



Proposed Development of the Hendrina North 132kV Power Line and an On-site Substation associated with the Hendrina Power Station near Hendrina in the Mpumalanga Province

Draft Basic Assessment Report

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KEY PROJECT INFORMATION

TECHNICAL DETAILS:

Component	Description / Dimensions
Project Location	The proposed project is located approximately 15km west of Hendrina, within the Steve Tshwete Local Municipality, in the Nkangala District Municipality, Mpumalanga Province.
Generation Capacity of Substation	33/132kV
Affected Properties	<ul style="list-style-type: none"> • Portion 0 of Farm 162 Eskom; • Portion 11 of Farm 162 Hendrina Power Station; • Portion 8 of Farm 154 Boschmanskop; • Portion 18 of Farm 151 Roodepoort; • Portion 1 of Farm 151 Roodepoort; • Portion 13 of Farm 151 Roodepoort; • Portion 14 of Farm 151 Roodepoort; • Portion2 of Farm 151 Roodepoort; • Portion 1 of Farm 158 Aberdeen; • Portion 1 of Farm 25 Broodsneyersplaats; • Portion 37 of Farm 153 Driefontein; • Portion 17 of Farm 153 Driefontein; • Portion 12 of Farm 153 Driefontein; • Portion of Farm 153 Driefontein; • Portion 0 of Farm 186 Gloria; • Portion 4 of Farm 185 Hartebeestkuil; and • Portion 3 of Farm 185 Hartebeestkuil.
SG Codes	<ul style="list-style-type: none"> • TOIS00000000015300000 • TOIS00000000015100000 • TOIS00000000015400000 • TOIS00000000018500000 • TOIS00000000025000000 • TOIS00000000016200000 • TOIS00000000018600000 • TOIS00000000015800000
Area occupied by Substation	Up to approximately 3 hectares.
Height of Substation	The height of the substation will be confirmed during the final design stages of the substation, prior to construction commencing
Site Access	Provincial and local roads, including existing farm roads, will be utilised, to access the Project as far as possible. New access tracks will only be created where there are no existing roads in place. These roads will be unsurfaced "Jeep" tracks between 4-5m wide and will run beneath the power line within the servitude.
Fencing	No new fencing is envisaged at this stage.
Grid Connection Information	<ul style="list-style-type: none"> ▪ Onsite substation consisting of 33/132kV yard (to be owned by the applicant) and a 132kV switching station yard (to be owned by Eskom) (footprint up to 3ha). The substation will consist of: <ul style="list-style-type: none"> ○ feeder bays, transformers, switching station electrical equipment (bus bars, metering equipment, switchgear, etc.), control building,

Component	Description / Dimensions
	<p>workshop, telecommunication infrastructure, and access roads.</p> <ul style="list-style-type: none"> ○ The substation will include an area with a subterranean earthing mat onto which a concrete plinth will be constructed. ▪ Up to 132kV power line connecting the on-site substation at Hendrina North WEF to the Hendrina Power Station. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 40m. <p>The two alternative grid connection solutions (within a 500m wide corridor) will include:</p> <ul style="list-style-type: none"> ▪ Grid Connection Alternative 1 (Preferred): The proposed power line will be approximately 17km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative is shorter spanning over existing road and farm boundaries. This is the landowners preferred routing. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole. ▪ Grid Connection Alternative 2: The proposed power line will be approximately 20km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative follows an existing dirt road until it meets the Eskom HENDRINA-ABINA 132kV power line. It then follows the Eskom power line into the Hendrina Power Station. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.
Proximity to the Eskom grid	<ul style="list-style-type: none"> ▪ The project location is close to the Hendrina Power Station substation, consequently reducing the length of the power line that will be required for connection and thus reducing the capital costs, energy losses and environmental impact. In addition, further existing power lines are located within proximity to the Project site, allowing for potential direct connection to these existing lines where insufficient allocation may be available at the Hendrina substation, or where Eskom planning indicates different future use.

COORDINATES OF PREFERRED ALTERNATIVES

Table 1: Grid Connection Coordinates

HENDRINA GRID: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
Alternative 1		
POINT	SOUTH	EAST
1	26° 2'2.72"S	29°35'45.32"E
2	26° 1'52.99"S	29°35'10.27"E
3	26° 2'20.74"S	29°34'50.07"E
4	26° 2'26.57"S	29°34'42.15"E
5	26° 2'29.90"S	29°34'40.86"E
6	26° 3'4.53"S	29°34'15.33"E
7	26° 3'19.37"S	29°34'6.92"E
8	26° 5'34.01"S	29°32'44.63"E
9	26° 8'1.36"S	29°33'58.12"E
10	26° 8'49.83"S	29°34'26.10"E
11	26° 9'26.57"S	29°34'39.08"E

HENDRINA GRID: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss) Alternative 2		
POINT	SOUTH	EAST
1	26° 2'2.72"S	29°35'45.32"E
2	26° 1'52.99"S	29°35'10.27"E
3	26° 2'20.74"S	29°34'50.07"E
4	26° 2'26.57"S	29°34'42.15"E
5	26° 2'29.90"S	29°34'40.86"E
6	26° 3'4.53"S	29°34'15.33"E
7	26° 3'36.21"S	29°32'10.94"E
8	26° 3'53.28"S	29°31'48.16"E
9	26° 3'19.37"S	29°34'6.92"E
10	26° 5'34.01"S	29°32'44.63"E
11	26° 8'1.36"S	29°33'58.12"E
12	26° 8'49.83"S	29°34'26.10"E
13	26° 9'26.57"S	29°34'39.08"E

The highlighted option represents the preferred alternative.

Table 2: On-site Substation Coordinate

SUBSTATION SITE COORDINATES		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
	SOUTH	EAST
Corner 1	26° 9'23.72"S	29°34'32.37"E
Corner 2	26° 9'23.96"S	29°34'38.95"E
Corner 3	26° 9'30.18"S	29°34'41.43"E
Corner 4	26° 9'30.48"S	29°34'33.67"E
CENTRE COORDINATES		
Centre	26° 9'26.87"S	29°34'36.76"E

The final design details of the proposed substation and power line will become available during the detailed design phase of the proposed development, before construction commences.

All maps included in the report are included in **Appendix 2**.

ENERTRAG SOUTH AFRICA (PTY) LTD

DRAFT BASIC ASSESSMENT REPORT

EXECUTIVE SUMMARY

INTRODUCTION AND PROJECT DESCRIPTION

ENERTRAG South Africa (Pty) Ltd (hereafter referred to as 'ENERTRAG') is proposing to develop one (1) new 33/132kV on-site substation and/or collector substation as well as one (1) new associated 132kV overhead power line for the proposed Hendrina North Wind Energy Facility (WEF) (part of a separate EIA process / application: **DFFE Reference Number: 14/12/16/3/3/2/2130**), near the town of Hendrina in the Mpumalanga Province of South Africa (hereafter referred to as the 'proposed development') (**Figure 1**). The overall objective of the proposed development is to feed the electricity generated by the proposed Hendrina North WEF into the national grid. The grid connection and 33/132kV on-site substation and/or collector substation (this application) require a separate Environmental Authorisation (EA), in order to allow the EA as well as the proposed infrastructure to be handed over to Eskom.

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental processes for the proposed construction of the Hendrina North On-site Switching / Collector Substation and associated 132kV Power Line. The proposed development requires an EA from the National Department of Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e., the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) will also be consulted. The EIA for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the NEMA. In terms of these regulations, the proposed overhead power line and 33/132kV on-site switching substation / collector substation would be subject to a BA process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 (as amended). All relevant legislation and guidelines will be consulted during the BA process and will be complied with at all times.

The grid connection infrastructure which is part of this application is being proposed to feed the electricity generated by the Hendrina North WEF into the national grid. The Hendrina North WEF will form part of the Renewable Energy Independent Power Producer Programme (REIPPP) in line with the Integrated Resource Plan (IRP). It should be noted that the proposed grid connection infrastructure will be handed over to Eskom once constructed. The on-site and/or collector substation will include an Eskom portion and an Independent Power Producer (IPP) portion. Following construction, the substation will be handed over to Eskom. The current applicant will remain in control of the low voltage components (more specifically the 33kV yard) of the substation, while the high voltage components (i.e., 132kV components) of the substation will likely be ceded to Eskom shortly after the completion of construction.

APPLICABILITY OF NEMA EIA REGULATIONS, 2014 (AS AMENDED IN 2017)

The following activities are applied for:

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended
Relevant Basic Assessment Activities as set out in Listing Notice 1	
11 (i)	GN R. 327 (as amended) Item 11: The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.
12 (ii) (a) (c)	GN R. 327 (as amended) Item 12: The development of: ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.
14	GN R. 327 (as amended) Item 14: The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
24 (ii)	GN R. 327 (as amended) Item 24: The development of a road - ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.
27 (i)	GN R. 327 (as amended) Item 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.
28 (ii)	GN R. 327 (as amended) Item 28: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;
56 (ii)	GN R. 327 Item 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre - (ii) where no reserve exists, where the existing road is wider than 8 metres –
Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended	
None	
Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended	
4 f. (i) (ee)	GN R. 324 (as amended) Item 4: The development of a road wider than 4 metres with a reserve less than 13,5 metres. (f) In Mpumalanga (i) Outside urban areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
10.	GN R. 324 (as amended) Item 10: The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended
	<p>(f) In Mpumalanga</p> <p>(i) Outside urban areas;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>
12 (f) (ii)	<p>GN R. 324 (as amended) Item 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>(f) In Mpumalanga</p> <p>(ii) Within critical biodiversity areas identified in bioregional plans;</p>
14 ii. a.c.f.i. ff	<p>GN R. 324 (as amended) Item 14: The development of:</p> <p>ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs-</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p>(f) In Mpumalanga</p> <p>(i) Outside urban areas;</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>

DETAILS OF ALTERNATIVES CONSIDERED

Layout alternatives have been considered and assessed as part of the BA process. The alternatives which have been considered and assessed as part of the grid connection infrastructure application include two (2) power line corridor route alignment alternatives. All alternatives have been comparatively assessed by the respective specialists and assessed against the 'no-go' alternative (i.e., status quo). The various alternatives are described below:

Grid corridors

Two (2) power line corridor route alignments are being considered and have been comparatively assessed by EAP and specialists as follows:

- **Grid Connection Alternative 1 (Preferred):** The proposed power line will be approximately 17km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative is a shorter span over existing road and farm boundaries. This is the landowners preferred routing. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.
- **Grid Connection Alternative 2:** The proposed power line will be approximately 20km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative follows an existing a dirt road until it meets the Eskom HENDRINA-ABINA 132kV power line. It then follows

the Eskom power line into the Hendrina Power Station. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.

Power line corridors are being assessed to allow flexibility when determining the final route alignment. As mentioned, the power line corridors which are being assessed are up to approximately 500m wide (250m on either side of the power line) to allow for flexibility to route the power line within the assessed corridor. Based on the specialist assessments, a few potentially sensitive and/or 'no-go' areas have been identified within the application site. These areas were used to inform the development area for the substation within the application site as well as the routing of the power line corridors. The identified sensitive / 'no-go' areas were also used to perform a comparison of route alternatives.

SPECIALIST STUDIES

The following specialist studies have been undertaken for the project:

Specialist Study	Findings	Recommendations
Agricultural Assessment	<p>The proposed development will have a low agricultural impact and will therefore be acceptable in terms of its impact on the agricultural production capability of the site. The only impact of this development is the loss of up to 3 hectares of agricultural land on the site of the substation. This is assessed as being of low significance because the amount of land loss is small, and the production potential of the land is limited to being unsuitable for crop production and only suitable as grazing land.</p> <p>The power line itself has insignificant agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath the power line and there will therefore be no loss of agricultural production potential underneath it.</p> <p>The only potential source of impact from the power line is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning).</p> <p>Because of the negligible agricultural impact of the power line, there is no material difference between the agricultural impacts of the proposed route alternatives within the assessed corridor. Both proposed route alternatives are considered equally acceptable in terms of agricultural impact.</p>	<p>The only potential source of impact from the power line is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). This impact can be completely mitigated with standard, generic mitigation measures that are included in the EMPr.</p> <p>From an agricultural impact point of view, it is recommended that the development be approved subject to the condition that the pylon locations minimize agricultural impacts by being located, wherever possible, outside of or on the edges of cropland so that they do not interfere with crop production. Pylon locations should be assessed and approved by an agricultural specialist during the final micro-siting walk-through exercise that occurs after EA and prior to construction. A desktop assessment of the pylon positions using satellite imagery will be adequate for this purpose.</p>

Specialist Study	Findings	Recommendations
Biodiversity Assessment (Flora & Fauna)	<p>Vegetation</p> <p>SANBI and DEAT (2009) and NEMBA, Government Notice 1002 (2011) indicate that the Eastern Highveld Grassland is a Vulnerable ecosystem, as so much is already transformed. On the specific site the vegetation is mostly transformed by agriculture, with very little original natural vegetation remaining.</p> <p>No Irreplaceable CBAs occur along the transect area. A small CBA Optimal site occurs in the wetland in the north, close to the Hendrina Power Station. Most of the transect is Heavily Modified or small local areas Moderately Modified. Most wetlands are classified as Other Natural Areas.</p> <p>The vegetation study of the proposed power line transects resulted in the identification of five different plant communities</p> <ul style="list-style-type: none"> • Agricultural Fields At several places within the study area, cultivated lands were observed under existing power lines. • Dry Grassland Two small patches of Dry Grassland were recognised, one in the north, east of the Hendrina (Pullens Hope) power station, where the proposed power line enters the power station, and the other on the south at the proposed Wind Energy Facility site. The grassland at the northern site is highly disturbed, with several existing power lines crossing the area. The southern Dry Grassland at the proposed Wind Energy Facility site is less disturbed but appears to be secondary, totally dominated by <i>Eragrostis curvula</i> with patches of old planted Kikuyu grass and several scattered weedy species. Two planted exotic trees are present at some old ruins. • Moist Grassland The Moist Grasslands are regarded as wetlands. All wetland systems in South Africa have legal protection (National Water Act (2004). These Grassland therefore have -High ecological sensitivity and therefore High conservation value. 	<p>The construction of the proposed power line can be supported. Care should be taken with positioning of pylons in the larger Moist Grassland areas and the crossing of Drainage Lines.</p> <p>From a biodiversity perspective, there is no objection against the development on condition that the development adheres to the mitigation measures concerning the wetlands on the site.</p>

Specialist Study	Findings	Recommendations
	<p>In some cases, the Moist Grassland has been ploughed. It is suggested that, if feasible, no pylons should be located within pristine (not previously ploughed) Moist Grassland. This may be a problem on Rietfontein and Aberdeen.</p> <ul style="list-style-type: none"> • Drainage Lines The Drainage Lines are all regarded as wetlands. All wetland systems in South Africa have legal protection (National Water Act (2004)). The wetlands within the transect corridor have High ecological sensitivity and therefore High conservation value. It is suggested that, if feasible, no pylons should be located within a drainage line, but the power lines should easily cross over most of the drainage lines on the route. • Pan A single Pan is located just north of the Alternate Route. This pan is added to the report as a cautionary measure, as all pans in the area are regarded to be highly sensitive, with specialised habitat for fauna and flora. The pan edge vegetation is very similar to the Drainage Lines and are not described further. <p>Fauna</p> <ul style="list-style-type: none"> • Mammals Although many mammal species may from time to time occur in the area of the site transect, only few may probably be encountered at any one time. This is due to low densities of small species, not easily seen. Many smaller mammals are either secretive, nocturnal, hibernators and/or seasonal, and some are seasonal migrators. However, by applying the standard methods of deducing probable presence by using the recognised literature on distribution and habitat preferences, and knowledge of habitats present on the site, a list of mammals could successfully be compiled with an acceptable level of confidence. <p>None of the mammal species predicted to visit the area of the site, will be threatened by the construction of the pylons and power line, or the during the operational phase. These mammal</p>	

