sandy loam soils) and 25% (sandy loam clay soils). The soils are further predominantly red-apedal soils with a loamy texture although it often forms mosaics of deeper red soils to shallower red soils and exposed bedrock on the surface. The soil depth is however lower than the prescribed 900mm for high potential soils in the Gauteng Province and not under irrigation.

The farm is also expected to receive an annual total rainfall of about 590 mm which is relatively low and highly variable. In addition, the farm is in an area which is marginal to dry for rain-fed arable crop production. Economically viable farming is thus, restrictive to irrigated cropping due the high risk that could be associated with dry-land farming. At present no irrigation or centre pivots occur on the property. Furthermore, higher day temperatures and evaporation rates in summer months may hamper soil moisture storage for crop use.

Grazing Land (Livestock Production)

The current vegetation at the proposed site of development consists mainly of areas of with mixed quality grazing (highly palatable and unpalatable grasses) throughout most parts of the site and these areas can support limited grazing by livestock and game species. The nature of the vegetation and size of the properties make the area marginal for extensive livestock production. Using planted pasture to supplement livestock production is an option considering the water availability for extensive irrigation.

Considering that re-growth of grass will take place under the panels as the mounting systems are at least 1m above ground level, the grazing value of the land will still be available to small livestock such as game and sheep. The nature of the vegetation at the farm is therefore moderate for extensive livestock production. The moderate agricultural potential of the soils and the moderate to high grazing capacity is further confirmed by the Agricultural Maps.

9.4.13 CULTURAL AND HERITAGE RESOURCES

A Heritage Impact Assessment (Annexure G) was conducted by Beyond Heritage and the following key findings of the assessment include:

- The topography of the study area is undulating with no major topographic features (such as pans or shelters) that would have been focal points for human activity in antiquity. However, chert outcrops mean that readily available raw material for lithic manufacture resulted in a background scatter (Orton 2016) of expediently knapped Stone Age artefacts to be present across the greater area attesting to some human occupation from the MSA onwards;
- During the survey no Earlier Stone Age material was noted and although few diagnostic pieces were recorded in the low-density open-air scatters, the lithics suggest human occupation of the area from the MSA onwards of the area the powerline traverse;
- Identified features affected by Option 2 are stone-walled enclosures;
- Due to access restrictions portions of the powerline options were not subjected to fieldwork mostly because of landowner consent that is not in place and will only be confirmed after the preferred option is determined;
- From a heritage perspective both Power Line options are viable.

The impact on heritage resources is low, and the project can commence provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval. All relevant reports will be submitted to SAHRA for approval.

Recommendations from the archaeologist include the following:

- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction.
- Final Pylon positions should be subjected to a heritage walkdown prior to development. If any heritage features are then noted micro siting of the powerline to preserve the sites will suffice as a mitigation measure.

9.4.14 PALAEOLOGICAL RESOURCES

A Palaeontological Impact Assessment (Annexure H) was conducted by Prof Marion Bamford. The project lies in the south western part of the Transvaal Basin where the lower rocks of the Transvaal Supergroup are exposed, in particular the dolomites of the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup; ca 2585-2480 Ma).

Based on the fossil record and confirmed by a site visit and walk through there are NO FOSSILS in exposures of dolomite in the project footprint. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary.

Recommendations of the Palaeontological Specialist

Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS in exposures of dolomite in the project footprint. There were mostly cherts but some dolomites occur in the proposed solar collector area. The western and central part has only a few cherts and mainly is covered with soils. No stromatolites were found on the farm although stromatolites have been recorded from some exposures of the Malmani Subgroup. This is reflected in the lack of a formation being assigned to the area, because the type of fossils would enable the recognition of the Formations within this group. It would appear that stromatolites, oolitic and algal dolomite are generally absent from this region. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary.

There is a very small chance that trace fossils may occur in below the ground surface in the dolomites of the Malmani Subgroup so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer or other responsible person once excavations and drilling have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample.

Since there is an extremely small chance of fossils being impacted by this project, as far as the palaeontology is concerned, the project should be authorised.

9.4.15 RADIO FREQUENCY INTERFERENCE

This Site Sensitivity Verification was undertaken by Mr. PF Smuts, an ECSA registered Engineer with more than 30 years of experience in the field of Radar, microwave and RF technology.

Electromagnetic interference (EMI), also called radio-frequency interference (RFI) when in the radio frequency spectrum, is a disturbance generated by an external source that affects an electrical circuit by electromagnetic induction, electrostatic coupling, or conduction.

Radio frequency interference, **RFI**, is any undesirable electrical energy with content in the frequency range dedicated to radio frequency transmission. **Radiated emissions** are unintentional energy that escapes equipment in the form of electric, magnetic, or electromagnetic fields. **Conducted emissions** are unintentional energy carried out of equipment on the equipment's power cables or attached signal cables. These conducted emissions can also be carried into equipment from an external source.

For the proposed Mopane Powerline to be in a position to interfere with any electronic and telecommunication systems associated with a commercial business, airports, telescopes or military installations, it must be located close enough to installations or have a conductive path into such an installation via cable, power lines and other carrier devices or technology.

The Mopane Powerline Corridor area is located next to the R501 road and other local roads as well as railway lines that are suitable for any landward movement. There are no military training areas and bases in the close vicinity and thus is not foreseen to have any impact on military landwards activities.

There are no runways visible in this area as well as the close surrounding area. It is not foreseen that a military airport will be constructed in this area. No corridors or buffer areas, other than the power line corridor, are identified or required within or close to the project footprint.

After evaluation and consideration of all activities identified, it is still considered to be classified as low sensitivity to RFI.

For the proposed development there should be no unacceptable impact on existing and potential, future installations if all equipment will have acceptable EMI/RFI levels subject to ICASA requirements and power lines and sub-stations are installed according to ESKOM best practices and standards. No Cumulative RFI effects are expected at any of the adjacent sites and whether there are one or five PV solar sites the outcome will be the same.

9.4.16 NOISE IMPACTS

Enviro-Acoustic Research cc was commissioned to compile a Noise Compliance Statement as part of the Environmental Authorisation for proposed development of the 14.4 km Mopane Powerline west of Welverdiend, Gauteng Province. The statement is attached in Annexure N. Because the online screening tool does not identify noise as an environmental theme require further investigation for a powerline, the requirements of SANS 10328:2008 to assess whether noise is a potential issue of concern.

Considering the information gained on numerous different projects in typical rural areas as well as the developmental character, ambient sound levels will be low and typical of a rural noise district. SANS 10103:2008 recommend rating levels of:

- 45 dBA for the daytime period; and
- 35 dBA for the night-time period.

These rating levels were considered in the screening report as the potential noise limits.

The screening report assessed the potential noise impact due to the proposed development of the Mopane Powerline. Generally, noises associated with a powerline relates to:

- Construction activities, though such noises are generally of a short duration and normally only associated with the day-time period (reducing the probability of a noise impact occurring); and
- Operational activities, associated with the limited maintenance activities, a hum from the invertors and transformers in the substations.

Considering the distance of potential noise sources, the temporary nature of construction noise impacts and the low magnitude of operational noises, the development of the 14.4 km Mopane Powerline is unlikely to influence ambient sound levels in the vicinity of the project site.

It is therefore the opinion of the author that no acoustical studies would be required for the proposed development of the 14.4 km Mopane Powerline, and it is recommended that the project be authorised (in terms of acoustics), see Annexure N.

9.4.17 AVIATION IMPACT ASSESSMEN

The development of solar developments throughout South Africa means that new renewable energy plants and overhead transmission lines are sometimes developed near existing civil and military airbases. The aviation assessment is done to determine if a proposed renewable energy generation project will interfere with the Obstacle Limitation Surfaces of airports in the vicinity of the project.

Although a “low” sensitivity has been identified, an Aviation Consultant undertook a safeguarding assessment for the proposed new solar park and new transmission line in the Gauteng Province in the vicinity of Carletonville Airport (FACR). The Aviation Assessment is attached in Annexure L.

FACR is the ICAO (International Civil Aviation Organization) code for the Carletonville Airport.

There are no Military installations and also no promulgated Danger, Restricted and Prohibited areas according to the SACAA list in the vicinity of the 14.4 km Mopane Powerline.

It was decided to assess the development using the methodology of the assessment of the Obstacle Limited Surfaces as well as the Approach/Departure Surfaces of Carletonville Airport. This was done in accordance with the ICAO and SACAA safeguarding rules and regulations.

According to the SACAA, Carletonville Airport is not a certified airport under Instrument Flight Rules. The possibility exist that the Carletonville Airport could become an Instrument Flight Rules airport in the future, therefore both the Obstacle Limited Surfaces as well as the Approach/Departure Surfaces were assessed.

Evidence from the assessment and the technical drawings show clearly that the Mopane Powerline Project will not interfere with the Obstacle Limit Surfaces and the Approach/Departure Surfaces of Carletonville Airport (FACR) and also will not interfere with the Landing Zone of the Johannesburg Sky Diving Club, present and in the long term.

9.5 IMPACTS AND RISKS IDENTIFIED

Environmental impacts of construction, operation, maintenance and management of the proposed project were identified, and significance of impacts was assessed. Each impact was assessed and rated. The assessment of the data, where possible was based on broadly accepted scientific principles and techniques. Construction activities for the proposed powerline include:

- land clearing activities necessary for preparation of the site and access routes;
- minimal excavation and filling activities;

EXTENT

The extent of most of the construction activities is localized and impacts will only occur at the development site. Mitigations measures are included in this EIA report.

DURATION

The impact of construction activities will only be for the duration of the construction phase, after which it will cease completely. (Construction period planned to last between a minimum of 6 months and a maximum 15 months).

PROBABILITY

The probability of impacts occurring during the construction is phase very high as there will be impacts on the vegetation as most will be removed to make way for the proposed development. The evaluation of environmental impacts as a result of the proposed development is discussed in this EIA report. Environmental impacts associated with the operational phase of a powerline include visual and other impacts.

The decommissioning activities of the PV plant mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

The identification of impacts is based on:

- legal and administrative requirements;
- the nature of the proposed activity;
- the nature of the receiving environment;
- specialist studies and
- issues raised during the public participation process.

Potential impacts include:

- Impacts on soils & agricultural potential;
- Geological, soil and erosion impacts;
- Impacts on avifauna;
- Impacts on vegetation;
- Impacts on heritage resources;
- Noise impacts;
- Visual impacts.