Specialist Study	Findings	Recommendations
	<p>species are all quite motile and if present in the way of the power line during construction, will easily move away from the danger. Although linear and stretching over about 20 km, the area affected is way too small to affect any of the mammal species.</p> <ul style="list-style-type: none"> • Herpetofauna <p>No threatened herpetofauna species were recorded from the area of the site. Should wetland areas be protected, most herpetofauna species will not be threatened. by the construction of the pylons and power line, or the phase of operation.</p>	
Avifaunal Assessment	<p>The proposed Hendrina WEF grid connection will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> • Displacement due to disturbance associated with the construction of the onsite substation and grid connection power line. • Displacement due to habitat transformation associated with the construction of the onsite substation and grid connection power line. • Collisions with the overhead line in the operational phase. • Electrocutions within the onsite substation. • Displacement due to disturbance associated with the decommissioning of the onsite substation and grid connection power line. 	<p>The proposed project will have a range of pre-mitigation impacts from medium to high on priority avifauna, but it is expected to be reduced to acceptable low levels with appropriate mitigation. No fatal flaws were discovered during the investigations, therefore the authorisation of the project is supported, provided the recommendations in this report is strictly implemented.</p>
Geotechnical Assessment	<p>The site area is underlain by sandstone, shale and coal beds of the Vryheid Formation, Eccca Group, Karoo Supergroup. A particularly significant feature of the formation is the close intercalation of the different rock types within it. It is not unusual for a lenticular body of coarse sandstone to occur within a predominantly finer siltstone horizon, while a weak lens of mudstone or siltstone occurring within a competent layer of sandstone is equally common. Similarly, bands of rock may be laterally discontinuous and may suddenly pinch out and may reappear some distance away.</p> <p>The siltstone and mudrock residual soils are generally soft to stiff, clayey silty to sandy silt material and no excavation difficulties are expected. Hard rock sandstone bands may cause excavation difficult but will provide good founding</p>	<p>No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective.</p> <p>The proposed route alignment corridors are assessed to have a "Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation" provided that the recommended mitigation measures are implemented. The remaining mitigation measures provided to minimise the impacts relate to the appropriate engineering design of</p>

Specialist Study	Findings	Recommendations
	<p>conditions. The dolerite usually occupies the high lying areas and is generally deeply weathered and exhibits loose, red, clayey silt material to depths greater than 3.00 m BGL. Ferricrete usually occurs on the midslopes and adjacent to streams. The ferricrete and sandstone can cause sub-surface flow to become return flow causes seasonal wet conditions at surface. Seasonal wetlands are known to be a common occurrence in this region and geology.</p> <p>The lower-lying valleys, defined by streams, is expected to comprise thick (>1.50 m), unconsolidated, alluvial material. The alluvium may be clayey sand to clayey material and will be variable in composition. No highly expansive or severely collapsible soils are expected to occur on the site. Some low to medium potential expansive may exist on the site. Steep slopes or slope instabilities are not expected anywhere within the corridor areas.</p> <p>Most the corridor areas are accessible via existing good gravel and small farm roads. The quality of the farm roads may vary and becoming non-trafficable during and after heavy rainfall due to loose to soft upper soil. The crop areas that have been ploughed will cause trafficability issues and 4x4 vehicles may bog down in these areas during and after heavy rainfall.</p> <p>These constraints may be mitigated via standard engineering design and construction measures.</p>	<p>earthworks and site drainage, erosion control and topsoil and spoil material management. These do not exceed civil engineering and construction best practices.</p>
<p>Archeological Impact Assessment</p>	<p>The project area is characterised by extensive cultivated fields and is considered to be of low archaeological potential. This was confirmed during the field survey and no archaeological sites of significance were noted and finds were limited to burial sites (Feature 093, 094, 101 and 102) as well as ruins (Feature 089, 090, 091 and 092). Both power line alternatives (alternative 1 & 2) will direct impact the potential grave at Feature 101 and the cemetery at Feature 102. The line should be micro sited to ensure avoidance of both sites with a 30-meter buffer zone. A secondary impact to ruins (089, 090, 091 and 092) and graves (093 and 094)</p>	<p>The impact to heritage resources can be mitigated to an acceptable level provided that the below recommendations are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> Recorded ruins (089, 090, 091 and 092) and burial sites (093 and 094) must be indicated on

Specialist Study	Findings	Recommendations
	<p>is possible but unlikely due to the distance from the power line (between 50 and 130 meters respectively). Although of low significance the possible presence of graves at the ruins is a risk, and the indirect impact for both graves and ruins is rated as low.</p>	<p>development plans and avoided during construction with a 30 m buffer.</p> <ul style="list-style-type: none"> • The line should be micro sited at Feature 101 and 102 so that the graves can be retained with a 30m buffer zone. • Implementation of the ENERTRAG Chance Find Procedure for the project • Pre-construction heritage walkdown of final pylon positions.
<p>Paleontological Impact Assessment</p>	<p>The proposed routes lie almost entirely in the potentially fossiliferous Vryheid Formation (Ecca Group, Karoo Supergroup) that could preserve fossils of the Glossopteris flora. The site visit and walk through showed that the routes are disturbed by current and earlier agriculture, existing roads and other infrastructure. The site visit showed that there were no fossils on the land surface and there were no rocky outcrops that could preserve fossils.</p> <p>According to the SAHRA Paleontological sensitivity map the study area is of very high paleontological significance and an independent study was conducted for this aspect. Bamford (2022) concluded that it is extremely unlikely that any fossils would be preserved in the loose soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales and siltstones of the early Permian Vryheid Formation, but only more than 5m below the surface, therefore, a Fossil Chance Find Protocol should be added to the EMPr.</p>	<p>A Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or drilling activities have commenced. Any impact would only occur during the Construction Phase. As far as the palaeontology is concerned, the impact will be low to insignificant; there is no preferred route and there is no no-go area.</p>
<p>Surface Water Assessment</p>	<p>The site assessment confirmed the presence of numerous Hydrogeomorphic (HGM) units, and were classified as follows:</p> <ul style="list-style-type: none"> ➢ Eight (8) valley bottom wetlands (includes channelled valley bottom HGM units and unchannelled valley bottom HGM units); ➢ Three (3) depression wetlands; and ➢ One (1) seep wetland. 	<p>It is advised that the layout footprint of the substation be revised so as to avoid the freshwater ecosystems and the associated 32m NEMA ZoR associated with the study and investigation areas. All mitigation measures as stipulated in this report must be implemented to prevent any edge effects and</p>

Specialist Study	Findings	Recommendations
	<p>The activities associated with the construction and operation of the proposed power line alternative 1 and 2 pose a “low” risk significance to the freshwater ecosystems within the study and investigation areas, provided that the supporting structures are placed outside the 32m Zone of Regulation (ZoR) of the freshwater ecosystems. However, the construction phase of the proposed substation poses a “high” risk significance to the valley bottom wetland, whilst the operational phase of the proposed substation poses a “low” risk significance, as the majority of impacts are likely to have occurred during the construction phase.</p> <p>Alternative 1 of the proposed power line is the preferred alternative from a freshwater ecological management perspective. Alternative 1 traverses fewer freshwater ecosystems and thus poses a lower risk to the freshwater environments. Sections of Alternative 1 are also located along an existing power line. As such, if the existing supporting structures are upgraded or new pylons erected adjacent to existing pylons, the potential risks associated with the construction of supporting structures will be significantly reduced.</p>	<p>cumulative impacts from occurring on the freshwater ecosystems within the study and investigation areas.</p>
Visual Impact Assessment	<p>Visual quality is defined by agricultural, mining and industrial activity as well as infrastructure. The naturally undulating landscape is interrupted by power lines, Hendrina Power Station, Afgri grain silo and the Optimum Coal Mine tailings dam. The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a rural agricultural area, albeit within a region blighted by development mostly associated with coal-fired power generation. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable.</p> <p>Impacts of the 132 kV power line and substation will be associated with visual intrusion and visual quality and have been assessed in this report. Construction (and decommissioning) activities associated with the 132 kV power line and substation are anticipated to be visually intrusive.</p>	<p>Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project (Power line Alternative 1 and 2) are both acceptable and there is no reason not to authorise the project. Power line Alternative 1 is the preferred alternative from a visual perspective.</p>

Specialist Study	Findings	Recommendations
	<p>The impact is assessed to be of low significance with and without the implementation of mitigation.</p> <p>During the operational phase, the 132 kV power line and substation will alter the sense of place and be visually intrusive. These impacts are assessed to be of medium significance with and without the implementation of mitigation. The visual impact of nightglow is anticipated to be of medium significance and with the implementation of mitigation is reduced to low. The comparative assessment of Power line Alternative 1 and 2 indicates that Power line Alternative 1 is the preferred power line alignment from a visual perspective as it minimises additional visual intrusion and clutter.</p> <p>Five other power stations are located within a 35 km radius of the proposed Hendrina Power line. Power lines radiate from each of these power stations, forming a dense network of large- and small-scale power lines, affecting visual quality and sense of place in this transitional landscape. The proposed power line and substation associated with this project will add to these accumulating impacts. Therefore, the cumulative impact of the 132 kV power line and substation is assessed to be of medium significance with and without the implementation of mitigation.</p> <p>The proposed project comprises the development of a substation and 132 kV power line, further altering the visual landscape of the project area. This project is moderately congruent with and marginally affects the integrity of the landscape, as five power stations and the associated highly concentrated network of power lines exist within the project area and the wider region. Due to the high vertical profile of the pylons, the VAC of the project area is low; however, the undulating topography is expected to increase the VAC to a degree. The substation will be screened by the topography to a limited degree and less so by the vegetation.</p>	

PUBLIC PARTICIPATION PROCESS UNDERTAKEN

WAY FORWARD

The Draft Basic Assessment Report (BAR) is currently being circulated for public participation for a period of 30 days (excluding public holidays) from **28 October 2022** until **27 November 2022**.

All comments received will be responded to in a C&RR, which will be included prior to submission of the Final BAR (FBAR) to the decision-making authority, namely the DFFE. Comments received on the report will be taken into consideration, incorporated into the report (where applicable) and will be used when compiling the FBAR.

Once the FBAR has been submitted and the DFFE has acknowledged receipt thereof, a decision to either grant or refuse the EA for the proposed development will be made by the DFFE. In addition, once a decision regarding the EA has been received from the DFFE, it will be made available to the public and all registered I&APs, stakeholders and OoS / authorities will be notified accordingly and provided details regarding the appeal process. The BA process will thus come to an end once appeals (if any) have been dealt with adequately and the appeal process closes.

All I&APs and key stakeholders are invited to register as I&APs in order to be kept informed throughout the process. To register as an I&AP / stakeholder and/or to obtain additional information, please submit your name, contact details (telephone number, postal address and email address) and the interest which you have in the application to SiVEST Environmental Division, as per the details below:

- Contact: Hlengiwe Ntuli
- PO Box 2921, RIVONIA, 2128
 - Phone: (011) 798 0600
 - E-mail: sivest_ppp@sivest.co.za
 - Fax: (011) 803 7272
- Website: www.sivest.com

Please reference '*Hendrina North Grid*' in your correspondence, should your comments be project specific. SiVEST shall keep all registered I&APs / key stakeholders informed of the BA process.

ENERTRAG SOUTH AFRICA (PTY) LTD
HENDRINA NORTH GRID INFRASTRUCTURE
DRAFT BASIC ASSESSMENT REPORT

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ACRONYMS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
DARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental
DFFE	Department Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EMPR	Environmental Management Programme
HGM	Hydrogeomorphic
IPP	Independent Power Producer
IRP	Integrated Resource Plan
MBSP	Mpumalanga Biodiversity Sector Plan
NEMA	National Environmental Management: Act (No. 107 of 1998)
MTPA	Mpumalanga Tourism & Parks Agency
NFA	National Forests Act (No. 84 of 1998)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No. 36 of 1998)
PAOI	Project Area of Impact
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
WEF	Wind Energy Facility
ZoR	Zone of Regulation

ENERTRAG SOUTH AFRICA (PTY) LTD

HENDRINA NORTH GRID INFRASTRUCTURE

DRAFT BASIC ASSESSMENT REPORT

1. INTRODUCTION

1.1 Background

ENERTRAG South Africa (Pty) Ltd (hereafter referred to as 'ENERTRAG') is proposing to develop one (1) new 33/132kV on-site substation and/or collector substation as well as one (1) new associated 132kV overhead power line for the proposed Hendrina North Wind Energy Facility (WEF) (part of a separate EIA process / application: **DFFE Reference Number: 14/12/16/3/3/2/2130**), near the town of Hendrina in the Mpumalanga Province of South Africa (hereafter referred to as the 'proposed development') (**Figure 1**). The overall objective of the proposed development is to feed the electricity generated by the proposed Hendrina North WEF into the national grid. The grid connection and 33/132kV on-site substation and/or collector substation (this application) requires a separate Environmental Authorisation (EA), in order to allow the EA as well as the proposed infrastructure to be handed over to Eskom.

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental processes for the proposed construction of the Hendrina North On-site Switching / Collector Substation and associated 132kV Power Line. The proposed development requires an EA from the National Department Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e., the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) will also be consulted. The EIA for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the NEMA. In terms of these regulations, the proposed overhead power line and 33/132kV on-site switching substation / collector substation would be subject to a BA process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 (as amended). All relevant legislation and guidelines will be consulted during the BA process and will be complied with at all times.

The grid connection infrastructure which is part of this application is being proposed to feed the electricity generated by the Hendrina North WEF into the national grid. The Hendrina North WEF will form part of the Renewable Energy Independent Power Producer Programme (REIPPP) in line with the Integrated Resource Plan (IRP). It should be noted that the proposed grid connection infrastructure will be handed over to Eskom once constructed. The on-site and/or collector substation will include an Eskom portion and an Independent Power Producer (IPP) portion. Following construction, the substation will be handed over to Eskom. The current applicant will remain in control of the low voltage components (more specifically the 33kV yard) of the substation, while the high voltage components (i.e., 132kV components) of the substation will likely be ceded to Eskom shortly after the completion of construction.

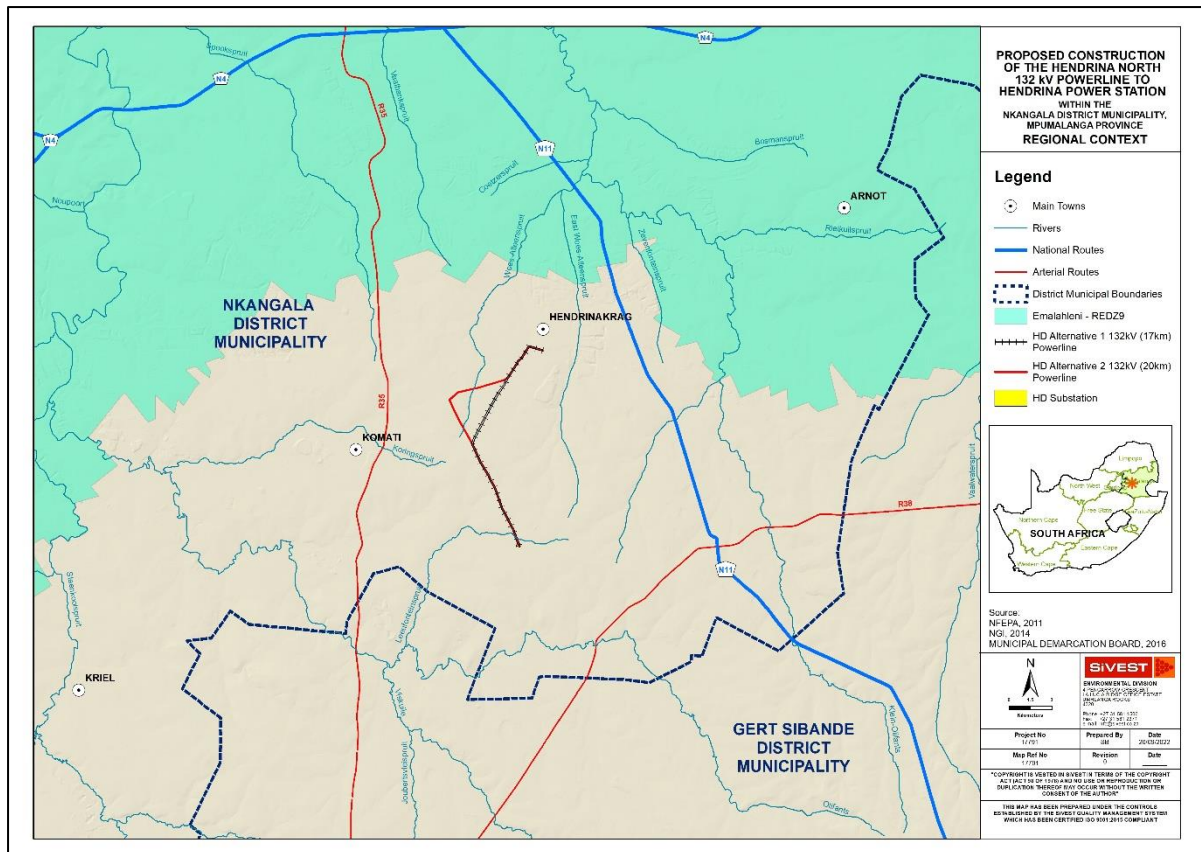


Figure 1: Hendrina Regional Context

1.2 Content Requirements for a Basic Assessment Report

A BAR must contain the information that is necessary for the competent authority to consider and come to a decision on the application and must include a proper understanding of the process, informing all preferred alternatives, the scope of the assessment, an assessment of the significant impacts, findings of the specialists and proposed mitigation measures, and the consultation process followed through the BA process. The content requirements for a BAR (as provided in Appendix 1 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 3** below.