Potential impacts identified include:

- **Impacts on soils & agricultural potential:**
 - Extent: Locally at the proposed site
 - Duration: Life of the project (approx. 30 years)
 - Probability: Low
 - Significance: Low
- **Impacts on ground water:**
 - Extent: Surrounding and adjacent land
 - Duration: Medium – only applicable to construction phase
 - Probability: Medium
 - Significance: Low
- **Geological, soil and erosion impacts:**
 - Extent: Locally at the proposed site
 - Duration: Medium – only applicable to construction phase
 - Probability: Low
 - Significance: Low
- **Impacts on avifauna:**
 - Extent: Locally at the proposed site
 - Duration: Life of the project (approx. 30 years)
 - Probability: Low
 - Significance: Low
- **Impacts on vegetation:**
 - Extent: Locally at the proposed site
 - Duration: Medium – only applicable to construction phase
 - Probability: Likely
 - Significance: Medium
- **Impacts on heritage resources:**
 - Extent: Locally at the proposed site
 - Duration: Life of the project (approx. 30 years)
 - Probability: Low
 - Significance: Low
- **Noise impacts:**
 - Extent: Locally at the proposed site
 - Duration: Medium – only applicable to construction phase
 - Probability: Low
 - Significance: Very Low

- **Social impacts:**
 - Extent: Regional & Locally
 - Duration: Medium – only applicable to construction phase
 - Probability: High
 - Significance: High - Positive
- **Visual impacts:**
 - Extent: Locally at the proposed site
 - Duration: Life of the project (approx. 30 years)
 - Probability: Definite
 - Significance: Medium

Significance of potential impacts was determined as all specialist studies have been obtained.

9.5.1 DEGREE TO WHICH THE IMPACTS CAN BE REVERSED

- The visual impact is resident for a long time (25-30 years). It can be reversed during decommissioning and rehabilitation of the area.
- Biodiversity impacts can be reversed at the decommissioning stage of the development. Plants can be replanted, and animals will return to the project area.
- Impacts on water quality and quantity can be reversed after construction.
- Agricultural resources will again become available after decommissioning of the facility.
- Impacts on heritage resources could be permanent without mitigation.
- The potential impacts on river systems, drainage channels and wetlands will be minimal. Impacts on these resources can be reversed successfully.
- Socio-economic impacts can be reversed at the decommissioning phase, though this will have a nett negative effect on the area.

9.5.2 DEGREE TO WHICH IMPACTS MAY CAUSE IRREPLACEABLE LOSS OF RESOURCES

The only impact which can cause an irreplaceable loss of resources is an impact on the heritage resources where heritage sources are destroyed. This should not happen as the heritage resources are well surveyed and protected from development impacts.

9.5.3 DEGREE TO WHICH IMPACTS CAN BE AVOIDED, MANAGED OR MITIGATED

It is not possible to completely avoid the impacts of the development on the environment. By following the mitigation and management measures detailed in the impact section in this report, most of the impacts and the effects it can have on the environment can be successfully lowered to a lower degree of significance to the environment. This can be done to a point where the impacts are acceptable and where the benefits of the development are greater than the detriment to the environment.

9.6 METHODOLOGY USED FOR THE ASSESSMENT OF SIGNIFICANCE OF IMPACTS

To assess the impacts on the environment, the process will be divided into two main phases namely the Construction phase and the Operational phase. The activities, products and services present in these two phases will be studied to identify and predict all possible impacts. In any process of identifying and recognising impacts, one must recognise that the determination of impact significance is inherently an anthropocentric concept. Duinker and Beanlands, (1986) in DEAT 2002. Thompson (1988), (1990) in DEAT 2002 stated that the significance of an impact is an expression of the cost or value of an impact to society.

However, the tendency is always towards a system of quantifying the significance of the impacts so that it is a true representation of the existing situation on site. This will be done by using where possible, legal and scientific standards which are applicable.

The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The consequence matrix uses parameters like severity, duration and extent of impact as well as compliance to standards. Values of 1-5 are assigned to the parameters that are added and averaged to determine overall consequence. The same process is followed with the likelihood that consists of two parameters namely frequency and probability. The overall consequence and the overall likelihood are then multiplied to give values ranging from 1 to 25. These values as shown in the following table are then used to rank the significance.

It must be said however that in the end, a subjective judging of an impact can still be done, but the reasons for doing so must be qualified.

Significance ratings (Plomp 2004)

Significance	Low -	Low-Medium -	Medium -	Medium-High -	High -
Overall Consequence X Overall Likelihood	1-4.9	5-9.9	10-14.9	15-19.9	20-25
Significance	Low +	Low-Medium +	Medium +	Medium-High +	High +
Overall Consequence X Overall Likelihood	1-4.9	5-9.9	10-14.9	15-19.9	20-25

Description of the parameters used in the matrixes

Severity:

Low	Low cost/high potential to mitigate. Impacts easily reversible, non-harmful insignificant change/deterioration or disturbance to natural environments.
Low-medium	Low cost to mitigate Small/ potentially harmful Moderate change/deterioration or disturbance to natural environment.
Medium	Substantial cost to mitigate. Potential to mitigate and potential to reverse impact. Harmful significant change/deterioration/disturbance to natural environment
Medium-high	High cost to mitigate. Possible to mitigate Great/Very Harmful Very significant change/deterioration or disturbance to natural environment.
High	Prohibitive cost to mitigate. Little or no mechanism to mitigate. Irreversible. Extremely Harmful Disastrous change/deterioration or disturbance to natural environment.

Duration:

Low	Up to one month
Low-medium	One month to three months
Medium	Three months to one year
Medium-high	One to ten years
High	Beyond ten years

Extent:

Low	Within footprint area
Low-medium	Whole of site
Medium	Adjacent properties
Medium-high	Communities around site area
High	Local Municipality area

Frequency:

Low	Once/more a year or once/more during operation
Low-medium	Once/more in 6 months
Medium	Once/more a month
Medium-high	Once/more a week
High	Daily

Probability:

Low	Almost never/almost impossible
Low-medium	Very seldom/highly unlikely
Medium	Infrequent/unlikely/seldom
Medium-high	Often/Regularly/Likely/Possible
High	Daily/Highly likely/definitely

Compliance:

Low	Best Practise
Low-medium	Compliance
Medium	Non-compliance/conformance to policies etc. - internal
Medium-high	Non-compliance/conformance to legislation etc. - external
High	Directive, prosecution of closure or potential for non-renewal of licences or rights

9.7 ASSESSMENT CRITERIA

The terms of reference for the EIA study will include criteria for the description and assessment of environmental impacts. These criteria are drawn from the *Integrated Environmental Management Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts*, published by the DFFE in terms of the Environmental Impact Assessment.

These criteria include:

Table 10. Impact Assessment Criteria

<p>Nature of impact This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how.</p>		
<p>Extent The physical and spatial size of the impact.</p>	<p>Site</p>	<p>The impact could affect the whole, or a measurable portion of the above-mentioned properties.</p>
	<p>Local</p>	<p>The impacted area extends only as far as the activity, e.g. a footprint.</p>
	<p>Regional</p>	<p>The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.</p>
<p>Duration The lifetime of the impact; this is measured in the context of the lifetime of the proposed base.</p>	<p>Short term (2)</p>	<p>The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.</p>
	<p>Medium term</p>	<p>The impact will last up to the end of the phases, where after it will be entirely negated.</p>
	<p>Long term</p>	<p>The impact will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.</p>

	Permanent	The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
Intensity	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but function and process continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Probability This describes likelihood of impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.	Improbable	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
	Probable	There is a possibility that the impact will occur to the extent that provisions must be made therefore.
	Highly probable	It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.
	Definite	The impact will take place regardless of any prevention plans, and there can only be relied on mitigation actions or contingency plans to contain the effect.
Determination of significance. Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	No significance	The impact is not substantial and does not require any mitigation action.
	Low	The impact is of little importance but may require limited mitigation.
	Medium	The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
	High	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

9.8 POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY

- The positive impact that the development will have on the environment and community is a Socio-economic impact. It will create *temporary jobs* during the construction phase.
- The powerline providing the grid connection to the Mopane PV Solar Parks will help to reduce the pressure on the Eskom grid in the country with far less negative impacts on the natural resources of the area than in the case of power generation using other sources like coal, gas, water and nuclear energy.
- During the operational phase the Powerline might have a negative impact on the *visual environment* in the area of the PV Facility.

9.9 POSSIBLE MITIGATION MEASURES AND RESIDUAL RISK

- Clearance of vegetation will be limited during the construction phase. Holes will be made for the **monopole structures** supporting the electrical cables.
- Use monopole structures for the powerlines and bird flappers as deterrents on lines to limit impact on birds in the area.
- Domestic waste must be removed from the site on a regular basis not to impact on the soils or water bodies in the area.

9.10 CONCLUDING STATEMENT INDICATING PREFERRED ALTERNATIVE AND ACTIVITY LOCATION

The preferred alternative was selected based on the fact that it will have the smallest impact on the environment having been located on the least sensitive area, avoiding potentially sensitive heritage sites and will be in line with Eskom requirements.

The negative impacts including the *cumulative* impacts can be effectively mitigated and managed to reduce the negative effect the impacts would have on the environment, so that the development with the positive effect of the socio-economic impact and the positive impact of renewable energy generation will have a positive effect on the environment that would offset the negative effects of the development.

10 DESCRIPTION OF THE PROPOSED PROCESS TO IDENTIFY AND RANK ENVIRONMENTAL IMPACTS THAT THE ACTIVITY, ASSOCIATED STRUCTURES AND INFRASTRUCTURE WILL IMPOSE ON THE PREFERRED LOCATION THROUGH THE LIFE OF THE ACITIVITY

An environmental impact is defined as a change in the environment: physical/chemical, biological, cultural and/or socio-economic. Any impact can be related to certain aspects of human activities in this environment and this impact can be either positive or negative. It could also affect the environment directly or indirectly and the effect of it can be cumulative.

10.1 DESCRIPTION OF ENVIRONMENTAL ISSUES AND RISKS IDENTIFIED DURING THE EIA PROCESS

The potential aspects to assess during the EIA process may include:

- Soils & agricultural potential;
- Avifauna aspects;
- Vegetation aspects;
- Heritage resources aspects;
- Visual aspects.

The **decommissioning activities** of the PV plant mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

The identification of impacts will be based on:

- legal and administrative requirements;
- the nature of the proposed activity;
- the nature of the receiving environment;
- specialist studies; and
- issues raised during the public participation process.

Potential impacts may include:

- Impacts on soils & agricultural potential;
- Impacts on avifauna;
- Impacts on vegetation;
- Impacts on heritage resources;
- Social impacts; and
- Visual impacts.

10.2 ASSESSMENT OF POTENTIALLY SIGNIFICANT IMPACTS AND RISKS

Impacts with a rating of Medium-High or High are impacts which are regarded as potentially significant, rated without any mitigation measures. In this impact assessment, there were NO impacts which were regarded as potentially significant impacts:

- No impacts will result in a significant **loss** of a natural resource (soils)
- Local communities WILL **benefit** in various ways, including job opportunities, skills development and other projects.
- NO impacts could result in loss of life or injuries.
- All impacts are reversible.
- Successful mitigation is possible.