Table 3: Content requirements for a Basic Assessment Report

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this BAR
Appendix 1, Section 3 (1)	A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—	Refer to relevant reference sections below:
Appendix 1, Section 3 (a)	Details of – (i) The EAP who prepared the report; and (ii) The expertise of the EAP, including a curriculum vitae.	Section 4
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel;	Section 5

ENERTRAG SOUTH AFRICA (PTY) LTD

Prepared by:



Project No. 17791
Description Hendrina North Grid
Revision No. 1.0

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this BAR
	(ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 5 Figure 4
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered and being applied for; and (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 7
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 11 and 12
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 13
Appendix 1, Section 3 (g)	a motivation for the preferred site, activity and technology alternative;	Section 14
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	Section 14
	(i) Details of all alternatives considered;	Section 14
	(ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 14
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	TBC in Final BAR
	(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9 and 10
	(v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated.	Section 15
(vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of	Appendix 7	

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this BAR
	<p>potential environmental impacts and risks associated with the alternatives;</p> <p>(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(viii) The possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) The outcome of the site selection matrix;</p> <p>(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;</p> <p>(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.</p>	<p>Section 16</p> <p>Section 15</p> <p>Section 14</p> <p>Not Applicable</p> <p>Section 14</p>
Appendix 1, Section 3 (i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-</p> <p>(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and</p> <p>(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.</p>	Appendix 7 and Section 15
Appendix 1, Section 3 (j)	<p>An assessment of each identified potentially significant impact and risk, including-</p> <p>(i) Cumulative impacts;</p> <p>(ii) The nature, significance and consequences of the impact and risk;</p> <p>(iii) The extent and duration of the impact and risk;</p> <p>(iv) The probability of the impact and risk occurring;</p> <p>(v) The degree to which the impact and risk can be reversed;</p> <p>(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and</p> <p>(vii) The degree to which the impact and risk can be avoided, managed or mitigated.</p>	Section 15
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 17
Appendix 1, Section 3 (l)	<p>An environmental impact statement which contains-</p> <p>(i) A summary of the key findings of the environmental impact assessment;</p> <p>(ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</p> <p>(iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</p>	Section 18
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Refer attached in Appendix 8
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 20

ENERTRAG SOUTH AFRICA (PTY) LTD

Prepared by:



Project No. 17791
Description Hendrina North Grid
Revision No. 1.0

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this BAR
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 21
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 18 and Section 22
Appendix 1, Section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Section 22
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Section 23
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Not Applicable at this stage
Appendix 1, Section 3 (t)	any specific information required by the Competent Authority.	Section 24
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	None
Appendix 1 Section 3 (2)	Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	Noted and applied with

2. PROJECT TITLE

Proposed Development of the Hendrina On-site Switching / Collector Substation and associated 132kV Power Line near Hendrina in the Mpumalanga Province

3. DETAILS OF APPLICANT

3.1 Name and contact details of the Applicant

Name and contact details of Applicant:

Table 4: Name and contact details of the applicant

Business Name of Applicant	ENERTRAG South Africa (Pty) Ltd
Physical Address	Suite 104, Albion Springs, 183 Main Road, Rondebosch, Cape Town
Postal Address	Suite 104, Albion Springs, 183 Main Road, Rondebosch, Cape Town
Postal Code	7700
Telephone	071 689 7349
Fax	N/A
Email	sandhisha.jaynarain@enertrag.com mercia.grimbeek@enertrag.com

4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

4.1 Name and contact details of the Environmental Consultant

The table below provides the name and contact details of the Environmental Consultants who prepared this report:

Table 5: Name and contact details of the Environmental Consultant who prepared the report

Business Name of EAP	SIVEST SA (PTY) Ltd
Physical Address	2 Autumn Street, Rivonia, Sandton
Postal Address	PO Box 2921, Rivonia
Postal Code	2128
Telephone	011 798 0634
Fax	-
Email	rendanir@sivest.co.za

4.2 Names and expertise of the Environmental Assessment Practitioner

The table below provides the names of the EAP's who prepared this report:

Table 6: Names and details of the expertise of the EAP's involved in the preparation of this report

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Natalie Pullen	MSc (Environmental Biotechnology)	EAPASA Registration No. 2018/132 IAIAsa	18

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Rendani Rasivhetshela – EAP	BSc Honours Environmental Management	EAPASA Registration No. 2019/1729	6

CV's of SiVEST personnel and EAP declaration are attached in **Appendix 1**.

4.3 Names and expertise of the specialists

Specialist studies have been conducted in terms of the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) And 44 of the NEMA when applying for EA, as well as the EIA Regulations, 2014 (as amended). The table below provides the names of the specialists involved in the project:

Table 7: Names of specialists involved in the project

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
SRK Consulting (Pty) Ltd	Kelly Armstrong	Visual Impact Assessment	BSocSc (Hons) Environmental Science	5
Beyond Heritage (Pty) Ltd	Jaco Van der Walt	Heritage Impact Assessment	Professional Archaeologist (ASP) Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP)	15
	Prof Marion Bamford	Palaeontological Desktop Impact Assessment	PhD (Palaeontology)	33
Gage Consulting (Pty) Ltd	Duan Gage	Desktop Geotechnical Assessment	Professional registered SACNASP, PrNatSci (137543), MSAIEG, Master of Science (Engineering Geology), *Doctoral Candidate (Engineering Geology)	4
Johann Lanz Consulting	Johann Lanz	Agriculture and Soils Impact Assessment (desktop)	M.Sc. (Environmental Geochemistry)	24
Scientific Aquatic Services (Pty) Ltd	Kristen Nienaber	Freshwater Assessment	BSc (Hons) Environmental Science	2
	Amanda Milesen		N. Dip Nature Conservation	8

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
Ecoagent	Prof GJ Bredenkamp	Biodiversity Impact Assessment	D.Sc. (Ph.D.) University of Pretoria, Plant Ecology.	36
Chris Van Rooyen Consulting	Chris van Rooyen	Avifaunal Impact Assessment	BA LLB	22
	Albert Froneman	Avifaunal Impact Assessment	MSc (Conservation)	22

5. LOCATION OF THE ACTIVITY

The proposed development is located approximately 15 km west of Hendrina, within the Steve Tshwete Local Municipality in the Nkangala District Municipality of the Mpumalanga Province (**Figure 2**).

At this stage, it is proposed that a 132kV overhead power line will connect the proposed Hendrina North Wind Energy Facility (“WEF”) to the Hendrina Power Station.

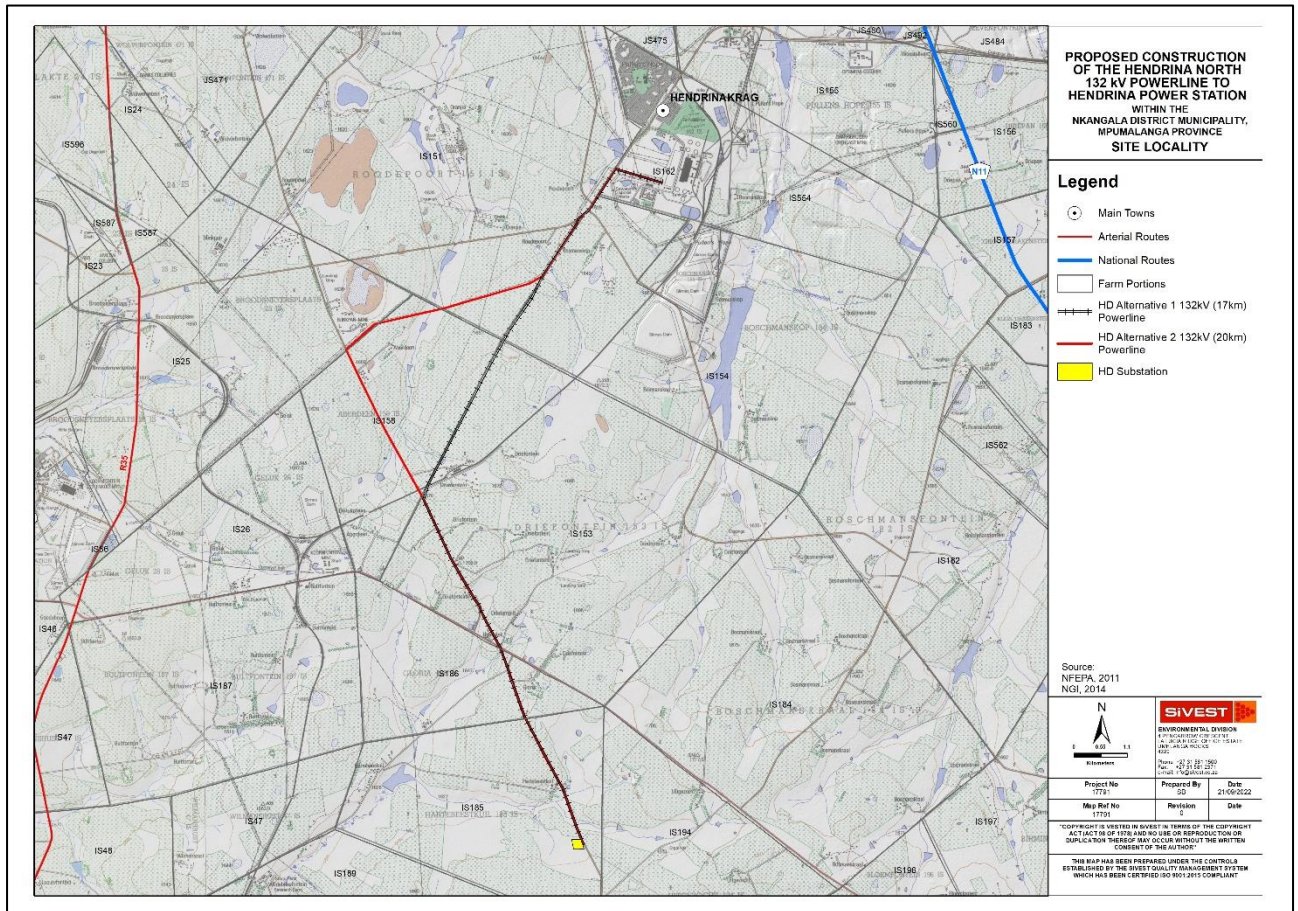


Figure 2: Site locality

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5.1 21 Digit Surveyor General Codes of the site and Property Description

The following properties were considered for the various grid alternatives for Hendrina Grid:

Table 8: Summary of affected properties (including SG Codes and Farm Names) for all alternatives

21 Digit Surveyor General Code	Description	Portion No.	Farm No.	Farm Name
T0IS00000000015300000	Portion 12 of Farm 153 Driefontein.	12	153	Driefontein
T0IS00000000015300000	Portion 37 of Farm 153 Driefontein.	37	153	Driefontein
T0IS00000000015300000	Portion 2 of Farm 153 Driefontein.	2	153	Driefontein
T0IS00000000015300000	Portion 17 of Farm 153 Driefontein	17	153	Driefontein
T0IS00000000015100000	Portion 14 of Farm 151 Roodepoort	14	151	Roodepoort
T0IS00000000015100000	Portion 13 of Farm 151 Roodepoort	13	151	Roodepoort
T0IS00000000015100000	Portion 2 of Farm 151 Roodepoort	2	151	Roodepoort
T0IS00000000015100000	Portion 18 of Farm 151 Roodepoort	18	151	Roodepoort
T0IS00000000015100000	Portion 1 of Farm 151 Roodepoort	1	151	Roodepoort
T0IS00000000015400000	Portion 8 of Farm 154 Boschmanskop	8	154	Boschmanskop
T0IS00000000018500000	Portion 3 of Farm 185 Hartebeestkuil.	3	185	Haartebeestkuil
T0IS00000000018500000	Portion 4 of Farm 185 Hartebeestkuil.	4	185	Haartebeestkuil
T0IS00000000025000000	Portion 4 of Farm 185 Hartebeestkuil	1	25	Broodsneyerplaats
T0IS00000000016200000	Portion 0 of Farm 162 Hendrina Power Station.	0	162	Hendrina Power Station/Eskom
T0IS00000000018600000	Portion 0 of Farm 186 Gloria.	0	186	Gloria
T0IS00000000016200000	Portion 11 of Farm 162 Hendrina Power Station.	11	162	Hendrina Power Station
T0IS00000000015800000	Portion 1 of Farm 158 Aberdeen.	1	158	Aberdeen

5.2 Coordinates of the site

The coordinates for the grid connection and associated substation are as follows:

Table 9: Grid Connection Coordinates

HENDRINA GRID: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss) Alternative 1		
POINT	SOUTH	EAST
1	26° 2'2.72"S	29°35'45.32"E
2	26° 1'52.99"S	29°35'10.27"E
3	26° 2'20.74"S	29°34'50.07"E
4	26° 2'26.57"S	29°34'42.15"E
5	26° 2'29.90"S	29°34'40.86"E
6	26° 3'4.53"S	29°34'15.33"E
7	26° 3'19.37"S	29°34'6.92"E
8	26° 5'34.01"S	29°32'44.63"E
9	26° 8'1.36"S	29°33'58.12"E
10	26° 8'49.83"S	29°34'26.10"E
11	26° 9'26.57"S	29°34'39.08"E

HENDRINA GRID: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss) Alternative 2		
POINT	SOUTH	EAST
1	26° 2'2.72"S	29°35'45.32"E
2	26° 1'52.99"S	29°35'10.27"E
3	26° 2'20.74"S	29°34'50.07"E
4	26° 2'26.57"S	29°34'42.15"E
5	26° 2'29.90"S	29°34'40.86"E
6	26° 3'4.53"S	29°34'15.33"E
7	26° 3'36.21"S	29°32'10.94"E
8	26° 3'53.28"S	29°31'48.16"E
9	26° 3'19.37"S	29°34'6.92"E
10	26° 5'34.01"S	29°32'44.63"E
11	26° 8'1.36"S	29°33'58.12"E
12	26° 8'49.83"S	29°34'26.10"E
13	26° 9'26.57"S	29°34'39.08"E

The highlighted option represents the preferred alternative.

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Table 10: On-site Substation Coordinate

SUBSTATION SITE COORDINATES		
COORDINATES AT CORNER POINTS (DD MM SS.sss) preferred		
	SOUTH	EAST
Corner 1	26° 9'23.72"S	29°34'32.37"E
Corner 2	26° 9'23.96"S	29°34'38.95"E
Corner 3	26° 9'30.18"S	29°34'41.43"E
Corner 4	26° 9'30.48"S	29°34'33.67"E
CENTRE COORDINATES		
Centre	26° 9'26.87"S	29°34'36.76"E

6. SITE LAYOUT/ ROUTE ALIGNMENT PLAN

The Site Layout/Route Alignment Plan is attached in **Appendix 3**.

Photographs of the site are included in **Appendix 4**.

7. ACTIVITY INFORMATION

7.1 Project Description

Electricity generated by the proposed Hendrina North WEF will be fed into the national grid by way of a 132kV overhead power line, connecting the Hendrina North WEF to the Hendrina Power Station. **Figure 3** below provides a conceptual diagram of the electricity generation process.

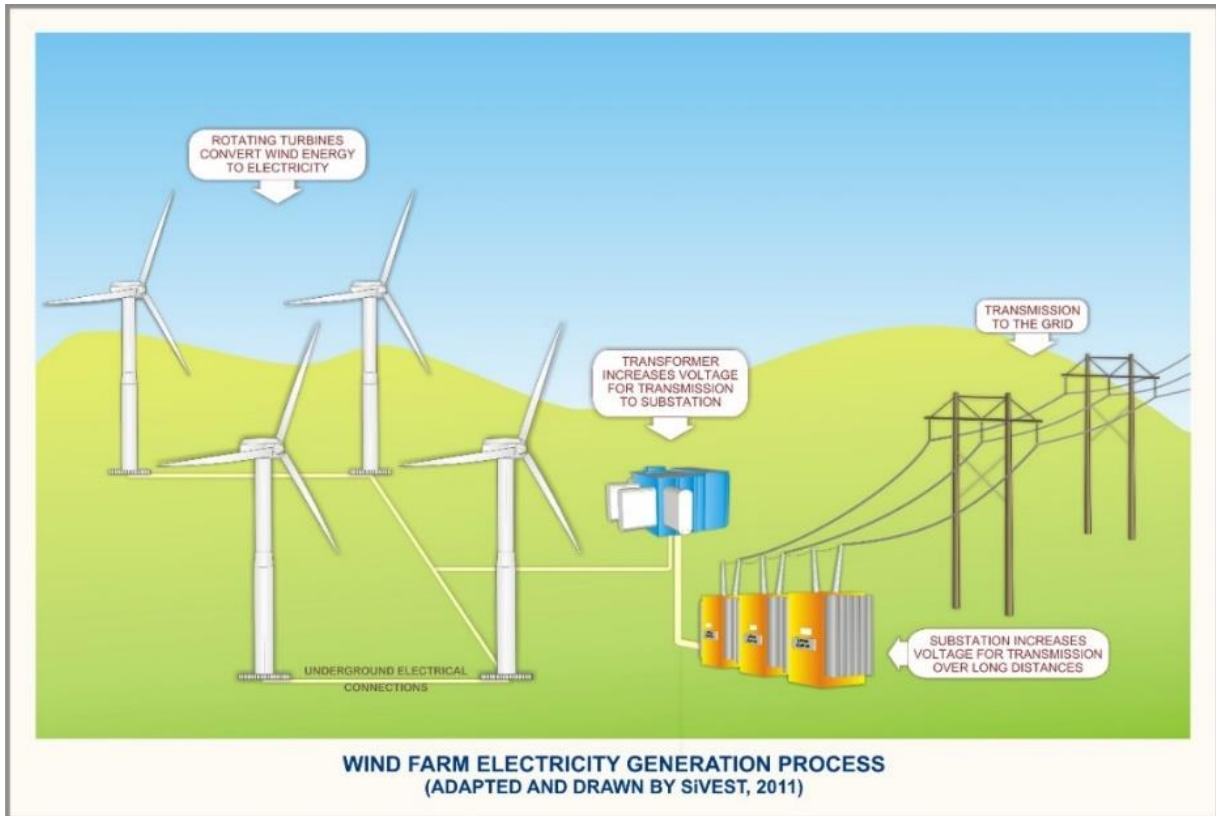


Figure 3: Conceptual WEF electricity generation process showing electrical connections

The proposed grid connection infrastructure to serve the Hendrina North WEF will include the following components:

Onsite Substation:

- An onsite substation consisting of 33/132kV yard (to be owned by the applicant) and a 132kV switching station yard (to be owned by Eskom) (footprint up to 3ha). The substation will consist of:
 - feeder bays, transformers, switching station electrical equipment (bus bars, metering equipment, switchgear, etc.), control building, workshop, telecommunication infrastructure, and access roads.
 - The substation will include an area with a subterranean earthing mat onto which a concrete plinth will be constructed.

132kV Power line:

- Up to 132kV power line connecting the on-site substation at Hendrina North WEF to the Hendrina Power Station. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. The maximum tower height is expected to be approximately 25m.

The two alternative grid connection solutions (within a 500m wide corridor) will include:

- **Grid Connection Alternative 1 (Preferred):** The proposed power line will be approximately 17km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative is shorter span over existing road and farm boundaries. This is the landowners preferred routing. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.
- **Grid Connection Alternative 2:** The proposed power line will be approximately 20km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative follows an existing a dirt road until it meets the Eskom HENDRINA-ABINA 132kV power line. It then follows the Eskom power line into the Hendrina Power Station. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.
- The proposed substation will be located on Portion 3 of Hartebeestkuil 185IS

The Preferred Route Alignment and substation placement is reflected below in **Figure 4** and attached in **Appendix 3**.

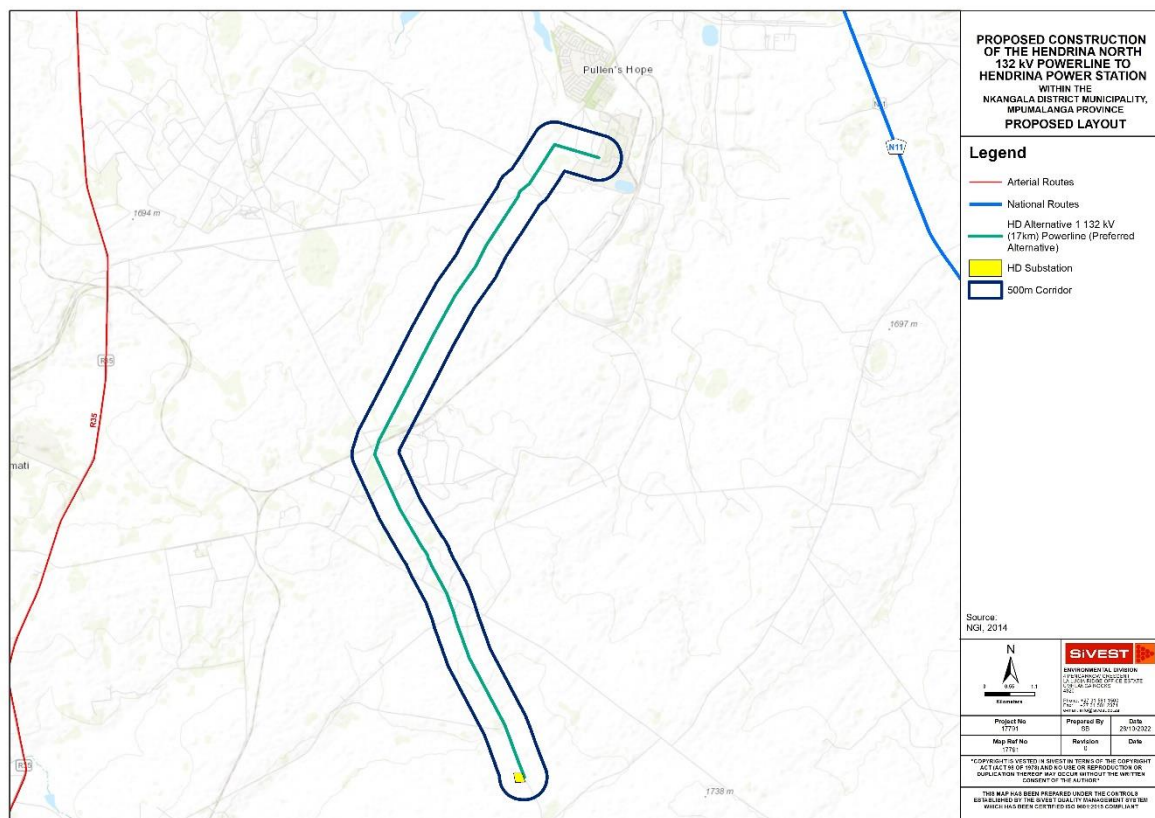


Figure 4: Preferred route alignment and substation location

The project infrastructure has been placed strategically within the development area based on environmental constraints.

A summary of the project technical details is provided in **Table 11** below.

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Table 11: Technical Detail Summary

Component	Description / Dimensions
Project Location	The proposed project is located approximately 15km west of Hendrina, within the Steve Tshwete Local Municipality, in the Nkangala District Municipality, Mpumalanga Province.
Generation Capacity of Substation	33/132kV
Affected Properties	<ul style="list-style-type: none"> • Portion 0 of Farm 162 Eskom. • Portion 11 of Farm 162 Hendrina Power Station; • Portion 8 of Farm 154 Boschmanskop; • Portion 18 of Farm 151 Roodepoort. • Portion 1 of Farm 151 Roodepoort; • Portion 13 of Farm 151 Roodepoort; • Portion 14 of Farm 151 Roodepoort; • Portion2 of Farm 151 Roodepoort; • Portion 1 of Farm 158 Aberdeen; • Portion 1 of Farm 25 Broodsneyersplaats; • Portion 37 of Farm 153 Driefontein; • Portion 17 of Farm 153 Driefontein; • Portion 12 of Farm 153 Driefontein; • Portion of Farm 153 Driefontein; • Portion 0 of Farm 186 Gloria; • Portion 4 of Farm 185 Hartebeestkuil; and • Portion 3 of Farm 185 Hartebeestkuil.
SG Codes	<ul style="list-style-type: none"> • T0IS00000000015300000 • T0IS00000000015100000 • T0IS00000000015400000 • T0IS00000000018500000 • T0IS00000000025000000 • T0IS00000000016200000 • T0IS00000000018600000 • T0IS00000000015800000
Area occupied by Substation	Up to approximately 3 hectares.
Height of Substation	Height of substation will be confirmed during the final design stages of the substation, prior to construction commencing
Site Access	Provincial and Local roads, including existing farm roads will be utilised, to access the Project as far as possible. New access tracks will only be created where there are no existing roads in place, these roads will be unsurfaced “Jeep” tracks of between 4-5m wide and will run beneath the power line within the servitude.
Fencing	No new fencing is envisaged at this stage.
Grid Connection Information	<ul style="list-style-type: none"> ▪ Onsite substation consisting of 33/132kV yard (to be owned by the applicant) and a 132kV switching station yard (to be owned by Eskom) (footprint up to 3ha). The substation will consist of: <ul style="list-style-type: none"> ○ feeder bays, transformers, switching station electrical equipment (bus bars, metering

Component	Description / Dimensions
	<p>equipment, switchgear, etc.), control building, workshop, telecommunication infrastructure, and access roads.</p> <ul style="list-style-type: none"> ○ The substation will include an area with a subterranean earthing mat onto which a concrete plinth will be constructed. ▪ Up to 132kV power line connecting the on-site substation at Hendrina North WEF to the Hendrina Power Station. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 40m. <p>The two alternative grid connection solutions (within a 500m wide corridor) will include:</p> <ul style="list-style-type: none"> ▪ Grid Connection Alternative 1 (Preferred): The proposed power line will be approximately 17km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative is shorter span over existing road and farm boundaries. This is the landowners preferred routing. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole. ▪ Grid Connection Alternative 2: The proposed power line will be approximately 20km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative follows an existing a dirt road until it meets the Eskom HENDRINA-ABINA 132kV power line. It then follows the Eskom power line into the Hendrina Power Station. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.
Proximity to the Eskom grid	<ul style="list-style-type: none"> ▪ The project location is close to the Hendrina Power Station substation, consequently reducing the length of the power line that will be required for connection and thus reducing the capital costs, energy losses and environmental impact. In addition, further existing power lines are located within proximity to the Project site, allowing for potential direct connection to these existing lines where insufficient allocation may be available at the Hendrina substation, or where Eskom planning indicates different future use.

7.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, and 324 for activities which must follow a Basic Assessment Process. The project will trigger the following listed activities:

Table 12: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Relevant Basic Assessment Activities as set out in Listing Notice 1		
11 (i)	GN R. 327 (as amended) Item 11: The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	The proposed Project involves the construction and operation of electricity distribution infrastructure (132kV), to connect the proposed Hendrina North Wind Energy Facility (WEF) to the Hendrina Power Station.
12 (ii) (a) (c)	GN R. 327 (as amended) Item 12: The development of: ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	The proposed development will entail the construction of infrastructure within the proposed project site which will have a physical footprint of approximately 100m ² or more and may occur within some of the surface water features / watercourses identified within the application site or within 32m of some of the surface water features / watercourses identified within the application site.
14	GN R. 327 (as amended) Item 14: The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The development of the onsite substation will require the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.
24 (ii)	GN R. 327 (as amended) Item 24: The development of a road - ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.	Access roads for the construction and maintenance of the power line may be required.
27 (i)	GN R. 327 (as amended) Item 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	The development of the collector substation will require the clearance of >1ha of indigenous vegetation.
28 (ii)	GN R. 327 (as amended) Item 28: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for	The proposed development site is currently zoned for agricultural land use; however, the property is no longer actively used for agricultural activities.

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Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	<p>agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</p>	<p>The proposed development will result in special zoning being required, as an area greater than 1ha will be transformed into industrial / commercial use.</p>
56 (ii)	<p>GN R. 327 Item 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres –</p>	<p>Existing roads may need to be widened or lengthened for the construction and maintenance of the power line.</p>
Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended		
None		
Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended		
4 f. (i) (ee)	<p>GN R. 324 (as amended) Item 4: The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p>(f) In Mpumalanga</p> <p>(ii) Outside urban areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>The development of the grid connection facility and associated infrastructures is likely to require the development of roads wider than 4m with a reserve of less than 13.5m within areas classified as CBA.</p> <p>These roads will occur within the Mpumalanga Province, outside urban areas.</p>
10.	<p>GN R. 324 (as amended) Item 10: The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.</p> <p>(f) In Mpumalanga</p> <p>(ii) Outside urban areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>The development of the onsite substation will require the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters within areas classified as CBAs.</p>
12 (f) (ii)	<p>GN R. 324 (as amended) Item 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>(f) In Mpumalanga</p> <p>(ii) Within critical biodiversity areas identified in bioregional plans;</p>	<p>The proposed development will involve the clearance of more than 300m² or more of indigenous vegetation within potential CBAs/ESAs.</p>

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
14 ii. a.c.f.i. ff	<p>GN R. 324 (as amended) Item 14: The development of:</p> <p>ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs-</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p>(f) In Mpumalanga</p> <p>(ii) Outside urban areas;</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>The proposed development will entail the construction of infrastructure within the proposed project site which will have a physical footprint of approximately 100m² or more and may occur within some of the surface water features / watercourses identified within the application site or within 32m of some of the surface water features / watercourses identified within the application site.</p>

8. NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL

The National Web based Environmental Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an application for EA in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended to screen their proposed site for any environmental sensitivity.