10.3 IMPACTS & MITIGATION MEASURES OF CONSTRUCTION PHASE

All the possible impacts that can be predicted in both the construction and operational phases of the Mopane Powerline is addressed. Specific mitigation measures are proposed, and the significance of these impacts is described with and without the mitigation measures. Considering that the proposed Mopane Powerline may be owned and/or operated by Eskom, the mitigation measures described in the following paragraphs and in particular in the attached Environmental Management Plan can be the responsibility of Eskom or of the developer.

10.3.1 ATMOSPHERIC POLLUTION AND NOISE

Listed Activity:

Listing Notice 1, Activity 24 (ii) - The development of a road with a reserve wider than 13,5m or where no reserve exists where the road is wider than 8m.

Listing Notice 3, Activity 12c(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.

Construction Phase

During this phase there will be a concentration of earthmoving equipment and construction vehicles that will level the area, clear vegetation for construction purposes and in the process, will create dust and exhaust smoke that will impact on air quality. There will also be more noise created by the vehicles during this phase. Burning of waste and fires at construction sites may also create smoke.

Construction Phase Impacts

Impact: Atmospheric Pollution		
Activity: Earthworks and Vegetation Clearance		
Specific Impact: <u>Air Pollution – Dust</u>		
	Without Mitigation	With Mitigation
Severity	Medium – 2	Low - 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 2	Low – 1
Frequency	Medium – 3	Medium – 2
Probability	Medium-High – 4	Medium – 3
Significance	Low-Medium – 9.6	Low-Medium – 5.6
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • The clearing of the site should be done in phases as construction progresses. • Construction areas must be dampened/treated to prevent excessive dust formation. This would lower the cumulative impact of dust formation. • Cleared vegetation must be stock-piled and removed regularly and distributed amongst local community members (if possible). Cleared vegetation may not be burned on site. 		

Impact: Noise		
Activity: Vehicle Movement		
Specific Impact: <u>Noise Pollution</u>		
	Without Mitigation	With Mitigation
Severity	Low-Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low – 1
Frequency	Medium – 3	Low – 1
Probability	Medium-High – 4	Medium – 3
Significance	Low-Medium – 9.3	Low – 3.3
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	

Mitigation:

- Vehicles must be well serviced to prevent excessive smoke and noise.
- Speed of construction vehicles must be kept low (20-30km/h) to reduce the generation of dust and noise.
- Construction may only take place during the hours between sunrise and sunset on weekdays and Saturdays.
- Contractors must comply with Provincial noise regulations.
- Construction machinery must be fitted with noise mufflers and be maintained properly. This would lower the cumulative impact of noise during this phase

Impact: Atmospheric Pollution

Activity: Burning of cleared vegetation, veld fires and cooking fires

Specific Impact: Air pollution (excessive smoke)

	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low – 1
Frequency	Medium – 3	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 5.3	Low – 1.6
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	

Mitigation:

- Solid waste generated by the construction teams may not be burned on site or the surrounding areas but be regularly removed to the municipal waste disposal site.
- The cleared vegetation must be stock-piled and should be removed at regular intervals and be distributed amongst the local community members. The cleared vegetation may not be burned on site.
- Cooking at construction site may not be done on open fires. Gas stoves can be used.

Operational Phase

There will be no vehicle movement during the operational phase except for maintenance reasons. There will be no activities and/or personnel during the operational phase of the powerline.

Decommissioning Phase

The decommissioning activities of the Powerline mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

Decommissioning Phase Impacts

Impact: Atmospheric Pollution		
Activity: Earthworks and Vegetation Clearance		
Specific Impact: Air Pollution – Dust		
	Without Mitigation	With Mitigation
Severity	Medium – 3	Low-Medium – 2
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low – 1
Frequency	Medium-High – 4	Medium – 3
Probability	Medium-High – 4	Medium – 3
Significance	Medium – 12	Low-Medium – 6
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • The clearing of the site should be done in phases as construction progresses. • Construction areas must be dampened/treated to prevent excessive dust formation. This would lower the cumulative impact of dust formation. • Cleared vegetation must be stock-piled and removed regularly and distributed amongst local community members (if possible). Cleared vegetation may not be burned on site. 		

Impact: Noise		
Activity: Vehicle Movement		
Specific Impact: Noise Pollution		
	Without Mitigation	With Mitigation
Severity	Low-Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low – 1
Frequency	Medium – 3	Low – 1
Probability	Medium-High – 4	Medium – 3
Significance	Low-Medium – 9.3	Low – 3.3
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	

Mitigation:

- Vehicles must be well serviced to prevent excessive smoke and noise.
- Speed of construction vehicles must be kept low (20-30km/h) to reduce the generation of dust and noise.
- Construction may only take place during the hours between sunrise and sunset on weekdays and Saturdays.
- Contractors must comply with Provincial noise regulations.
- Construction machinery must be fitted with noise mufflers and be maintained properly. This would lower the cumulative impact of noise during this phase

10.3.2 LAND AND SOILS

Listed Activity:

Listing Notice 1, Activity 24 (ii) - The development of a road with a reserve wider than 13,5m or where no reserve exists where the road is wider than 8m.

Listing Notice 2, Activity 15 - The clearance of an area of 20 hectares or more of indigenous vegetation.

Construction Phase

During construction, the vehicles have the potential to spill diesel and lubricants that can pollute the soil and the same applies to the storage of solid waste before it can be disposed of which can also become a nuisance.

Cumulative impact of possible soil erosion is increased with the development actions.

Construction Phase Impacts

Impact: Land and Soils		
Activity: Spilling of oil/diesel by construction machinery		
Specific Impact: <u>Contamination of soil</u>		
	Without Mitigation	With Mitigation
Severity	Medium-High – 4	Low – 1
Duration	Medium – 3	Low – Medium – 2
Extent	Medium – 3	Low – Medium – 2
Frequency	Medium – 3	Low – Medium – 2
Probability	Medium – 3	Low – Medium – 2
Significance	Medium – 10.5	Low – 4.5
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		

- Construction vehicles must be well maintained and serviced to minimise leaks and spills.
- Spill trays must be used during refuelling of vehicles on site.
- Any spills must be treated and removed by a qualified agent.
- Temporary diesel storage must not exceed 30 000 l at construction camp. Diesel tanks and harmful chemicals and oils must be within bunded area and water from bunding must be channelled through oil separator.

Impact: Land and Soils		
Activity: Spilling of chemicals/sewage and solid waste		
Specific Impact: <u>Contamination of soil</u>		
	Without Mitigation	With Mitigation
Severity	Medium-High – 4	Low – 1
Duration	Medium – 3	Low – Medium – 2
Extent	Medium – 3	Low – Medium – 2
Frequency	Medium – 3	Low – Medium – 2
Probability	Medium – 3	Low – Medium – 2
Significance	Medium – 10.5	Low – 4.5
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Chemical/temporary sanitation facilities at construction site must be regularly serviced to ensure no spills or leaks to surface and/or groundwater. • Chemical toilets (if used) must be placed on level ground. • The mixing of cement and paints must be done at designated areas on a protective plastic lining to contain any spillages into surface and groundwater resources. • Solid waste must be kept in containers and disposed of regularly at the closest municipal dumping site. 		

Impact: Land and Soils		
Activity: Using land for powerline		
Specific Impact: Sterilising of Agricultural Land		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low – 1
Frequency	Medium – 3	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 5.3	Low – 1.6

Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> • Clearance of vegetation should be restricted to the footprint area and access road. • Construction activities should be restricted to the proposed development footprint. • The clearing of the site should be done in phases as the construction progresses. 		

Operational Phase

Once the powerline has been constructed, there will be no personnel on site and there will not be the generation of solid waste and/or wastewater. However, herbicides may be used for control of vegetation under powerline.

Operational Phase Impacts

Impact: Land and Soils		
Activity: Use of herbicides		
Specific Impact: <u>Pollution</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	High – 5	High – 5
Extent	Low – 1	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 4.5	Low – 2.75
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> • The use of eco-friendly products e.g., organic compost, herbicides and insecticides should be promoted and should only be used according to the specifications. 		

Decommissioning Phase

The decommissioning activities of the powerline mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

Decommissioning Phase Impacts

Impact: Land and Soils		
Activity: Spilling of oil/diesel by machines or tanks		
Specific Impact: <u>Contaminate soil</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
<p>Mitigation:</p> <ul style="list-style-type: none"> • Construction vehicles must be well maintained and serviced to minimise leaks and spills. • Spill trays must be used during refuelling of vehicles on site. • Any spills must be treated and removed by a qualified agent. • Temporary diesel storage must not exceed 30 000 litres at construction camp. Diesel tanks and other harmful chemicals and oils must be within a bunded area and water from this bunding must be channelled through an oil/water separator. 		

Impact: Land and Soils		
Activity: Sewage		
Specific Impact: <u>Contamination of soil</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	

<p>Mitigation:</p> <ul style="list-style-type: none"> • Temporary sanitation facilities at construction site must be regularly serviced to ensure no spills or leaks to surface and/or groundwater. • Chemical toilets (if used) must be placed on level ground.

Impact: Land and Soils		
Activity: Building Rubble Disposal		
Specific Impact: <u>Soil Pollution</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
<p>Mitigation:</p> <ul style="list-style-type: none"> • Building rubble must be kept in closed containers and disposed of regularly at the closest municipal dumping / refuse site. 		

10.3.3 GROUNDWATER AND SURFACE WATER POLLUTION

Listed Activity:

Listing Notice 1, Activity 12(xii)(c): Development of infrastructure or structures with a physical footprint of 100m² or more; within 32m of a watercourse, measured from edge of watercourse.

Construction Phase

- Lack of sanitation facilities could result in ground water pollution and health risks.
- Construction vehicles will be refuelled at the construction camp.
- Spillage of fuel and lubricants from construction vehicles could occur. Storm water contamination by solid waste could lead to groundwater and surface water pollution.
- Soil cover and vegetation is removed, and storm water can cause erosion. Road construction will increase possibility of erosion, because of storm water run-off.

Construction Phase Impacts

Impact: Groundwater and Surface Water Pollution		
Activity: Spillage of fuel (fuel tanks) and lubricants from construction vehicles		
Specific Impact: <u>Groundwater Pollution</u>		
	Without Mitigation	With Mitigation
Severity	Medium -High – 4	Low-Medium – 2
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low-Medium – 2
Frequency	Medium – 3	Low-Medium – 2
Probability	Medium – 3	Low Medium – 1
Significance	Medium – 10.5	Low – 4.12
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Drip pans should be used during re-fuelling and servicing of construction vehicles. Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products. • Oil traps must be installed in wash bay to prevent pollution. Must be serviced regularly by approved agent. • Any spills must be treated and removed by a qualified agent. • Diesel storage must not exceed 30 000 l at construction camp. Diesel tanks and other harmful chemicals and oils must be in a bunded area. Any water from this bunding must flow through an oil/water skimmer. • Vehicle maintenance yard and storage area must have bund walls and lined with impermeable material to prevent ground and surface water pollution. • Chemical/temporary sanitation facilities at construction site must be regularly serviced to ensure no spills or leaks to surface and/or groundwater. 		