According to the DFFE Screening Tool Report (attached in **Appendix 9**), the following themes described in **Table 13** below are applicable to the proposed grid and substation development:

Table 13: DEA Screening tool themes

Theme	Sensitivity		Comment
	Grid	Substation	
Agriculture Theme	Very high	High	<p>The Agricultural Compliance Statement is included in Appendix 6 of the Draft BAR.</p> <p>The Result of the DFFE Screening Tool is regarded as Very high for most of the site.</p> <p>The sensitivity of an agricultural environment to overhead power lines is not what the screening tool classifies the sensitivity as, because most agricultural environments have a very low sensitivity to overhead power lines. This is because power lines have negligible agricultural impact in most environments, regardless of the agricultural production potential of the land that they cross. Therefore, in the context of the development of overhead power lines, almost no</p>

Theme	Sensitivity		Comment
	Grid	Substation	
			land can be considered to have high sensitivity for impacts on agricultural resources. For this reason, the screening tool sensitivity of the power line corridor is largely irrelevant, only the footprint of the substation is of relevance because that land will be permanently removed from agricultural production. The classified land capability of the substation site is 9 to 10, which translates to a high agricultural sensitivity. In contrast to what the screening tool and land capability data indicate, the substation site should be classified as medium agricultural sensitivity because it is unsuitable for crop production.
Animal Species Theme	Medium	Medium	The Terrestrial Ecological Report is included in Appendix 6 of the Draft BAR. The Result of the DFFE Screening Tool analysis for Animal Species Sensitivity is regarded as Medium. This is however disputed because the habitats are mostly transformed.
Aquatic Biodiversity Theme	Very High	Low	The Freshwater Report is included in Appendix 6 of the Draft BAR. The Result of the DFFE Screening Tool is regarded as Low for most of the proposed power line transect. Only the few drainage line crossings have Very High Sensitivity. Therefore, this Low Aquatic Sensitivity for the majority of the site is confirmed, and the very High Sensitivity for the drainage Lines is also confirmed.
Archaeological and Cultural Heritage Theme	Low	Low	The Heritage Report is included in Appendix 6 of the Draft BAR. The Project site is characterised by extensive cultivated fields and is considered to be of low archaeological potential. This was confirmed during the field survey and no archaeological sites of significance were noted.
Civil Aviation (Wind) Theme	High	Medium	The high sensitivity rating is due to the civil aviation aerodrome. The aerodrome referred to is the aircraft landing strip associated with the Koorfontein Mines located, west of the Komati Power Station. The Air Traffic Navigational Services (ATNS) will be consulted throughout this application process.
Defence (Wind) Theme	Low	Low	The entire site has a low sensitivity in terms of the defence theme. No further specialist study required.
Palaeontology Theme	Very High	Very High	The Heritage Report is included in Appendix 6 of the Draft BAR.

Theme	Sensitivity		Comment
	Grid	Substation	
			<p>According to the SAHRA Paleontological map the study area is of very high paleontological significance. A study was conducted for this aspect and concluded that it is extremely unlikely that any fossils would be preserved in the loose soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales and siltstones of the early Permian Vryheid Formation, but only more than 5m below the surface.</p>
Plant Species Theme	Medium	Medium	<p>The Terrestrial Ecological Report is included Appendix 6 of the Draft BAR.</p> <p>The Result of the DFFE Screening Tool analysis for Plant Species Sensitivity for the development site is shown as Medium for more natural areas.</p> <p>The vegetation survey results indicate Low plant species richness in the various plant communities on the site. No protected and no red data plant species were found on the site. In general, the DFFE Screening Tool result of Low Plant Species Sensitivity for the terrestrial habitat is confirmed. The very limited wetland plant communities have Medium plant species sensitivity. This is also confirmed.</p>
Terrestrial Biodiversity Theme	Very High	Very High	<p>The Terrestrial Ecological Report is included Appendix 6 of the Draft BAR.</p> <p>The Result of the DFFE Screening Tool analysis for Terrestrial Biodiversity Sensitivity is regarded as Very High.</p> <p>The Terrestrial Biodiversity Sensitivity is regarded to be Very High. This is because, according to SANBI & DEAT (2009) and NEMBA, Government Notice 1002 (2011) the Ecosystem status for this vegetation type (Eastern Highveld Grassland) is Vulnerable, as so much of this vegetation type is already transformed.</p> <p>In terms of the Terrestrial Assessment almost the entire area is Heavily Modified and some areas Moderately Modified. Very limited areas area classified as Other Natural Areas. Critical Biodiversity Area is almost non-existing. However, the field survey indicated that most of the site is totally transformed by cultivation. Only the small wetland area in the north, at the Hendrina (Pullens Hope) power station is</p>

Theme	Sensitivity		Comment
	Grid	Substation	
			<p>mapped as an Optimal Critical Biodiversity Area, but the field survey showed that this wetland area is also highly disturbed and degraded.</p> <p>The result of the screening tool on terrestrial biodiversity sensitivity is therefore disputed.</p>

9. DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter summarises the environmental attributes associated with the proposed project study area focusing on the geographical, physical and biological environment.

9.1 Geographical

The proposed Hendrina North grid connection infrastructure is located approximately 15km west of Hendrina in the Mpumalanga Province and is within the Steve Tshwete Local Municipality, in the Nkangala District Municipality. The regional context of the proposed application area is shown in **Figure 1**.

9.2 Land Use

The area surrounding the site is predominantly characterised by agricultural activity (mainly maize cultivation and cattle pastures), urban and industrial development, power plants and a network of very large coal mines and associated tailings facilities which blight the landscape. Highly concentrated networks of power lines emanate from the Hendrina Power Station, and other power stations in the region.

Surrounding land use includes:

- Urban areas (e.g., Pullens Hope, Hendrina);
- Farmsteads;
- Hendrina Power Station;
- Power lines;
- Optimum Coal Mine and tailings dam;
- Agriculture:
 - Afgri grain silo;
 - Maize cultivation; and
 - Cattle and sheep pastures.



Figure 5: Power plant, and power lines traversing the landscape



Figure 6: Hendrina Power Plant (left of centre) and a tailings dam (right of centre) in the distance



Figure 7: Afgri grain silo

The two power line route alternatives are mostly routed along existing gravel roads and farm boundaries. The northern portion of the alignment for Power line Alternative 2 will be routed parallel to the existing Eskom Hendrina-Abina 132kV power line.



Figure 8: Existing Eskom Hendrina-Abina 132 kV power line

9.3 Climate

The area surrounding Hendrina is considered to be a warm and temperate climate. Rainfall generally occurs in summer with much less rain in winter. The area is within a subtropical highland climate (Cwb) according to the Köppen-Geiger climate classification. The average annual rainfall is 794 mm with the average temperatures of 15.1°C. Climate plays a fundamental role in rock weathering and soil development. The effect of climate on the weathering processes (i.e., soil formation) in a particular area can be determined from the climatic N-value, defined by Weinert (1980). A climatic N-Value of 5 or less implies a water surplus and the dominant mode of weathering is chemical decomposition. These climatic conditions are favourable for the development of a deep residual soil profile. Where the climatic N-value is greater than 5, mechanical disintegration is the predominant mode of rock weathering. In these drier areas residual soils are typically shallow. Climatic N-values of greater than 10 imply an arid climate with a limited or absent residual soil profile. Weinert's climatic N-value for the site was determined to be 2, which indicates a water surplus climate condition. Therefore, rock and soil are expected to predominantly undergo chemical weathering and the presence of residual soils can be expected.

9.4 Topography

The site topography is gently undulating and locally sloping between 2° to 4° on convex slopes and valleys throughout the alignment. The route alignment cut across ridges and small, shallow, valleys. The site exists between the elevations of 1705m (in the middle of the route alignment) to 1600 m (at the Hendrina Power Station) above mean sea level (AMSL). The most southernly end of the alignment exists at 1640 m AMSL. The flow on seeping from the alignment corridors are expected to occur as hill wash and shallow sub-surface seepage becoming concentrated flow in non-perennial and perennial streams. The southern portion of the site will drain into the Leeufonteinspruit flowing south into the Olifants River. The middle to northern portions of the alignment corridors will flow into the Woes-Alleenspruit flowing north into the Klein-Olifants and eventually in the Olifants River. The site topography is shown in **Figure 10**. Some of the streams intercepting the alignments have small earth dams built in the channel. The area is known to have seasonal wetlands and return flow on the mid to lower slopes.

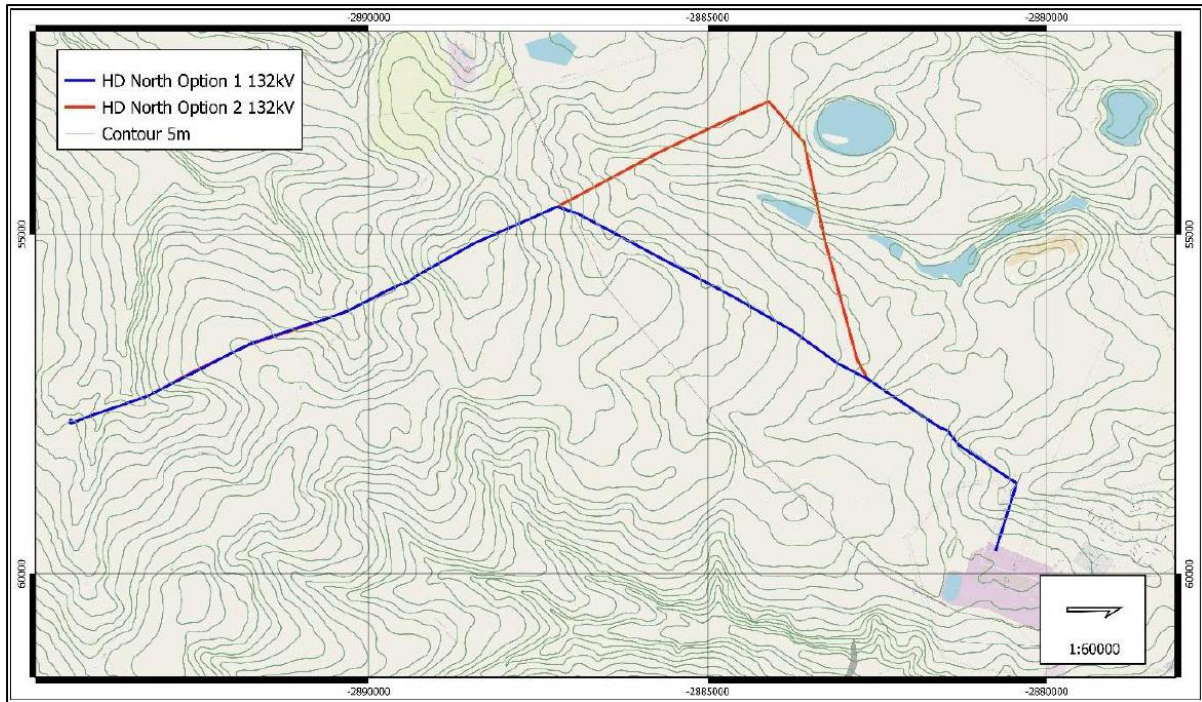


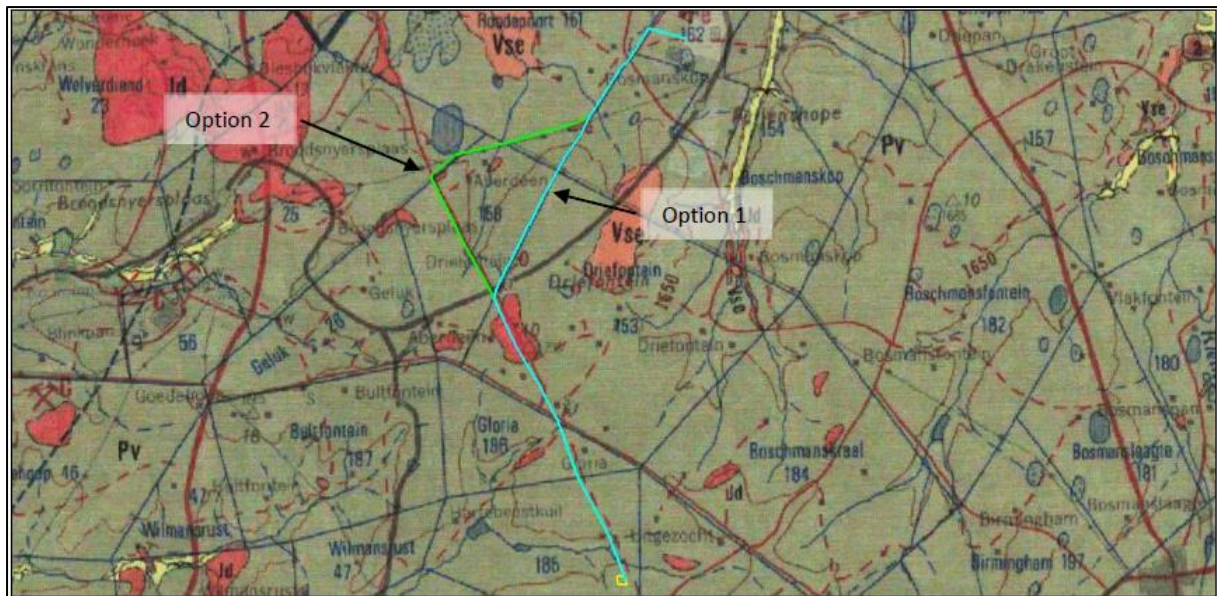
Figure 9: Topography

9.5 Geology and Soils

A desktop geotechnical report was undertaken by GaGe Consulting (Pty) Ltd (October 2022). According to the 1:250 000 2628 East Rand geological sheet, the proposed alignments are underlain by sandstone, shale and coal beds of the Vryheid Formation, Ecca Group, Karoo Supergroup. A particularly significant feature of the formation is the close intercalation of the different rock types within it. It is not unusual for a lenticular body of coarse sandstone to occur within a predominantly finer siltstone horizon, while a weak lens of mudstone or siltstone occurring within a competent layer of sandstone is equally common. Similarly, bands of rock may be laterally discontinuous and may suddenly pinch out and may reappear some distance away.

The Vryheid Formation has been intruded by dolerite dykes and sills and the map indicates dolerite is expected to underlain portions of the alignments, especially in the high lying areas. Alluvial material is expected to occur in low-lying areas adjacent to and within streams on the sites. The alluvium is expected to be thick, unconsolidated, variable, sand to clay material.

The regional geology of the site is illustrated below in **Figure 10**.



Symbol	Age	Sedimentary and Volcanic Rocks			Intrusive Rocks	Geological Unit Type
		Supergroup	Group	Formation		
	Quaternary	N/A				Alluvium
Jd	Jurassic	-	-	-	Dykes / Sills	Dolerite
Pv	Permian	Karoo	Ecca	Vryheid	-	Sandstone, shale, coal beds

Figure 10: Geology of the project site

The site area is expected to be underlain by alternating residual and completely weathered siltstone and mudrock with bands of hard rock sandstone with thin residual sandstone. The excavation conditions in the siltstone and mudrock is expected to be ‘soft’ to 3.00 m below ground level (BGL), according to the SANS 634:2012. The siltstone and mudrock residual soils are generally soft to stiff, clayey silty to sandy silt material. The sandstone may cause excavation difficult due to the hard rock material near surface. This is variable and difficult to map without high density trial pit study. The dolerite usually occupies the high lying areas and is generally deeply weathered and exhibits loose, red, clayey silt material to depths greater than 3.00 m BGL. These areas are generally free-draining and have only weakly cemented ferricrete in the upper soils. Dolerite corestones are anticipated to exist in the dolerite residuum.

The residual soils will be covered by relatively thin (~0.50-0.80 m thick) colluvium soils comprising, loose, silty fine sand when not near streams. The colluvium and upper residual soils are expected to be reworked and ferruginised. The ferricrete can be variably cemented and varying in thickness between approximately 0.50 to 1.50 m thick. Where the ferricrete is strongly cemented, ‘intermediate’ excavations conditions may be anticipated. Ferricrete usually occurs on the midslopes and adjacent to streams. The ferricrete and sandstone can cause sub-surface flow to become return flow causes seasonal wet conditions at surface. Seasonal wetlands are known to be a common occurrence in this region and geology.

The lower-lying valleys, defined by streams, is expected to comprise thick (>1.50 m), unconsolidated, alluvial material. The alluvium may be clayey sand to clayey material and will be variable in composition. No highly expansive or severely collapsible soils are expected to occur on the site. Some low to medium potential expansive may exist on the site. Any steep slopes or slope instabilities are not expected anywhere within the corridor areas. Most the corridor areas are accessible via existing good gravel and small farm roads. The quality of the farm roads may vary and becoming non-trafficable during and after heavy rainfall due to loose to soft upper soil. The crop areas that have been ploughed will cause trafficability issues and 4x4 vehicles may bog down in these areas during and after heavy rainfall.

9.6 Surface Water

An Aquatic Impact Assessment was undertaken by Scientific Aquatic Services (Pty) Ltd (September 2022). The site assessment confirmed the presence of numerous Hydrogeomorphic (HGM) units, and were classified as follows:

- Eight (8) valley bottom wetlands (includes channelled valley bottom HGM units and unchannelled valley bottom HGM units);
- Three (3) depression wetlands; and
- One (1) seep wetland.

Table 14: Characterisation at Levels 3 and 4 of the Classification System (Ollis et al., 2013) of the freshwater ecosystems associated with the study and investigation areas.

Freshwater ecosystems	Level 3: Landscape unit	Level 4: HGM Type
Eight (8) valley bottom wetlands (includes channelled and unchannelled valley bottom HGM units) are traversed by the proposed power line (Alternative 1 and 2) and are located throughout the investigation area.	Valley floor: The base of a valley, situated between two distinct valley side-slopes.	Unchannelled valley bottom: A valley bottom wetland without a river channel running through it. Channelled valley bottom: A valley bottom wetland with a river channel running through it.
One depression wetland in the northern portion of the study area is traversed by the proposed power line (Alternative 1). Two depression wetlands are located in the eastern portion of the investigation area.	Plain: an extensive area of low relief. These areas are generally characterised by relatively level, gently undulating or uniformly sloping land with a very gentle gradient that is not located within a valley. Gradient is typically less than 0.01 or 1:100.	Depression: A wetland or aquatic ecosystem with closed (or near closed) elevation contours which increases in depth from the perimeter to a central area of greatest depth and within which water typically accumulates.
One seep wetland is adjacent to the proposed power line (Alternative 1 and 2) and is located in the south eastern portion of the investigation area.	Slope: an included stretch of ground that is not part of a valley floor, which is typically located on the side of a mountain, hill or valley	Seep: a wetland area located on (gently to steeply) sloping land, which is dominated by the colluvial (i.e., gravity-driven), unidirectional movement of material down-slope. Seeps are often located on the side-slopes of a valley but they do not, typically, extend into a valley floor.

The delineated freshwater ecosystem are conceptually depicted in **Figure 12**.

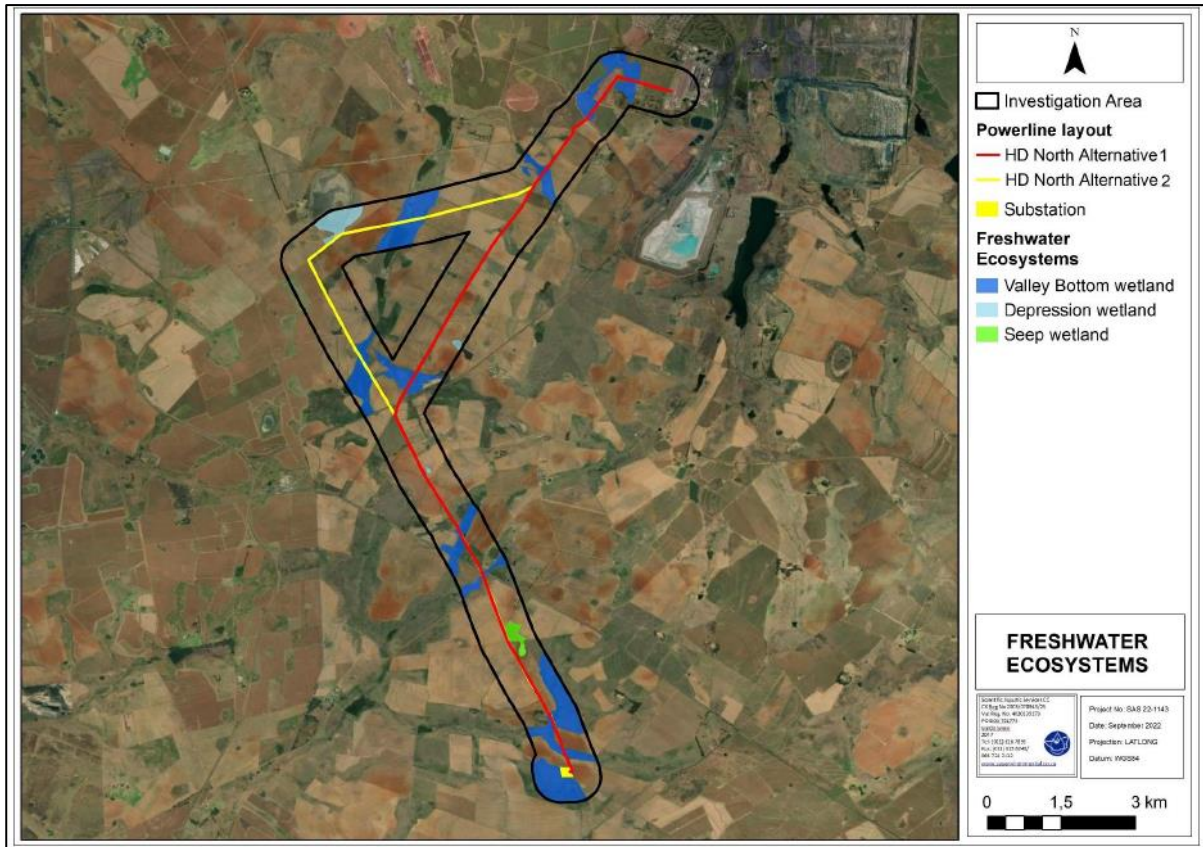


Figure 11: Location of the freshwater ecosystems associated with the project site area.

The results of the assessment are summarised in the table below:

Table 15: Summary of results of the field assessment

Freshwater ecosystem	PES	Ecoservices	EIS	REC/RMO/BAS
Valley Bottom wetlands (Group 1)	E	Moderately Low-Very low	Moderate	D/Improve/D
Depression wetland (Group 2)	C	Low-Very low	Moderate	C/Maintain/C
Depression wetlands (Group 3)	C	Low-Very low	Moderate	C/Maintain/C
Seep wetland (Group 4)	D	Low-Very low	Moderate	D/Maintain/D

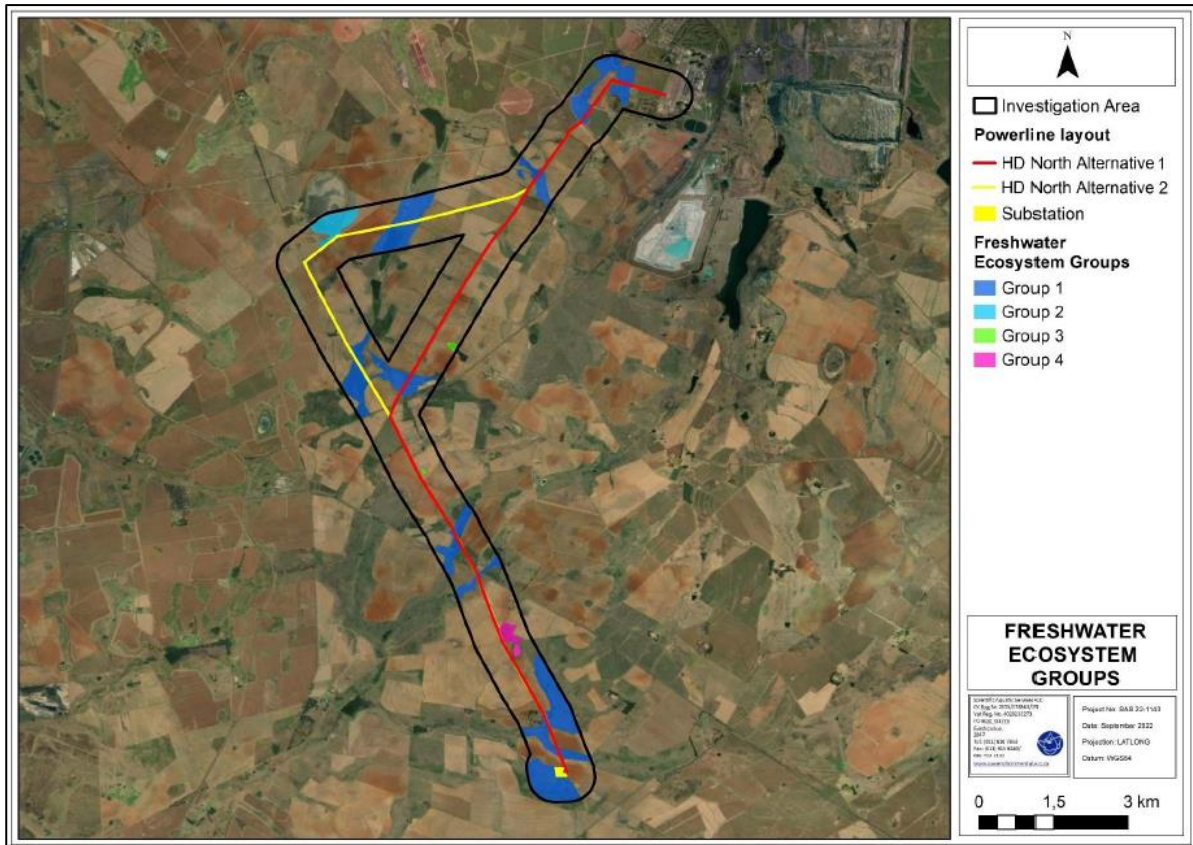


Figure 12: Visual representation of the grouping of the freshwater ecosystems associated with the project site

The activities associated with the construction and operation of the proposed power line alternative 1 and 2 pose a “low” risk significance to the freshwater ecosystems within the study and investigation areas, provided that the supporting structures are placed outside the 32m ZoR of the freshwater ecosystems. However, the construction phase of the proposed substation poses a “high” risk significance to the valley bottom wetland, whilst the operational phase of the proposed substation poses a “low” risk significance, as the majority of impacts are likely to have occurred during the construction phase.

Since the proposed substation will result in the loss of approximately 2,50 ha of valley bottom wetland (associated with the substation), it is advised that the layout footprint of the substation be revised so as to avoid the freshwater ecosystems and the associated 32m NEMA ZoR associated with the study and investigation areas. All mitigation measures as stipulated in the report, must be implemented to prevent any edge effects and cumulative impacts from occurring on the freshwater ecosystems within the study and investigation areas.

Alternative 1 of the proposed power lines is the preferred alternative from a freshwater ecological management perspective. Alternative 1 traverses fewer freshwater ecosystems and thus poses a lower risk to the freshwater environments. Sections of Alternative 1 are also located along an existing power line. As such, if the existing supporting structures are upgraded or new pylons erected adjacent to existing pylons, the potential risks associated with the construction of supporting structures will be significantly reduced.

9.7 Biodiversity (Fauna and Flora)

9.7.1 Flora

9.7.1.1 Critical Biodiversity Areas and Ecological Support Areas

A biodiversity assessment Study was undertaken by Ecoagent (October 2022) to assess the fauna, vegetation and flora. The site is situated within the Eastern Highveld Grassland (Gm 12) vegetation type (Mucina & Rutherford 2012). According to Mucina & Rutherford (2006, 2012) Eastern Highveld is classified as Endangered. In Eastern Highveld Grassland about 44% has been ploughed for agriculture (Mucina & Rutherford 2006) or utilised for coal mining and very little (<1%) is statutorily conserved. According to SANBI & DEAT (2009) and NEMBA, Government Notice 1002 (2011) the Ecosystem status for this vegetation type is Vulnerable. This is because so much is already transformed, particularly by mining, agriculture and town and industrial development. The remaining natural habitats generally show evidence of grazing.

On the specific site the vegetation is mostly transformed by agriculture, with little original indigenous grassland vegetation remaining. The wetlands and drainage lines are mostly still natural, though often ploughed up to the edges and often grazed by livestock.

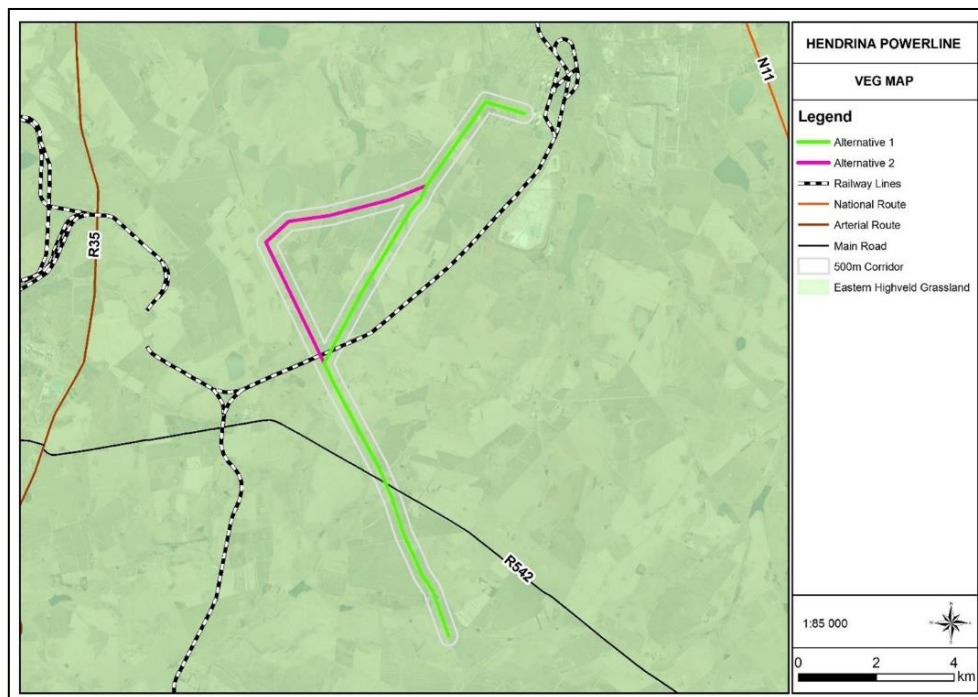


Figure 13: The site is located within the Eastern Highveld Grassland (Mucina & Rutherford 2006).

9.7.1.2 Critical Biodiversity Areas and Ecological Support Areas

In terms of the MBSP (Mpumalanga Biodiversity Sector Plan) Terrestrial Assessment, no Irreplaceable CBAs occur along the transect area. A small CBA Optimal site occurs in the wetland in the north, close to the Hendrina Power Station (Pullens Hope). Most of the transect is Heavily Modified or small local areas Moderately modified. Most wetlands are classified as Other Natural Areas.

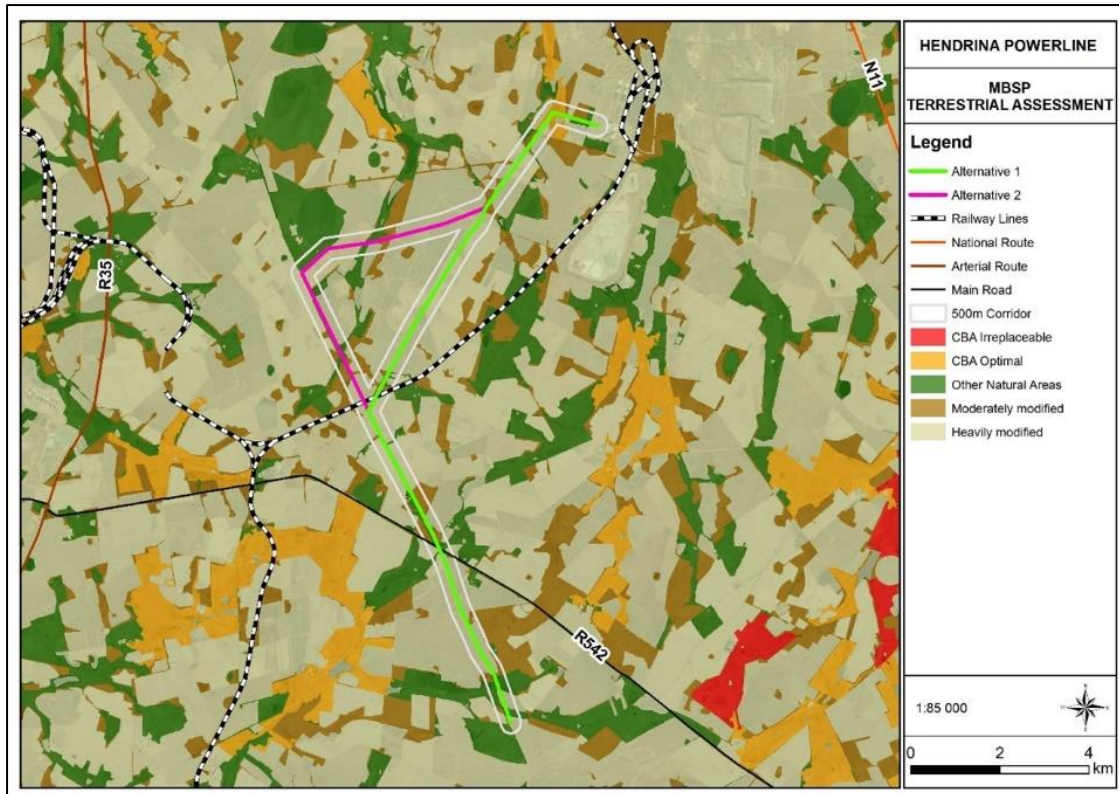


Figure 14: Mpumalanga Biodiversity Sector Plan Map showing the project site

9.7.1.3 Site sensitivity

Five plant communities were identified and mapped, with two additional mapping units namely Degraded area and Power station:

- **Agricultural Fields – Low sensitivity**

From a vegetation and flora point of view, there is no objection against the transect of the proposed power line through the agricultural fields. At several places within the study area, cultivated lands were observed under existing power lines



Figure 15: Agricultural field with Hendrina Power Station in the background. A drainage line (dammed) visible on the left.