Impact: Groundwater and Surface Water Pollution		
Activity: Clearing of vegetation		
Specific Impact: <u>Erosion & Siltation of Streams</u>		
	Without Mitigation	With Mitigation
Severity	Medium – 3	Low-Medium – 2
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low-Medium – 2
Frequency	Medium – 3	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 6.5	Low – 2.75
Status (Positive or Negative)	Negative	Negative

Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> • Clearance of vegetation and construction activities must be restricted to the footprint area and access road. • Cleared areas should be rehabilitated by reintroducing a grass layer to limit soil erosion. • Berms to limit water flow over cleared areas, to limit erosion. 		

Impact: Groundwater and Surface Water Pollution		
Activity: Solid waste disposal water resources		
Specific Impact: <u>Pollution of freshwater resources</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <ul style="list-style-type: none"> • Solid waste must be kept in adequate waste bins. Construction waste and various waste products must be removed regularly to the closest municipal landfill site. 		

Operational Phase

- There will be no sanitation facilities at the powerline during operation and no water use.

Decommissioning Phase

The decommissioning activities of the powerline mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

Decommissioning Phase Impacts

Impact: Groundwater and Surface Water Pollution		
Activity: Spillage of fuel and lubricants from construction vehicles and fuel tanks		
Specific Impact: <u>Groundwater Pollution</u>		
	Without Mitigation	With Mitigation
Severity	Medium – 3	Low-Medium – 2
Duration	Medium – 5	Medium – 5
Extent	Low – 1	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low -Medium – 2	Low – 1
Significance	Low-Medium – 6.5	Low – 3
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Drip pans should be used during re-fuelling and servicing of construction vehicles. Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products. • Oil traps must be installed in the vehicle wash bay to prevent pollution. Oil traps must be serviced on a regular basis by an approved service agent. • Any spills must be treated and removed by a qualified agent. 		

Impact: Groundwater and Surface Water Pollution		
Activity: Building rubble disposal water resources		
Specific Impact: <u>Pollution of freshwater resources</u>		
	Without Mitigation	With Mitigation
Severity	Medium – 3	Low-Medium – 2
Duration	Medium – 5	Medium – 5
Extent	Low – 1	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low -Medium – 2	Low – 1
Significance	Low-Medium – 6.5	Low – 3
Status (Positive or Negative)	Negative	Negative

Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> Building rubble must be kept in adequate waste bins. Construction waste and various waste products must be removed regularly to the closest municipal landfill site. 		

10.3.4 WATER USE / WATER QUANTITY

Listed Activity:

Listing Notice 2, Activity 15 - The clearance of an area of 20 hectares or more of indigenous vegetation.

Construction Phase

During this phase, water consumption will be the highest because it will be utilized for gravel roads and building construction.

Construction Phase Impacts

Impact: Water Use		
Activity: Construction Process		
Specific Impact: <u>Water Consumption</u>		
	Without Mitigation	With Mitigation
Severity	Medium – 3	Low -Medium – 2
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low -Medium – 2
Frequency	Medium – High – 4	Low – Medium – 2
Probability	Medium – 3	Low – 1
Significance	Medium – 11.37	Low – 4.12
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> Water should be used sparingly, and it should be ensured that no water is wasted. Water use in construction must be managed in such a way that there is no wastage of water as a resource. Washing of construction vehicles should be limited to once or twice a month and must be done with high-pressure sprayers to reduce water consumption. 		

Impact: Water Use		
Activity: Dampening of cleared areas to prevent dust pollution		
Specific Impact: <u>Water Consumption</u>		
	Without Mitigation	With Mitigation
Severity	Medium – 3	Low -Medium – 2
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low -Medium – 2
Frequency	Medium – High – 4	Low – Medium – 2
Probability	Medium – 3	Low – 1
Significance	Medium – 11.37	Low – 4.12
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> Roads must be treated with chemicals to lower water use for dust suppression. 		

Operational Phase

There will be NO water use during the construction phase.

Decommissioning Phase

The decommissioning activities of the PV plant mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

Decommissioning Phase Impacts

Impact: Water Use		
Activity: Decommissioning Process		
Specific Impact: <u>Water Consumption</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes

Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> Water should be used sparingly, and it should be ensured that no water is wasted. Water use in construction must be managed in such a way that there is no wastage of water as a resource. Washing of construction vehicles should be limited and must be done with high-pressure sprayers to reduce water consumption. 		

Impact: Water Use		
Activity: Dampening of cleared areas to prevent dust pollution		
Specific Impact: <u>Water Consumption</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – Medium – 2	Low – 1
Significance	Low-Medium – 5.5	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> Roads must be treated with chemicals to lower water use for dust suppression. 		

10.3.5 ARCHAEOLOGICAL, CULTURAL AND SOCIAL FEATURES

Listed Activity:

Listing Notice 1, Activity 11 (i) - The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.

Listing Notice 2, Activity 15 - The clearance of an area of 20 ha or more indigenous vegetation.

Construction Phase

The clearing of the site may have a negative impact on the archaeological features of the site. Care must be taken in the excavations and moving of soil to observe any other archaeological, previously undetected, features of importance, which must be left and reported to the archaeological consultant for comments and actions.

Construction Phase Impacts

Impact: Loss of Archaeological, Cultural and Social Features		
Activity: Earth moving and soil clearance		
Specific Impact: <u>Destroy Archaeological Evidence and Heritage</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low-Medium – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage resources in case heritage resources are uncovered during construction. Any changes to the layout should be subjected to a heritage walkdown prior to development. The ECO must contact the archaeologist on standby in the case of finds. The latter will liaise with SAHRA on the nature of the find and suitable consequent actions, must be taken, such as an immediate site inspection and/or application for an archaeological collection permit. Care must be taken during construction that anything else of archaeological value that is unearthed must be recorded. The archaeologist or SAHRA must be notified whenever anything of importance is discovered. 		

Impact: Loss of Archaeological, Cultural and Social Features		
Activity: Earth moving and soil clearance		
Specific Impact: <u>Impact of Palaeontological Resources</u>		
	Without Mitigation	With Mitigation
Severity	Low – 1	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Medium – 3
Frequency	Low – 1	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 2.75	Low – 2.75
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No

Can impacts be mitigated?	YES
<p>Mitigation:</p> <ul style="list-style-type: none"> It is not feasible for a specialist monitor to be continuously present at the earth works and therefore, personnel must be involved in mitigation by watching for fossils. Follow the steps outlined in the Chance Find Protocol in the Paleontological report if any fossilised remains are found. The ECO must contact the palaeontologist contracted to be on standby in the case of finds. The latter will liaise with SAHRA on the nature of the find and suitable consequent actions, must be taken, such as an immediate site inspection and/or application for a palaeontological collection permit. 	

Operational Phase

Operational phase will not have any negative impact on archaeological features of the site if the recommendations of the Heritage and Palaeontological Impact Assessment are adhered to.

10.3.6 IMPACT OF THE DEVELOPMENT ON ECOLOGY (FAUNA & FLORA) OF THE AREA

Listed Activity:

Listing Notice 1, Activity 12 (xii) (c) - The development of infrastructure or structures with a physical footprint of 100m² or more; within 32m of a watercourse, measured from the edge of a watercourse.

Listing Notice 2, Activity 15 - The clearance of an area of 20 ha or more indigenous vegetation.

Planning and Construction Phase

The removal of natural vegetation and destruction of habitat will have a negative effect on the biodiversity and is part of a cumulative effect together with other renewable energy development projects in the area. It is though partly on agricultural lands areas which has a LOW -MODERATE agricultural potential. The specific mitigation measures included in the Ecological and Avifauna Impact Assessment (Annexures D, E & F) should be adhered to.

Construction Phase Impacts

Impact: Ecology (Fauna and Flora)		
Activity: Earthworks and vegetation clearance at construction site		
Specific Impact: <u>Loss of indigenous plant species & disturbance to sensitive habitats</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25

Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> • Clearance of vegetation should be restricted to footprint area and access roads. • Construction activities should be restricted to the proposed development footprint. -Do not use more agricultural cropland areas than planned for. • No unnecessary clearance of vegetation must be allowed. Where possible, natural vegetation must be retained to limit this impact. • Cleared areas should be rehabilitated by reintroducing a vegetation layer as soon as possible to limit the occurrence of erosion. 		

Impact: Ecology (Fauna and Flora)		
Activity: Vegetation clearance and movement of people on site at development area		
Specific Impacts: Spreading of exotic and/or invasive plant species		
	Without Mitigation	With Mitigation
Severity	Medium – 3	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – High – 4	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – Medium – 2	Low – 1
Significance	Low-Medium – 7	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> • Clearance of vegetation should be restricted to footprint area and access roads. • Construction activities should be restricted to the proposed development footprint. • No unnecessary clearance of vegetation must be allowed. Where possible, natural vegetation must be retained to limit this impact. • Cleared areas should be rehabilitated by reintroducing a vegetation layer as soon as possible to limit the occurrence of erosion. 		

Impact: Ecology (Fauna and Flora)		
Activity: Topsoil & subsoil stripping, exposure of soils to wind and rain during construction causing erosion		
Specific Impacts: <u>Soil erosion</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Cleared areas should be rehabilitated by reintroducing a vegetation layer as soon as possible to limit the occurrence of erosion. • Stockpiled topsoil and construction material must be managed in such a way that material is not transported by wind or rain. Can be done by restricting height of stockpiles, sandbagging and avoiding steep slopes. • No unnecessary clearance of vegetation must be allowed. Where possible, natural vegetation must be retained to limit this impact. • Clearance of vegetation should be restricted to footprint area and access roads. 		

Impact: Ecology (Fauna and Flora)		
Activity: Soil Sterilisation – Land not available for agriculture		
Specific Impacts: <u>Less land available for agricultural development</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 5	Medium – 5
Extent	Medium – 3	Low -Medium – 2
Frequency	Low – Medium – 2	Low – 1
Probability	Medium – 3	Low -Medium – 2
Significance	Low-Medium – 8.75	Low – 4.5
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	

- Mitigation:**
- Clearance of vegetation should be restricted to footprint area and access roads.
 - Construction activities should be restricted to the proposed development footprint. -Do not use more agricultural grazing areas than planned for.
 - No unnecessary clearance of vegetation must be allowed. Where possible, natural vegetation must be retained to limit this impact.
 - Cleared areas should be rehabilitated by reintroducing a vegetation layer as soon as possible to limit the occurrence of erosion.
 - The herbaceous layer should be revived after clearance of the vegetation and actively managed through slashing during the entire lifetime of the project. Small animals like sheep could also graze beneath the panels.

Impact: Ecology (Fauna and Flora)		
Activity: Control of animals on site		
Specific Impacts: <u>Disturbance to and loss of indigenous fauna to the area</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Construction must preferably take place after the bird breeding season. • Speed limit of 30 km/h must be enforced on the roads. • Bird nests found in the construction phase must be reported to the ECO. • Herbicides used to control invasive plant species must be chosen in consultation with an ecologist. Some agents are detrimental to surrounding fauna and flora. • Poisons for control of problem animals must be avoided. The wrong use thereof can have disastrous consequences for raptors occurring in the area. Use of poisons for control of vermin should only be used after approval from an ecologist. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for all applications. • Speed limit of 30km/h on site to avoid collisions with night birds and twilight active birds. • Only power lines structures that are considered safe for birds should be erected to avoid the electrocution of birds (particularly large raptors) perching or attempting to perch. 		

- Where possible the installation of artificial bird space perches or platforms at a safe distance from energised components.
- All probable and high-risk perching surfaces should be fitted with bird guards and perch guards as deterrents.
- Overhead transmission cables should be marked with bird diverters to make the lines as visible as possible to collision-susceptible species.
- No animals may be killed, captured or hunted on site and no wild animal may be fed on site.
- Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and trapped and/or injured. This can be prevented by constant excavating and backfilling of trenches during construction process.

Impact: Ecology (Fauna and Flora)		
Activity: The occurrence of veldt fires		
Specific Impacts: <u>The loss of indigenous fauna and flora</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • No Fires should be allowed in construction camp and care should be taken to prevent veldt fires of occurring. • Firebreaks should comply with the National Veldt and Forest Fire Act, 1998 (Prepare and maintain firebreaks). • Cleared vegetation may not be burned on site and must be stockpiled and distributed to local communities. 		

Operational Phase

Operation of the development can have a negative impact on biodiversity if not managed correctly.

Operational Phase Impacts

Impact: Ecology (Fauna and Flora)		
Activity: Rehabilitation of cleared areas		
Specific Impact: <u>Spreading of exotic invasive plants & Loss of habitat and indigenous flora</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	High – 5	High – 5
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.875	Low – 2.75
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • The herbaceous layer should be revived after clearance of the vegetation and actively managed through slashing during the entire lifetime of the project to limit open soils which is prone to erosion. • An ecologist must be consulted on use of herbicides/eco-friendly products to control exotic plant species. • The use of eco-friendly products e.g. Organic Compost and/or Effective Microorganisms (EM), which reduces the frequency of application of conventional fertilizers, herbicides and insecticides, should be promoted. 		

Impact: Ecology (Fauna and Flora)		
Activity: The occurrence of veldt fires		
Specific Impact: <u>The loss of indigenous fauna and flora</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	High – 5	High – 5
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.875	Low – 2.75
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Firebreaks should comply with the National Veldt and Forest Fire Act, 1998 (Prepare and maintain firebreaks). 		

Impact: Ecology (Fauna and Flora)		
Activity: Birds colliding with power line		
Specific Impact: <u>Electrocution of birds</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	High – 5	High – 5
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.875	Low – 2.75
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> • Report all incidences of collisions of birds with panels. • All probable and high-risk perching surfaces should be fitted with bird guards and perch guards as deterrents. • Where possible the installation of artificial bird space perches or platforms at a safe distance from energised components. • Overhead transmission cables should be marked with bird diverters to make the lines as visible as possible to collision-susceptible species. 		

Decommissioning Phase

The decommissioning activities of the PV plant mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

Decommissioning Phase Impacts

Impact: Ecology (Fauna and Flora)		
Activity: Earthworks and Removal of Infrastructure		
Specific Impact: <u>Loss of indigenous plant species & disturbance to sensitive habitats</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25

Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation: <ul style="list-style-type: none"> • The removal of infrastructure on site should be done in phases as the decommissioning progresses. • The building rubble must be stock-piled and should be removed at regular intervals. • The disturbed areas must be revegetated immediately after the infrastructure has been removed from site to prevent soil erosion and limit invasive plants to germinate on disturbed areas. 		

10.3.7 VISUAL IMPACTS

Listed Activity:

Listing Notice 1, Activity 11 (i) - The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.

Construction Phase

The natural aesthetic character of the site will change. However, the local communities will be informed of the development stages and impacts on them during the construction phase.

Construction Phase Impacts

Impact: Visual Disturbance		
Activity: Buildings & Panels		
Specific Impact: <u>Visual</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low – Medium – 2
Frequency	Low – Medium – 2	Low – 1
Probability	Medium – 3	Low – Medium – 2
Significance	Low-Medium – 7.5	Low – 3.75
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		

- Only the footprint and a small “construction buffer zone” around proposed components are exposed and natural occurring vegetation, should be retained.
- Revegetate bare areas with vegetation occurring naturally in the area.
- Ensuring that cut to fill areas (if any) are revegetated with indigenous species that relate to the original vegetation types, as soon as possible after the establishment of terraces/roads/parking areas.
- Structures should be painted to mimic the hues of existing vegetation, specifically warehouses, workshops and control buildings associated with substation.
- Construction camp areas should either be screened or positioned in areas where they would be less visible from human settlements and main roads.

Impact: Visual Disturbance		
Activity: Lights		
Specific Impact: <u>Visual</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Medium – 3	Low – Medium – 2
Frequency	Low – Medium – 2	Low – 1
Probability	Medium – High – 4	Low – Medium – 2
Significance	Low-Medium – 9	Low – 3.75
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond immediate surrounds of project site and aimed away from public roads and areas around the site. Minimise lighting to security lighting. • Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on illegal entry to the site. • Minimise number of light fixtures to the bare minimum and connecting these lights to motion sensors in order to limit light pollution. 		

Operational Phase

Buildings and the solar modules have a visual impact to surrounding properties and to the sensitive viewers around the project site and lights at night can be a nuisance.

Impact: Visual Disturbance		
Activity: Lights		
Specific Impact: <u>Visual</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 5	Medium – 5
Extent	Medium – 3	Low – Medium – 2
Frequency	Low – Medium – 2	Low – 1
Probability	Low – Medium – 2	Low – 1
Significance	Low-Medium – 7	Low – 3
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on illegal entry to the site. • Minimise number of light fixtures to the bare minimum and connecting these lights to motion sensors in order to limit light pollution. 		

10.3.8 SAFETY, HEALTH, SECURITY AND FIRE HAZARDS

Listed Activity:

Listing Notice 1, Activity 11 (i) - The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.

Listing Notice 2, Activity 15 - The clearance of an area of 20 ha or more indigenous vegetation.

Construction Phase

Construction activities such as excavating of foundations and trenches, movement of construction vehicles, the use of equipment and the congregation of workers and staff on site increases the risk of injury. The activities of construction personnel on site may contribute to an increase in the level of crime in the area and may also contribute to an increased fire risk.

Construction Phase Impacts

Impact: Safety, Health, Security and Fire Hazards		
Activity: Construction activities – excavation of foundations, trenches etc.		
Specific Impact: <u>Loss or injury to human life</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> The Contractor shall conform to Occupational Health and Safety Act, 1993 (Act 85 of 1993) and regulations. Act requires designation of a Health and Safety representative when more than 20 employees are employed. Open trenches or excavations must be marked with danger tape or safety netting and must be filled and compacted as soon as possible. 		

Impact: Safety, Health, Security and Fire Hazards		
Activity: Security		
Specific Impact: <u>Crime</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		

- Mitigation measures is required in the form of equipment design and on-site security. To ensure the panels and equipment are well protected.
- Number of construction workers to stay on site should be limited to the minimum.
- Proper access control (I.D. cards) should be enforced to ensure that no authorised persons enter the site.
- A security fence should be constructed along the boundary of the development.

Impact: Safety, Health, Security and Fire Hazards		
Activity: Fire Hazards		
Specific Impact: <u>Loss of human life and construction equipment etc.</u>		
	Without Mitigation	With Mitigation
Severity	Low – Medium – 2	Low – 1
Duration	Medium – 3	Medium – 3
Extent	Low – Medium – 2	Low – 1
Frequency	Low – Medium – 2	Low – 1
Probability	Low – 1	Low – 1
Significance	Low – 4.12	Low – 2.25
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • No solid waste or vegetation may be burnt on the premises or surrounding areas. • Firebreaks should comply with the National Veldt and Forest Fire Act, 1998. • Fire extinguishers and fire-fighting equipment must be available. 		

Operational Phase

NO access should be allowed in the powerline corridor and therefore there will be no human activity during the operational phase.

10.3.9 SOCIO-ECONOMIC IMPACT

Listed Activity:

Listing Notice 2, Activity 1 - The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 MW or more.

Construction phase

Construction and operation phases will have a **positive impact** on socio-economic environment through employment opportunities and training and skills development.

Construction Phase Impacts

Impact: Job Creation		
Activity: Job creation		
Specific Impact: <u>Job creation</u>		
	Without Mitigation	With Mitigation
Severity	High – 5	High – 5
Duration	Medium – 3	Medium – 3
Extent	Medium – High – 4	Medium – High – 4
Frequency	Medium – High – 4	Medium – High – 4
Probability	High – 5	High – 5
Significance	Medium – High – 18+	Medium – High – 18+
Status (Positive or Negative)	POSITIVE	POSITIVE
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> Jobs must be created for unemployed local people and skills must be transferred to them. Where viable, the work must be executed in a labour-intensive manner to create as many jobs as possible. 		

Operational phase

A small number of permanent jobs will be created for Eskom employees. No further job opportunities will become available.

Decommissioning Phase

The decommissioning activities of the PV plant mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

Decommissioning Phase Impacts

Impact: Job Creation		
Activity: Job creation		
Specific Impact: <u>Job creation</u>		
	Without Mitigation	With Mitigation
Severity	High – 5	High – 5
Duration	Medium – 3	Medium – 3
Extent	Medium – High – 4	Medium – High – 4
Frequency	Medium – High – 4	Medium – High – 4
Probability	High – 5	High – 5
Significance	Medium – High – 18+	Medium – High – 18+
Status (Positive or Negative)	POSITIVE	POSITIVE
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> Jobs must be created for unemployed local people and skills must be transferred to them. Where viable, the work must be executed in a labour-intensive manner to create as many jobs as possible. 		

11 ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

Cumulative impacts are assessed within the context of the extent of the proposed development within a 30 km radius in relation to general habitat loss and disturbance resulting from other anthropogenic activities in the area. The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline.

Cumulative impacts were assessed in relation to other renewable energy developments in the proximity from the proposed Mopane Powerline. Mitigation measures are proposed, in order to mitigate the impacts that may result from the establishment of the Mopane Powerline to an acceptable level.

The general approach to this study has been guided by the principles of Integrated Environmental Management (IEM). In accordance with the IEM Guidelines issued by the previously called DEA, an open approach, which encourages accountable decision-making, was adopted.

The principles of the IEM require:

- informed decision-making.
- accountability for information on which decisions are made;
- a broad interpretation of the term "environment";
- an open participatory approach in the planning of proposals.
- consultation with I&APs;
- due consideration of alternatives;
- an attempt to mitigate negative impacts and enhance positive impacts of proposals;
- an attempt to ensure social costs of developments are outweighed by social benefits;
- democratic regard for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of proposals; and
- the opportunity for public and specialist input in the decision-making process.