- **Dry grassland – Low sensitivity**

Two small patches of Dry Grassland were recognised, one in the north, east of the Hendrina Power Station (Pullens Hope), where the proposed power line enters the power station, and the other on the south at the proposed Wind Energy Facility site. The grassland at the northern site is highly disturbed, with several existing power lines crossing the area. The southern Dry Grassland at the proposed Wind Energy Facility site is less disturbed but appears to be secondary, totally dominated by *Eragrostis curvula* with patches of old planted Kikuyu grass and several scattered weedy species. Two planted exotic trees are present at some old ruins.



Figure 16: The disturbed Dry Grassland at the Hendrina Power Station (Pullens Hope).

- **Moist Grassland – High sensitivity**

The Moist Grasslands are regarded as wetlands. All wetland systems in South Africa have legal protection (National Water Act (2004)). These Grassland therefore have **High** ecological sensitivity and therefore **High** conservation value. In some cases, the Moist Grassland has been ploughed. It is suggested that, if feasible, no pylons should be located within pristine (not previously ploughed) Moist Grassland. This may be a problem on Rietfontein and Aberdeen.



Figure 17: Moist Grassland

- **Drainage Lines – High sensitivity**

The Drainage Lines are all regarded as wetlands. All wetland systems in South Africa have legal protection (National Water Act (2004)). The wetlands within the transect corridor have **High** ecological sensitivity and therefore **High** conservation value. It is suggested that, if feasible, no pylons should be located within a drainage line, but the power lines should easily cross over most of the drainage lines on the route.



Figure 18: Drainage lines

- **Pan – High sensitivity**

A single Pan is located just north of the Alternate Route (**Figure 19**). This pan is added to the report as a cautionary measure, as all pans in the area are regarded to be highly sensitive, with specialised habitat for fauna and flora. The pan edge vegetation is very similar to the Drainage Lines and are not described further.



Figure 19: The pan

A vegetation map showing the distribution of the mapping units is presented in **Figure 20** while the ecological sensitivity is given in **Figure 21** below

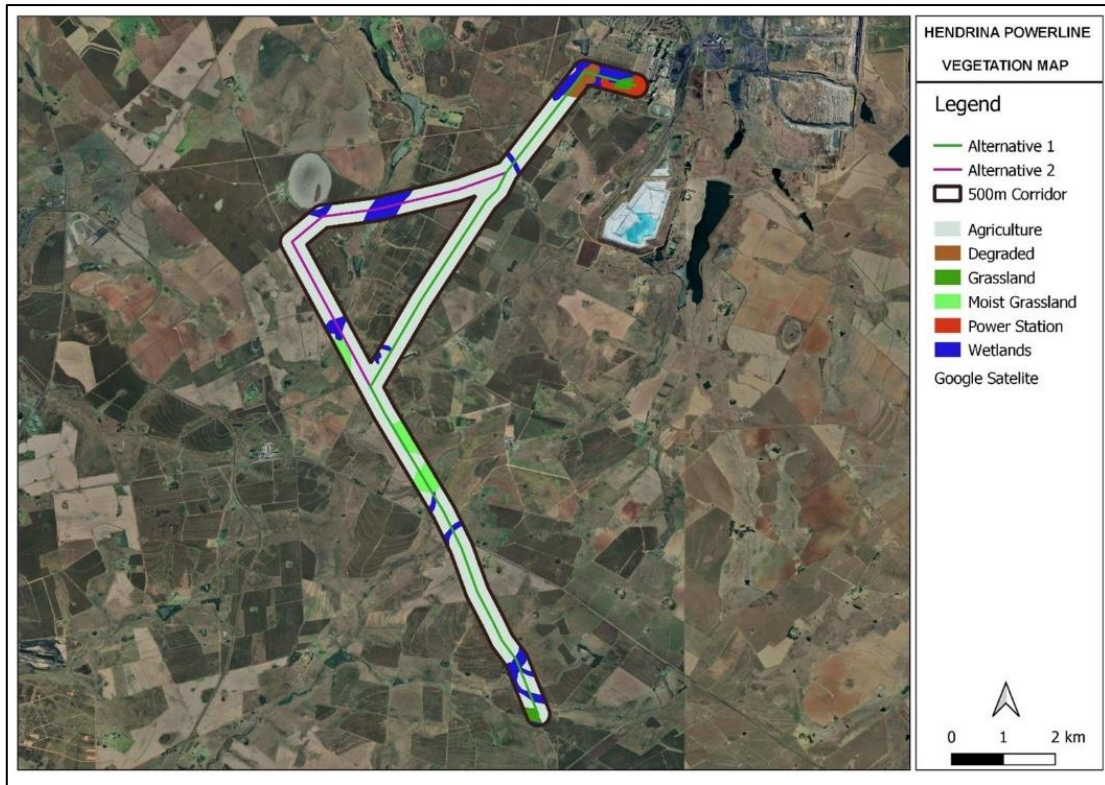


Figure 20: A vegetation map of the project site

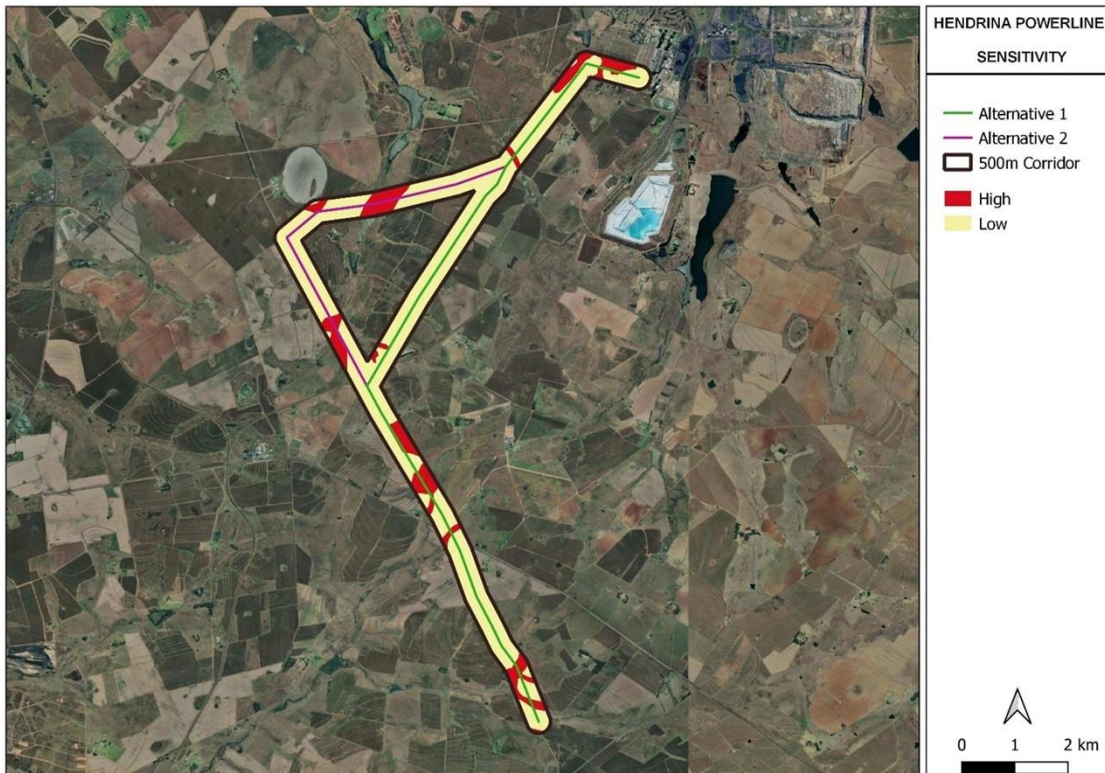


Figure 21: An ecological sensitivity map of the project

The results of the vegetation and flora study indicate that most of the terrestrial habitat areas along the power line transect corridor have been transformed for cultivation with very little original natural vegetation remaining. From a vegetation and flora perspective these areas have low species richness, no threatened or protected plant species and low conservation value. Very limited areas still contain natural primary vegetation. Two small areas, one on the north at the Hendrina Power Station, and one in the south at the only drainage line areas and their floodplains (Moist Grassland) have high ecological sensitivity and high conservation value.

No Irreplaceable CBAs occur along the transect area. A small CBA Optimal site occurs in the wetland in the north, close to the Hendrina Power Station. Most of the transect is Heavily Modified or small local areas Moderately Modified. Most wetlands are classified as Other Natural Areas.

The vegetation study of the proposed power line transects resulted in the identification of five different plant communities (ecosystems on the plant community level of organisation) that could be mapped. The terrestrial plant communities identified have low plant species richness, no threatened, red data or protected plant species were recorded on the two transect corridor sites. The result of the sensitivity assessment indicates that the Wetlands have High ecological sensitivity. The Agricultural Fields, and Dry Grasslands have Low ecological sensitivity and Low conservation value, due to their transformed status.

The construction of the proposed power line can be supported. Care should be taken with positioning of pylons in the larger Moist Grassland areas and the crossing of Drainage Lines.

9.7.2 Fauna

9.7.2.1 Mammals

It is estimated that 46 mammal species may from time to time occur on or near the study site area, and 17 were confirmed on or close to the site. Six of the species are listed as Red Data species. African Clawless Otter was found on a farm in the study area (MTPA). Although the Spotted-Necked Otter is mentioned as medium sensitive within the study area, this species needs larger, pristine water bodies and streams and because of their narrow dependence on large permanent wetland habitat, it is probably not present in the area of the site transect.

The Southern African hedgehog occurs in a wide variety of habitat types but must have vegetation cover. The study site has suitable habitat therefore this species may be present in the corridor transect, but the large area used for agriculture limits the distribution and occurrence of this species.

None of the mammal species predicted to visit the area of the site, will be threatened by the construction of the pylons and power line, or during the operational phase. These mammal species are all quite motile and if present in the way of the power line during construction, will easily move away from the danger. Although linear and stretching over about 20 km, the area affected is way too small to affect any of the mammal species. From a mammal perspective, the power line can be supported.

9.7.2.2 Herpetofauna Habitat Assessment

Of the 39 reptile species that may occur on the study site, three were confirmed during the site visit (*Ichnotropis capensis*, *Trachylepis capensis*, *Hemachatus haemachatus*).

The species assemblage is typical of what can be expected of the habitats on the site or the vicinity of the site. Most of the species of the resident diversity are fairly common and widespread e.g., the common house snake, Cape skink, speckled rock skink, variable skink, yellow-throated plated lizard, common river frog, striped stream frog, guttural toad and red toad. The species richness is poor to fair due to the fact that only two habitat types occur on or near the study site.

9.7.2.3 Threatened and Red listed Reptile and Amphibians Species

The study site falls outside the natural range of Nile crocodile, Southern African python, Breyer's long-tailed seps, spotted shovel-nosed frog, large-scaled grass lizard, giant dragon lizard and Fitzsimons' flat lizard. These species should not occur on the site.

The striped harlequin snake has not been recorded on this quarter degree square (TVL Museum Records or Ditsong Museum of Natural History), and no moribund termitaria, where this species is most likely to be found, are present on the study site. It is very difficult to confirm whether this cryptic snake is present on any study site, but this species should not occur on the study site.

The coppery grass lizard has been recorded on this quarter degree square (TVL Museum Records or Ditsong Museum of Natural History) but grassland is too limited in the study site and this species should not occur on the site.

Giant bullfrogs need temporary dams in order to avoid predation from fish. There may be temporary water bodies with gradual sides on or near the study site, where bullfrogs may breed. This species may occur on or near the study site. The Red Data status of the Giant Bullfrog was recently changed to Least Concern, but there is still some disagreement on this. No threatened herpetofauna species were recorded from the area of the site. Should wetland areas be protected, most herpetofauna species will not be threatened by the construction of the pylons and power line, or the phase of operation

9.8 Avifauna

An Avifaunal Assessment was undertaken by Chris van Rooyen Consulting (October 2022). According to the assessment, it is estimated that a total of 186 bird species could potentially occur in the broader area. Of these, 66 species are classified as power line sensitive species and 10 of these are South African Red List species. Of the power line sensitive species, 33 are likely to occur regularly in the Project Area of Interest (PAOI). The PAOI is not located in an Important Bird Area (IBA). The nearest IBA to the PAOI is the Amersfoort-Bethal-Carolina IBA (SA018), located approximately 6.3km east of the site. The key species within this IBA is the Botha's Lark (Globally Endangered, Regionally Endangered); however, this species was neither detected within the SABAP2 monitoring broader area of PAOI, nor during the four seasons of pre-construction monitoring at the Hendrina North WEF which included large parts of the PAOI.

Additional trigger species for the Amersfoort-Bethal-Carolina IBA include highly mobile power line sensitive species which may utilise the PAOI for dispersal, foraging, roosting, or nesting purposes given the shared grassland ecotypes between the PAOI and the IBA, and so these species could be impacted by the project. Such trigger species include:

- *Secretarybird* (Globally Endangered, Regionally Vulnerable)
- *Denham's Bustard* (Globally Near Threatened, Regionally Vulnerable)
- *Martial Eagle* (Globally Endangered, Regionally Endangered)

- Lanner Falcon (Globally Least Concern, Regionally Vulnerable)
- Southern Bald Ibis (Globally Vulnerable, Regionally Vulnerable)

Bird counts were conducted in representative habitat in the PAOI and immediate environment in the following sampling periods:

- 1) 04 – 15 July 2020
- 2) 29 October – 03 November 2020
- 3) 09 February, 15 – 19 February, 09 – 11 March 2021
- 4) 30 April – 11 May 2022
- 5) 27 September 2022

Table 16 below list all the power line sensitive species recorded during surveys in the PAOI and immediate environment:

Table 16: Power line sensitive species recorded during survey in the PAOI and immediate environment

Species name	Scientific name
Bustard, Denham's	<i>Neotis denhami</i>
Buzzard, Common	<i>Buteo buteo</i>
Buzzard, Jackal	<i>Buteo rufofuscus</i>
Coot, Red-knobbed	<i>Fulica cristata</i>
Cormorant, Reed	<i>Microcarbo africanus</i>
Cormorant, White-breasted	<i>Phalacrocorax lucidus</i>
Crane, Grey Crowned	<i>Balearica regulorum</i>
Crow, Pied	<i>Corvus albus</i>
Darter, African	<i>Anhinga rufa</i>
Duck, Fulvous Whistling	<i>Dendrocygna bicolor</i>
Duck, White-faced Whistling	<i>Dendrocygna viduata</i>
Duck, Yellow-billed	<i>Anas undulata</i>
Eagle, African Fish	<i>Haliaeetus vocifer</i>
Eagle, Black-chested Snake	<i>Circaetus pectoralis</i>
Eagle, Long-crested	<i>Lophaetus occipitalis</i>
Eagle-Owl, Spotted	<i>Bubo africanus</i>
Egret, Great	<i>Ardea alba</i>
Egret, Intermediate	<i>Ardea intermedia</i>
Egret, Little	<i>Egretta garzetta</i>
Egret, Western Cattle	<i>Bubulcus ibis</i>
Falcon, Amur	<i>Falco amurensis</i>
Falcon, Lanner	<i>Falco biarmicus</i>
Flamingo, Greater	<i>Phoenicopterus roseus</i>
Flamingo, Lesser	<i>Phoeniconaias minor</i>
Goose, Egyptian	<i>Alopochen aegyptiaca</i>
Goose, Spur-winged	<i>Plectropterus gambensis</i>

ENERTRAG SOUTH AFRICA (PTY) LTD

Prepared by:



Project No. 17791
 Description Hendrina North Grid
 Revision No. 1.0

Species name	Scientific name
Grebe, Great Crested	<i>Podiceps cristatus</i>
Grebe, Little	<i>Tachybaptus ruficollis</i>
Guineafowl, Helmeted	<i>Numida meleagris</i>
Hamerkop	<i>Scopus umbretta</i>
Harrier, Montagu's	<i>Circus pygargus</i>
Harrier-Hawk, African	<i>Polyboroides typus</i>
Heron, Black-headed	<i>Ardea melanocephala</i>
Heron, Grey	<i>Ardea cinerea</i>
Ibis, African Sacred	<i>Threskiornis aethiopicus</i>
Ibis, Glossy	<i>Plegadis falcinellus</i>
Ibis, Hadada	<i>Bostrychia hagedash</i>
Ibis, Southern Bald	<i>Geronticus calvus</i>
Kestrel, Greater	<i>Falco rupicoloides</i>
Kestrel, Rock	<i>Falco rupicolus</i>
Korhaan, Blue	<i>Eupodotis caerulescens</i>
Owl, Marsh	<i>Asio capensis</i>
Pochard, Southern	<i>Netta erythrophthalma</i>
Secretarybird	<i>Sagittarius serpentarius</i>
Shoveler, Cape	<i>Spatula smithii</i>
Sparrowhawk, Black	<i>Accipiter melanoleucus</i>
Spoonbill, African	<i>Platalea alba</i>
Stork, White	<i>Ciconia ciconia</i>
Stork, Yellow-billed	<i>Mycteria ibis</i>
Teal, Red-billed	<i>Anas erythrorhyncha</i>

9.8.1 Protected areas

According to the South African Protected Areas database (SAPAD), the closest protected area is the Heyns Private Nature Reserve, which is located approximately 12km north-east of the PAOI. No further information could be obtained about the nature reserve. However, from an avifaunal perspective the state of the habitat and land use at the development areas is more important than the legal status. The habitat at the reserve has already been impacted by mining, which would have had a negative impact on the avifauna.