The combined, incremental effects of human activity, referred to as cumulative impacts, may pose a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources, and can result in the degradation of important resources.

Method and process used for assessment of cumulative impacts at Mopane Powerline:

Step 1: Initiate the process by identifying possible cumulative impacts of the proposed project on the surrounding environment at the project location. The possible cumulative impacts can be selected based on information related to current or anticipated future conditions, the occurrence of protected species or habitats, and the presence or anticipated presence of other human activities that would (adversely) affect the same environment. Once the possible cumulative impacts have been selected, they should be subject to each of the following five steps.

Identified possible cumulative impacts:

- Visual impact
- Loss of Agricultural Resources
- Loss of Biodiversity
- Increase in Traffic Impact
- Increased positive Socio-economic Impact

Step 2: Identify other past, present, and reasonably foreseeable future actions within the space and time boundaries that have been, are, or could contribute to cumulative effects in the area. Based on this knowledge, identify appropriate spatial and temporal study boundaries.

- Visual impact
- Loss of Agricultural Resources
- Loss of Biodiversity
- Increase in Traffic Impact
- Increased positive Socio-economic Impact

Step 3: For the identified cumulative impacts, assemble appropriate information and describe and assess the historical to current conditions of the area. The historical information should coincide with the selected past temporal boundary (or historical reference point). Further, and depending upon the availability of information, any identified trends in the conditions of the area should be identified.

Step 4: Numerous types of tools could be used to establish either descriptive or quantitative connections. Predictions related to future cumulative impacts, resulting from multiple actions may be problematic due to the absence of detailed information; however, identification of changes in the environment and their indicators can be useful. Finally, emphasis should be given to the anticipated cumulative impacts.

Step 5: Assess the significance of the cumulative effects. Such significance determinations should begin with the incremental effects (the direct and indirect effects) of the proposed development on the directly surrounding areas. The concept of environmental sustainability (including social and economic sustainability) could be considered both in relation to incremental effects and cumulative effects.

Step 6: For negative incremental impacts from the proposed project and for which the cumulative effects are significant, develop appropriate action-specific mitigation measures for such impacts. Further, if significant cumulative effects are anticipated consideration should be given to multi-stakeholder collaboration to develop joint cumulative effects management measures, either locally or regionally, or both. Finally, multi-stakeholder collaboration in follow-up activities can be both cost-efficient and an aid in local and regional planning.

Environmental Assessment Framework and Cumulative Effects Assessment (A tool to be used as referred to in Step 4):

1. Scoping.
2. Analysis.
3. Mitigation.
4. Significance.
5. Follow-up.

According to the DFFE database, no wind and solar projects were proposed within 30 km from the project site or has applied for an Environmental Authorisation.

The preferred powerline corridor will run adjacent to a current Eskom powerline. The alternative follows a new route where there are no Eskom infrastructure.

11.1 CUMULATIVE IMPACTS ON THE ECOLOGY (FAUNA & FLORA)

This section describes the cumulative potential impacts of the project on the ecology (Fauna & Flora). Cumulative impacts are assessed in context of the proposed development area, other developments in the area, as well as general habitat loss and transformation resulting from other activities in the area.

Any impact can be related to certain aspects of human activities in this environment and this impact can be either positive or negative. It could also affect the environment directly or indirectly and the effect of it can be cumulative. There are three major categories of impacts on biodiversity namely:

- Impacts on habitat resulting in loss, degradation and / or fragmentation.
- Direct impacts on fauna and flora and species, for example plants and animals that are endemic/threatened/special to a habitat will not be able to survive if that habitat is destroyed or altered by the development.
- Impact on natural environmental processes and ecosystem functioning. This can lead to an accumulated effect on both habitat and species.

This biodiversity assessment focused on the description of ecosystem- and species-related biodiversity. It can be expected that if ecosystem diversity is managed effectively, species and genetic diversity should also be protected. Emphasis was therefore placed on the ecosystem diversity (landscape/habitat types) within the proposed development area, with reference to biota observed and expected to utilise these landscapes or habitat types.

Impact: Direct Habitat Destruction		
The development of the proposed Mopane powerline will contribute to cumulative habitat loss within the Welverdiend area and Critical Biodiversity Area.		
	Overall impact of the proposed development considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Very Low	Low
Duration	Low-Medium	Medium
Magnitude	Low	Low
Probability	Medium	Medium
Significance	Low-Medium	Medium
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	YES	
Mitigation:		
<ul style="list-style-type: none"> • The removal of indigenous plants should be kept to a minimum necessary. • Peripheral impacts around the development footprint on surrounding vegetation of the area should be avoided and a monitoring programme should be implemented to ensure impacts are kept to a minimum. • During construction, sensitive habitats must be avoided by construction vehicles and equipment, where possible. • All development activities should be restricted to specific recommended areas. 		

11.2 CUMULATIVE IMPACTS ON AQUATIC ECOLOGY

A background study of relevant national, provincial and municipal datasets (such as the National Freshwater Ecosystem Priority Areas [NFEPA] 2011 database; The National Wetland Map 5 (2018), the North-West Biodiversity Spatial Plan (2015) and the Gauteng Province C-Plan (2011)) was undertaken to aid in defining presence of any freshwater ecosystems prior to the site survey of the study area as well as the associated 500 m investigation area.

Both alternative powerline corridors cross drainage lines and rivers at two locations. For the preferred route there is already a powerline crossing a tributary of the Moorivierloop and the

preferred route will run adjacent to this powerline. For the alternative which is not preferred, there will be two new crossings in areas which has not been disturbed before.

The cumulative impact on the freshwater environment will only be at one point where the current Eskom powerline crosses a stream and where the preferred alternative will cross, as well. Impacts on freshwater features will be insignificant.

11.3 CUMULATIVE IMPACTS ON AVIFAUNA

This section describes the potential cumulative impacts of the project on the local and regional avifauna community.

Localised cumulative impacts include those from operations that are close enough to potentially cause additive effects on the local environment or any sensitive receivers (such as nearby large road networks, other solar PV facilities, and power infrastructure, agricultural loss). Long-term cumulative impacts associated with the site development activities can lead to the loss of endemic and threatened species, including natural habitat and vegetation types, and these impacts can even lead to the degradation of conserved areas such as the adjacent game parks and reserves.

The total area within the 30 km buffer around the project area amounts to 30,000 ha, but when considering the transformation (11539 ha) that has taken place within this radius, 18461 ha of intact habitat remains according to the 2018 National Biodiversity Assessment. Therefore, the area within 30 km of the project has experienced approximately 38.5% loss of natural habitat. Considering this context, the project footprint for Mopane Solar PV 1 is 185 ha, Mopane Solar PV 2 is 180 ha, Mopane Solar PV 3 is 245 ha, Mopane Solar PV 4 is 181 ha and Mopane Solar PV 5 is 182 ha in the 30 km region measuring a maximum of 17472 ha, which includes the project area (as per the latest South African Renewable Energy EIA Application Database). This means that the total amount of remaining habitat lost as a result of solar projects in the region amounts to 41.8% (the sum of all related developments as a percentage of the total remaining habitat).

Approximately, 38.5% of the habitat has already been lost, and as discussed above the proposed solar developments will result in a cumulative loss of approximately 41.8% from only similar developments. This means that the careful spatial management and planning of the entire region must be a priority, and existing large infrastructure projects must be carefully monitored over the long term. However, it is extremely difficult to calculate the cumulative impact of the proposed power line. Therefore, by minimising the distance between existing power lines will minimise the cumulative impact of the connection power line.

Impact: Avifauna		
The development of the proposed Mopane Powerline will contribute to cumulative impact on the avifauna within the Welverdiend area.		
	Overall impact of the proposed development considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Very Low	Low
Duration	Low-Medium	Medium
Magnitude	Low	Low
Probability	Medium	Medium
Significance	Medium	Medium
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <ul style="list-style-type: none"> • Bird nests found during the construction phase must be reported to the ECO. • Report all incidences of collisions of birds with panels. • Panels should be tilted towards the vertical when not in use. • All probable and high-risk perching surfaces should be fitted with bird guards and perch guards as deterrents. • Where possible the installation of artificial bird space perches or platforms at a safe distance from energised components. • Only power lines structures that are considered safe for birds should be erected to avoid the electrocution of birds (particularly large raptors) perching or attempting to perch. • Overhead transmission cables should be marked with bird diverters to make the lines as visible as possible to collision-susceptible species. 		

11.4 CUMULATIVE IMPACTS ON LAND USE, SOIL AND AGRICULTURAL POTENTIAL

Considering that re-growth of grass will take place under the powerline, the grazing value of the land will still be available to cattle and small livestock such as game, goats and sheep. At the end of the lifetime of the powerline, structures will be removed, and natural vegetation will re-establish naturally. The grazing value of the land can therefore be increased by using planted pasture underneath the powerline. The nature of the vegetation at the farm is therefore marginal for extensive livestock production. Using planted pasture to supplement livestock production is however possible but this could be constrained by high demand for irrigation water due to the shallow and often sandy nature of the soil and relatively higher day temperatures in summer.

The impacts associated with the proposed development on the agro-ecosystem capability will depend on the specific area where the development will take place.

The following list of impacts is anticipated with the proposed developments on the soils and land capability in the area during the construction phase:

- Disturbance of soils (Soil compaction, erosion and crusting).
- Loss of current and potential agricultural land.

Mitigation measures are provided that would reduce these impacts from a higher to a lower significance. Furthermore, the proposed layout plan of the solar development should be consistent with the agro-ecosystem maps and recommendations stipulated in this report, and the impact on the sensitive soil forms on site should be kept to a minimum.

11.5 CUMULATIVE IMPACTS ON HERITAGE (INCLUDING ARCHAEOLOGY, PALAEOLOGY AND CULTURAL LANDSCAPE)

The proposed project will have a low cumulative impact as no significant heritage resources will be adversely affected.

11.6 CUMULATIVE VISUAL IMPACTS

Cumulative landscape and visual effects (impacts) result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future. They may also affect how the landscape is experienced, and cumulative effects may be positive or negative. Where they comprise a range of benefits, they may form part of the mitigation measures.

Cumulative effects can arise from intervisibility of a range of developments and the combined effects of individual components of the proposed development (all five phases of the project) occurring in different locations or over a period of time. The separate effects of such individual developments may not be significant, but they may adversely impact visual receptors within their combined visual envelopes. Intervisibility depends upon general topography, aspect, vegetative cover or other visual obstruction, elevation and distance, as this affects visual acuity, which is also influenced by weather and light conditions.

Cumulative impact of the Project is potentially MODERATE when the five phases are considered along with the 275kV connector powerline. The intervisibility and the Project along with the other solar PV projects (solar projects are proposed to the immediate north of Mopane Solar PV 4 and Mopane Solar PV 5 and to the south east of the project sites north and south of Carmel substation and immediately west of Carletonville north and south of the R501), would over time, result in the nature and character of the sub-region being impacted in a manner beyond the anticipated moderate cumulative negative impact of the proposed Project alone.

The combined effect of approved, pending and proposed solar power developments would cause a change the nature, sense of study and character of the sub-region’s landscape’s baseline.

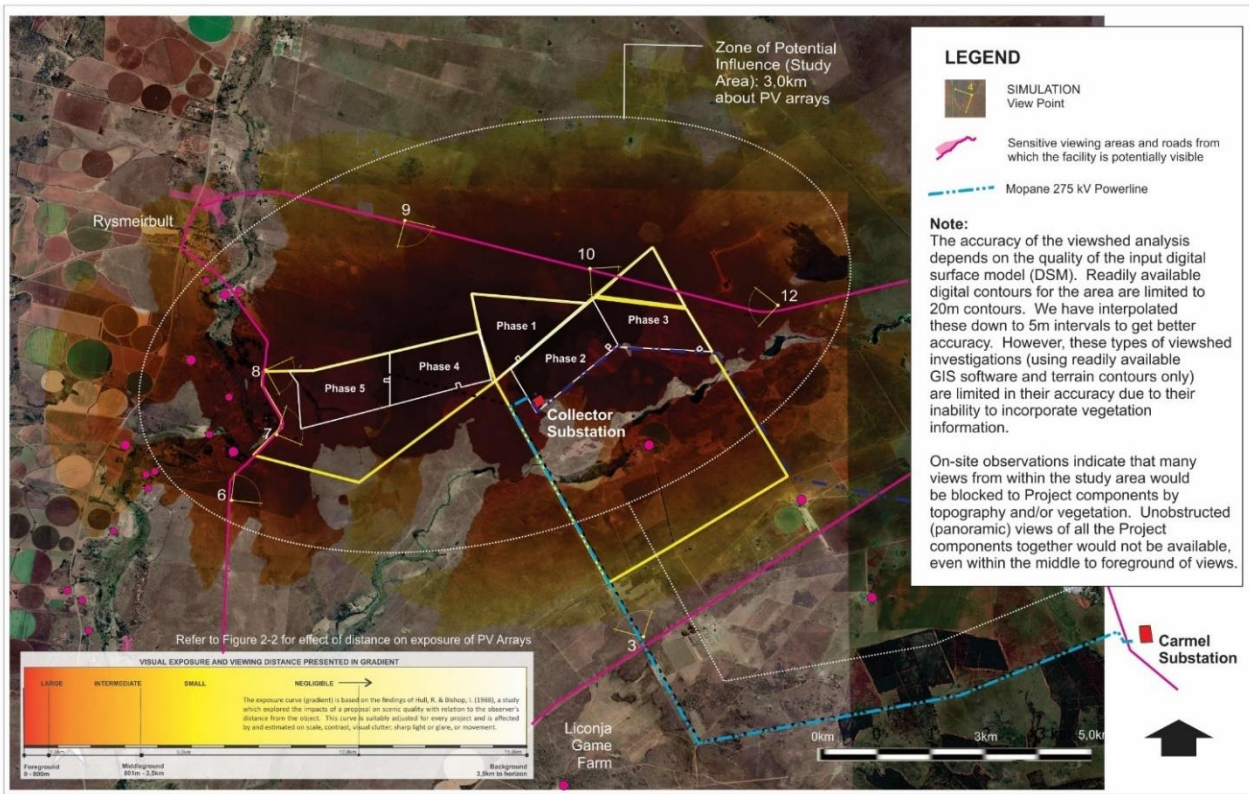


Figure 9. Indication of the combined visual effect of all phases of the project

The significance of the cumulative impact of these projects on the visual environment during their operational phases is assessed to have a moderate intensity and over the long-term with an unmitigated sub-regional impact extending beyond the site (to at least 3,0km beyond site boundaries) and is assessed to be MODERATE.

Impact: Visual		
The development of the proposed Mopane Powerline will contribute to cumulative impact on the visual within the Welverdiend area.		
	Overall impact of the proposed development considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low	Medium
Duration	Low-Medium	Medium
Magnitude	Medium	Medium
Probability	Low-Medium	Medium
Significance	Medium	Medium
Status (Positive or Negative)	Negative	Negative
Reversibility	Yes	Yes

Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <ul style="list-style-type: none"> • Only the footprint and a small “construction buffer zone” around proposed components are exposed and natural occurring vegetation, should be retained. • Revegetate bare areas with vegetation occurring naturally in the area. • Ensuring that cut to fill areas (if any) are revegetated with indigenous species that relate to the original vegetation types, as soon as possible after the establishment of terraces/roads/parking areas. • Structures should be painted to mimic the hues of existing vegetation, specifically warehouses, workshops and control buildings associated with substation. 		

11.7 CUMULATIVE SOCIO-ECONOMIC IMPACTS

The socio-economic impact of the proposed Mopane Powerline project is considered positive, and the application is supported, provided that all the mitigation measures proposed by specialist consultants are implemented.

Impact: Socio-economic		
The establishment of a number of renewable energy facilities in the Welverdiend area will create employment, skills development and training opportunities.		
	Overall impact of the proposed development considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Medium-High	High
Duration	High	High
Magnitude	High	High
Probability	High	High
Significance	High	High
Status (Positive or Negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <ul style="list-style-type: none"> • Jobs must be created for unemployed local people and skills must be transferred to them. • Where viable, the work must be executed in a labour-intensive manner to create as many jobs as possible. 		

11.8 CONCLUSION REGARDING CUMULATIVE IMPACTS

Cumulative impacts are expected to occur with the development of the Mopane Powerline throughout all phases of the project life cycle and within all areas of study considered as part of this EIA report. The main aim for the assessment of cumulative impacts considering the Mopane Powerline is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change. The following conclusions can be drawn regarding cumulative impacts associated with the project:

- There will be no unacceptable loss or impact on ecological aspects (vegetation types, species and ecological processes) due to the development of the Mopane Powerline and other renewable energy facilities within the surrounding area, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
- There will be no significant loss of sensitive and significant aquatic features, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
- There will be no unacceptable risk to avifauna with the development of the Mopane Powerline and other renewable energy projects within the surrounding area, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
- There will be no unacceptable loss of land capability due to the development of the Mopane Powerline and other renewable energy projects within the surrounding areas, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
- Change to the sense of place and character of the area is expected with the development of renewable energy facilities. However, the change is not considered to be a fatal flaw.
- There will be no unacceptable loss of heritage resources associated with the development of the Mopane Powerline and other developments within the surrounding areas. The cumulative impact is therefore acceptable.
- No unacceptable socio-economic impacts are expected to occur. The cumulative impact is therefore acceptable.
- No unacceptable impacts to the traffic network are expected to occur with the development of the Mopane Powerline and other renewable energy projects within the surrounding areas. The cumulative impact is therefore acceptable.

Positive cumulative impacts are expected to occur from a socio-economic perspective. These impacts will range from a medium to high significance depending on the impact being considered.

All cumulative impacts associated with the Mopane Powerline will be of low to medium significance, with impacts of a high significance associated with bats cumulative impacts. A summary of the cumulative impacts is included in Table 14.

Table 11. Summary of cumulative impact significance for Mopane Powerline in the project site

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low-Medium	Medium
Avifauna	Medium	Medium
Land use, soil and agricultural potential	Low	Low-Medium
Visual	Medium	Medium
Socio-Economic	High	High

12 SUMMARY AND FINDINGS AND RECOMMENDATIONS OF SPECIALIST REPORTS AND HOW FINDINGS HAVE BEEN INCLUDED IN THE ASSESSMENT REPORT

The main issues identified as a result of the specialist studies include the following:

- Visual impacts
- Soil erosion (Wind and water)
- Impact on biodiversity (bird collisions)
- Agricultural land availability
- Archaeological sites
- Paleontological finds

SPECIALIST	FINDINGS	RECOMMENDATIONS
<p>Landscape Architect: Visual Impacts</p>	<p>The existing visual condition of the landscape that may be affected by the proposed Mopane Powerline has been described. Sensitive viewing areas and landscape types have been identified and mapped, indicating potential sensitivity to the project.</p> <p>Impact on the visual environment during <u>construction phase</u> is assessed to have a low intensity over a localized area and would occur over the short-term resulting in a low consequence. Probability of the unmitigated impact is <i>low</i> resulting in a predicted LOW significance.</p> <p>Mitigation measures would not significantly reduce the anticipated impact and would remain LOW.</p> <p>Impact on the visual environment during <u>operational phase</u> is assessed to have a moderate intensity and would occur over the long-term resulting in a low consequence. Probability of the unmitigated impact is <i>low</i> resulting in a predicted LOW significance.</p>	<ol style="list-style-type: none"> 1. With the preparation of the land, the minimum amount of existing vegetation and topsoil should be removed. 2. Construction site, waste areas, storage areas and ablution facilities, should either be screened or positioned in areas where they would be less visible from the public road north of the project site. 3. Construction activities should be limited to between 08:00 and 17:00 or in conjunction with the ECO. 4. Adopt responsible construction practices that strictly contain the construction/establishment activities to demarcated areas. 5. Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas. 6. Existing vegetation should be retained where possible. 7. All cut and fill slopes (if any) and areas affected by construction work should be progressively top soiled and re-vegetated as soon as possible. 8. Disturbed soil must be exposed for the minimum time possible once cleared to avoid prolonged exposure to wind and water erosion and to minimise dust generation. 9. Lighting should be kept to a minimum.

SPECIALIST	FINDINGS	RECOMMENDATIONS
	<p>Mitigation measures can slightly reduce the visual impact, but it would remain a LOW impact.</p> <p>The nature of the visibility of the project and limited number of people that could be affected, suggests that glint and glare is not a significant issue.</p> <p><i>Visual impacts associated with construction, operation and decommissioning phases can be somewhat mitigated to acceptable levels provided the recommended measures are effectively implemented and managed in the long-term.</i></p>	<p>10. Lighting should be carefully directed and only used where necessary.</p> <p>11. Paint all structures (structural support for the arrays) with colours that reflect and compliment the colours of the surrounding landscape.</p>
Soil Specialist: Soil Potential assessment	<p>The land in general has a low capability for crop cultivation, except under extensive irrigation on large pockets of land and deeper soil forms and can mostly be utilized as grazing for wildlife. The construction of the proposed powerline will result in a partial loss of the land capability as it currently is.</p>	<ol style="list-style-type: none"> 1. Unnecessary soil compaction must be avoided. 2. Minimize the area of land disturbance. 3. Erosion and dust control measures to be implemented. 4. Stormwater management plan to be implemented. 5. Exposed, bare soil must be minimized. 6. Topsoil to be conserved and maintained where possible. 7. Store chemicals on impervious area. 8. Soil pollution to be avoided and prevented. 9. Treat spillages according to correct procedures. 10. Stockpile topsoil separately from subsoil. 11. Restrict development to specific areas.
Archaeologist: Archaeology and graves	<p>During the survey no Earlier Stone Age material was noted and although few diagnostic pieces were recorded in the low-density open-air scatters, the lithics suggest human occupation of the area from the MSA onwards of the area the powerline traverse.</p> <p>Identified features affected by Alternative 2 are stone-walled enclosures.</p>	<ol style="list-style-type: none"> 1. Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction. 2. Final Pylon positions should be subjected to a heritage walkdown prior to development. If any heritage features are then noted micro siting of the powerline to preserve the sites will suffice as a mitigation measure.

SPECIALIST	FINDINGS	RECOMMENDATIONS
<p>Paleontological specialist</p>	<p>The palaeontologist confirmed that weathered dolomites and cherts were fairly common in the area for the proposed solar collectors and substation. NO FOSSILS, such as stromatolites, were seen in the dolomite outcrops. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.</p>	<ol style="list-style-type: none"> 1. It's extremely unlikely that the proposed development will have any effect on palaeontological heritage. However, if fossils are exposed in possible Quaternary alluvial deposits, which are not indicated on the geological map, it will create a unique opportunity to explore the area for fossils. 2. It is thus recommended that, in the unlikely event that fossils are exposed as a result of the powerline development, a qualified palaeontologist must be contacted to assess the exposure for fossils before further activities takes place so that the necessary rescue operations are implemented following the attached Chance Find Protocol (CFP). 3. Depending on the nature of fossils discovered this could entail excavation and removal to a registered palaeontological museum collection.
<p>Avifauna specialist: Impact on biodiversity (bird collisions)</p>	<p>Findings of the relevant impact assessment concluded that the proposed powerline development would have a low to medium impact on the bird communities and will cause a slight impact on the ecological process of the overall bird community. The biggest concern is the threat the power lines within this area hold to threatened species such as vultures korhaans and herons present at the site. Therefore, careful considerations need to be taken in terms of the proposed power line.</p>	<ol style="list-style-type: none"> 1. Put bird diverters on power lines. 2. Put bird guards and perch guards as deterrents on infrastructure. 3. The installation of artificial bird space perches or platforms at a safe distance from energised components 4. Use bird-friendly powerline designs. 5. Keep activities inside development area. 6. Strict environmental control measures to be implemented. 7. Bird nests found must be reported. 8. Limit vehicle speeds on site. 9. Keep lighting to the minimum at night. 10. Report collisions with panels. 11. Train ECO and workforce well.
<p>Ecological specialist</p>	<p>The proposed development activities will modify the vegetation and faunal habitats of the development site to a certain extent varying according to the habitats on the site, although in general the vegetation on site where the development footprint is planned are classified as pristine to slightly degraded.</p>	<ol style="list-style-type: none"> 1. A permit must be obtained from authorities before any protected plants are eradicated. These plants should form part of a rescue and relocation programme should the development activities impact on populations. 2. Natural vegetation removal should be kept to a minimum during any future construction activities and only vegetation in the footprint areas should be removed. The unnecessary impact on the surrounding vegetation types should be avoided as far as possible.

SPECIALIST	FINDINGS	RECOMMENDATIONS
	<ul style="list-style-type: none"> • The Gauteng Biodiversity Conservation Plan indicates that most of the proposed development footprint falls into a CBA2 area, although most of these areas should rather be classified as ESA1 or ESA2 areas. The management objective for this area is to maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern. • The project area is not located within or close to any IBA • Development area does not fall in any area as identified in the Protected Areas Network and National Protected Areas Expansion strategy (NPAES). • The indigenous grassland vegetation units on the proposed development site is not considered a Critical Habitat in line with IFC Performance Standard PS6. 	<p>Considering the footprint area to form part of an area that is degraded, the impact on the vegetation of the larger area would be low.</p> <ol style="list-style-type: none"> 3. A detailed species rescue, relocation and re-introduction plan should be developed and implemented by a qualified person before any excavations or disturbance commences. 4. Mitigation measures and monitoring should be implemented should the development be approved. 5. Where trenches pose a safety risk, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. 6. No animals may be poached during the construction of the solar park. 7. Do not feed any wild animals on site. 8. Waste bins and foodstuffs should be made scavenger proof. 9. Roads in the area should be designed without pavements to allow for the movement of small mammals. 10. Monitoring of the environmental aspects should be done over the longer term to ensure that impacts are limited to a minimum during the construction and operational phases.
<p>Aviation Specialist</p>	<p>There are no Military installations and also no promulgated Danger, Restricted and Prohibited areas according to the South African Civil Aviation Authority (SACAA) listed in the vicinity of the Mopane Powerline.</p>	<p>It will not be necessary to investigate the Obstacle Identification Surfaces of the runway at Carletonville Airport.</p>
<p>RFI & Defence Specialist</p>	<p>All activities identified, is considered to be classified as low sensitivity to RFI.</p> <p>There should be no unacceptable impact on existing and potential, future installations if all equipment to be used permanently or temporarily has acceptable EMI/RFI levels that have been subjected to ICASA requirements and power lines and sub-stations are installed according to ESKOM best practices and standards adopted.</p>	<p>Irrigation installations and other communication equipment could potentially be affected by solar facility equipment. However, in this case, the equipment together with the solar facility control, monitor and security facility will be able to co-exist if they adhere to all ICASA radiation and interference equipment regulations.</p>

SPECIALIST	FINDINGS	RECOMMENDATIONS
Noise Impact Study	<p>Considering the distance of potential noise sources from Noise Sensitive Receptors (NSR), the temporary nature of construction noise impacts as well as the low magnitude of operational noises, the development of the Mopane Powerline is unlikely to influence ambient sound levels at the NSR in the vicinity of the project site.</p>	<p>No further Scoping or other acoustical studies would be required for the proposed development of the Mopane Powerline, and it is recommended that the project be authorized (in terms of acoustics).</p>

13 ENVIRONMENTAL IMPACT STATEMENT

13.1 SUMMARY KEY FINDINGS OF THE EIA

It can be concluded that there will be environmental impacts including cumulative impacts as a result of the proposed development of the Mopane Powerline. However, all the impacts can be mitigated to an extent which would make the development possible. Most of the impacts can be avoided and potential impacted areas such as the heritage site will be demarcated as no-go areas, therefore limiting the possible negative environmental impacts to an acceptable level.

14 FINAL PROPOSED ALTERNATIVES RESPONDING TO IMPACT MANAGEMENT MEASURES, AVOIDANCE AND MITIGATION MEASURES IDENTIFIED IN ASSESSMENT

The preferred alternative was identified after all possible negative impacts were mapped and demarcated as no-go zones.

In order to minimize negative environmental impacts, there are areas that are not available for future developments of any kind. In order to mitigate for most of the negative impacts, avoidance seemed to be the best option in terms of the main issues, including:

- Visual impacts
- Bird collisions - limit occurrences
- Impacts on soils
- Impacts on biodiversity
- Degradation of archaeological sites/paleontology.

15 ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT BY THE EAP OR SPECIALISTS WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

- Archaeological discoveries:
 - If anything of archaeological/paleontological significance is found, the archaeologist as well as SAHRA must be notified immediately.
 - Strict monitoring should be done during the construction phase.
- Eskom-approved; bird friendly devices must be attached to the powerlines to avoid bird collisions.
- Protected plants on site – permit applications and avoidance

An ecologist should be appointed to assist with permit applications as well as assistance on site before construction commences during ground truthing.
- Inform staff of the need to watch for potential fossil occurrences.
- Inform staff of the procedures to be followed in the event of fossil occurrences.

- Monitor for presence of fossils, especially fossil bones
- Obtain permit from SAHRA for collection of fossil finds.
- Traffic Impact:
 - Transport for workers should be by means of arranged or contracted transport. A dedicated public transport loading and off-loading area should be provided on site where workers and visitors can be loaded and off-loaded within a safe and dedicated area.
 - With the provision of the required sight distances at the final proposed access intersection position which would be determined (mitigated) as part of the detail design phase, the impact from a road safety perspective in terms of intersection sight distances would have a low significance.
 - With the provision of a dedicated loading and off-loading area on site as part of the Proposed Development and ensuring that contractors make use of the dedicated area, the impact from a road safety perspective in terms of loading and off-loading workers would have a low significance.

16 ASSUMPTIONS UNCERTAINTIES AND GAPS IN KNOWLEDGE

Uncertainties could be limited by implementing a thorough ground-truthing process before construction commences.

It is assumed that the developer will always act responsibly towards the environment during the development and will comply with the conditions of the environmental authorization at all times.

17 REASONED OPINION FOR AUTHORISATION OF ACTIVITY AND CONDITIONS IN RESPECT OF THAT AUTHORISATION

It is the opinion of the EAP that the environmental impacts associated with the proposed development were identified and that the mitigation measures proposed to mitigate the negative impacts will decrease the environmental negative impacts to acceptable levels.

The EAP respectfully request comments from the competent authority to issue environmental authorisation for the proposed Mopane Powerline, based on the findings included in this Final Impact Assessment Report.

Conditions to be included in the environmental authorisation

- Appoint an environmental control officer on site during construction of the development to monitor the development for compliance with the conditions of the environmental authorization.
- Permits are needed if any protected plants will be affected by the development and consequently have to be removed from the construction area.
- Invader plants must be controlled through removal and destroying the plants.
- Only vegetation inside the development footprint may be removed for construction.
- Preconstruction walk-through of the approved development footprint must be undertaken to ensure that sensitive habitats and species are avoided where possible.
- Permits from relevant authorities must be obtained for the removal or disturbance of any TOPs, Red Data listed or nationally protected species.
- Rehabilitation Plan that guides planting and seeding with indigenous perennial shrubs and succulents from the local area must be developed to avoid erosion and alien invasion.
- Sensitive habitats in close proximity to the development footprint must be avoided or demarcated as No-Go area (i.e. SWSA).
- Suitable bird repelling structures and bird diverters must be considered to avoid collision of birds with the PV facility.
- Pre and Post construction monitoring must be conducted under the guidance of an avifaunal specialist to assess collision rates.
- The development must stay clear of the identified heritage features found on the proposed site.
- Should any previously undetected surface or subsurface paleontological or archaeological material be exposed during development activities, all activities should be suspended, and the archaeological specialist should be notified immediately.

18 PERIOD OF ENVIRONMENTAL AUTHORISATION AND DATE OF CONCLUSION OF ACTIVITY

The period for which the EA is required is for 10 Years from date of Environmental Authorisation.

The date on which the activity will be concluded is in 10 years from date of Environmental Authorisation. Post construction monitoring must be done for at least 2 Years after finalisation of construction.

19 UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

I, Anton von Well, appointed EAP for the proposed Mopane Powerline application for Environmental Authorization, hereby confirm:

- Correctness of the information provided in this report.
- All comments and inputs and responses from stakeholders and I&APs are included here.
- All inputs and recommendations from the specialist reports where relevant, are included.
- Any information provided by the EAP to interested and affected parties and responses by the EAP to comments or inputs made by Interested and affected parties do form part of this Final report.



Signed

Date...06/06/2023.....

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