The following environmental sensitivities were identified from an avifaunal perspective for the proposed grid connection:

Very high sensitivity: drainage lines, dams, pans, and associated herbaceous wetlands.

Wetlands (including dam margins) are important breeding, roosting and foraging habitat for a variety of priority species, particularly waterbirds, as well as seven Red List species, namely:

1. Crane, Grey Crowned (*Globally Endangered, Regionally Endangered*)
2. Duck, Maccoa (*Globally Endangered, Regionally Near Threatened*)
3. Eagle, Martial (*Globally Endangered, Regionally Endangered*)
4. Falcon, Lanner (*Globally Least Concern, Regionally, Vulnerable*)
5. Flamingo, Greater (*Globally Least Concern, Regionally Near Threatened*)
6. Secretarybird (*Globally Endangered, Regionally Vulnerable*)
7. Stork, Yellow-billed (*Globally Least Concern, Regionally Endangered*)

Birds commuting between these areas will be at risk of collision with the earth-wire if they must cross over the grid connection. Spans crossing these areas, or situated between two or more such areas, must be identified during the walk-through inspection once the final tower positions have been determined and marked with Bird Flight Diverters.

High sensitivity: undisturbed natural grassland

The natural grassland is vital breeding, roosting and foraging habitat for a variety of Red List power line sensitive species and will therefore be associated with significant flight activity. These include the following five Red List species:

1. Eagle, Martial (*Globally Endangered, Regionally Endangered*)
2. Falcon, Lanner (*Globally Least Concern, Regionally Vulnerable*)
3. Ibis, Southern Bald (*Globally Vulnerable, Regionally Vulnerable*)
4. Korhaan, Blue (*Globally Near Threatened, Regionally Least Concern*)
5. Secretarybird (*Globally Endangered, Regionally Vulnerable*)

Spans crossing these areas, or situated between two or more such areas, must be identified during the walk-through inspection once the final tower positions have been determined and marked with Bird Flight Diverters.

Medium sensitivity: disturbed natural grassland/fallow agricultural land

Disturbed natural grassland and fallow agricultural land provide similar foraging, roosting, and potentially breeding opportunities for priority species which depend upon natural grassland, including the same five Red List species listed for natural undisturbed grassland.

Spans crossing these areas, or situated between two or more such areas, must be identified during the walk-through inspection once the final tower positions have been determined and marked with Bird Flight Diverters.



Figure 22: Map of the environmental sensitivities associated with the PAOI of the Hendrina North Grid Infrastructure.

According to the DFFE national screening tool, small sections of the habitat within the PAOI are classified as High sensitivity according to the Animal Species theme, due to the potential presence of species of conservation concern (SCCs), namely Yellow-billed Stork *Mycteria ibis* (Globally Least Concern, Regionally Endangered). Most the habitat within the PAOI is classified as medium sensitivity due the presence of other SCCs, namely, White-bellied Korhaan *Eupoditis senegalensis* (Globally Least Concern, Regionally Vulnerable), African Grass Owl *Tyto capensis* (Globally Least Concern, Regionally Vulnerable) and Caspian Tern *Hydroprogne caspia* (Globally Least Concern Regionally Vulnerable).

The classification of High sensitivity for Yellow-billed Stork is supported based on the habitat recorded during surveys, but in addition the PAOI as a whole should be reclassified as High based on the recorded presence of SCCs recorded in the PAOI during monitoring, namely Secretarybird (Globally Endangered, Regionally Vulnerable), Martial Eagle (Globally Endangered, Locally Endangered), Lanner Falcon (Locally Vulnerable), Southern Bald Ibis (Globally Vulnerable, Regionally Vulnerable), Blue Korhaan (Globally Near Threatened, Regionally Least Concern), and Grey Crowned Crane (Globally and Locally Endangered).

The proposed Project will have a range of pre-mitigation impacts from medium to high on priority avifauna, but it is expected to be reduced to acceptable low levels with appropriate mitigation. No fatal flaws were discovered during the investigations, therefore the authorisation of the project is supported, provided the recommendations in this report is strictly implemented.

9.9 Agricultural

An agricultural compliance statement and site sensitivity verification was undertaken by Johann Lanz (October 2022). The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is used for cropland or not. All cropland is

classified as at least high sensitivity, based on the logic that if it is under crop production, it is indeed suitable for it, irrespective of its land capability rating.

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The data is generated by GIS modelling. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land, based on its soil, climate and terrain. The higher land capability values (≥ 8 to 15) are likely to be suitable as arable land for crop production, while lower values are only likely to be suitable as non-arable grazing land.

A map of the proposed power line, overlaid on the screening tool sensitivity, is given in **Figure 23**, but as noted above, the screening tool sensitivity of the power line corridor is largely irrelevant to agricultural impact. The only relevance is that pylons should be located outside of or on the edges of cropland where they do not interfere with it.

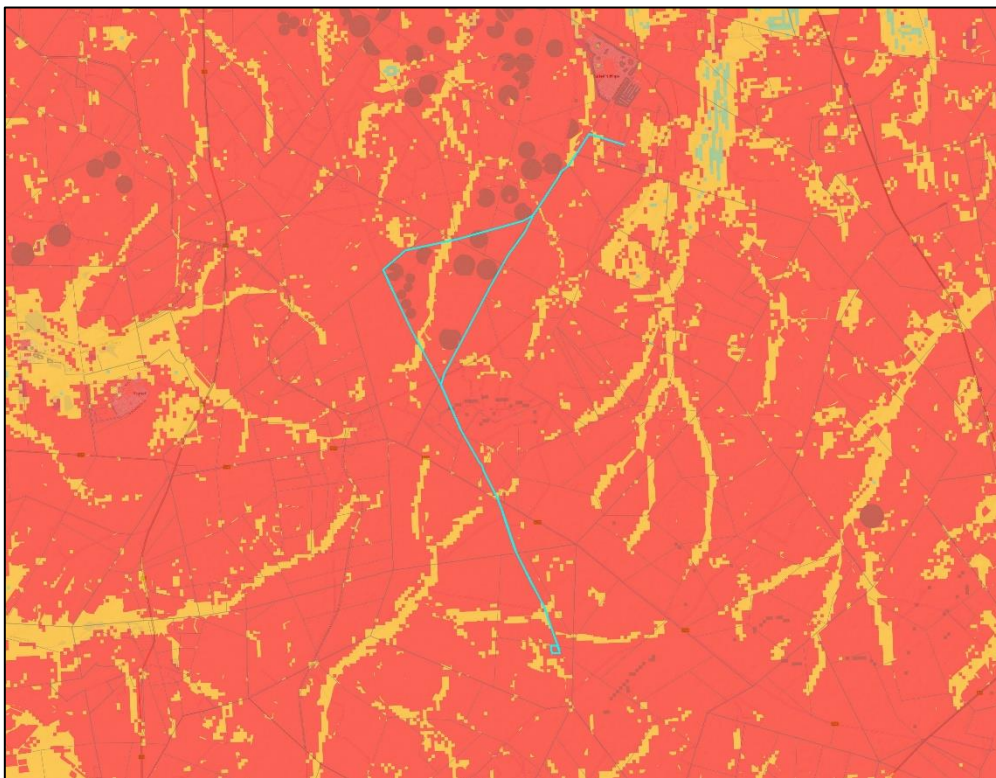


Figure 23: The proposed power line (both alternatives) plus the substation on its southern end overlaid on agricultural sensitivity as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high).

The agricultural sensitivity of the substation footprint is relevant because that land will be permanently removed from agricultural production. The classified land capability of the substation site is 9 to 10, which translates to a high agricultural sensitivity.

However, the site is not on cropland. At this scale, historical land use is actually a more reliable indication of soil cropping potential than land capability. The suitable versus the unsuitable soils have been identified over time through trial and error. In an agricultural environment like the one being

assessed, all the suitable soils are generally cropped, and uncropped soils can therefore fairly reliably be considered to be unsuitable for crop production. Therefore, in contrast to what the screening tool and land capability data indicate, the substation site should be classified as medium agricultural sensitivity because it is unsuitable for crop production.

10. DESCRIPTION OF THE SOCIO- ECONOMIC ENVIRONMENT

This chapter summarizes the attributes associated with the proposed project study area focusing on the social, economic, heritage and cultural aspects.

10.1 Socio Economic Characteristics

10.1.1 Nkangala District Municipality

The Nkangala District Municipality is a Category C municipality in the Mpumalanga Province. It is the smallest district of the three in the province, making up 22% of its geographical area. It is comprised of six local municipalities: Victor Khanye, Emalahleni, Steve Tshwete, Emakhazeni, Thembisile Hani, and Dr JS Moroka. The district's headquarters are in Middelburg. Nkangala is at the economic hub of Mpumalanga and is rich in minerals and natural resources. A strength of the district is the Maputo Corridor, which brings increased potential for economic growth and tourism development.

The following cities/towns are also located within the Nkangala district.

- Delmas
- Dullstroom
- Emgwenya (Waterval Boven)
- Hendrina
- Kriel,
- KwaMhlanga,
- Mdala Nature Reserve,
- Middelburg,
- Ogies,
- Phola,
- Pullens Hope,
- Rietkuil,
- eMakhazeni,
- eMalahleni,
- eNtokozweni (Machadodorp)

The main economic sectors of the district are:

- Mining
- Manufacturing
- Energy
- Tourism
- Agriculture

10.1.2 Steve Tshwete Local Municipality

The Steve Tshwete Local Municipality (previously Middelburg Local Municipality) is a Category B municipality located in the Nkangala District of the Mpumalanga Province. It is one of the larger municipalities of the six in the district. The municipality is named after Steve Tshwete, an ANC activist imprisoned by the apartheid authorities on Robben Island from February 1964 to 1983. In 1994, Middelburg and Mhluzi, as well as Hendrina and Kwazamokuhle, amalgamated to form the Transitional Local Councils. In 2001, the Transitional Local Councils of Middelburg and Hendrina, as well as some smaller towns, were amalgamated. A new municipality was formed, namely Steve Tshwete Local Municipality.

The local municipality was one of the four to have passed the 2009/10 audit by the Auditor-General of South Africa, who deemed it to have a clean administration. The seat of the Steve Tshwete Local Municipality is Middelburg.

10.2 Cultural/Historical Environment

10.2.1 Archaeological

An Archaeological Impact Assessment was undertaken by Beyond Heritage Pty Ltd (September 2022). The fieldwork conducted for the evaluation of the possible impact of the Hendrina grid connection infrastructure. It was confirmed during the survey that finds were limited to graves and ruins in the southern portion (but outside) of the impact area (Feature 089, 090, 091, 092, 093 and 094). A potential grave was identified close to this area (Feature 101) near the impact area. A small cemetery consisting of two graves (Feature 102) were recorded towards the middle of the project area and will be directly affected by the Project. Recorded heritage features were given waypoint numbers recorded in the field Refer **Figure 24** below. **Table 17** provides a brief description of the recorded observations.

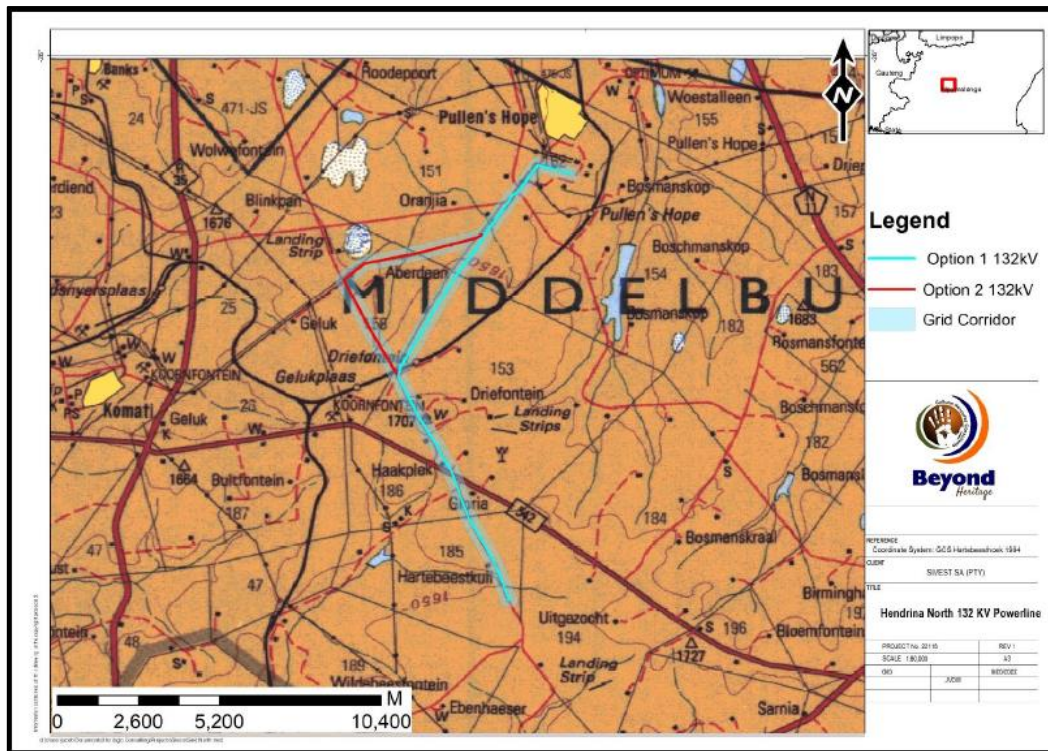


Figure 24: Locality of heritage features identified within the site

Table 17: Recorded features

Label	Location	Type Site	Description	Significance and Field Rating
089, 090, 091, 092	-26.1580157, 29.5780821	Ruins	Remains of a small homestead on the side of a large gravel road. The site consists of the remains of multiple small, demolished structures that are half buried under overgrown grass over an area measuring ~ 40 x 40m. Only the ephemeral foundations of the structures are left. These features are located in association with burial sites recorded as 093 and 094.	The ruins potential to contribute to aesthetic, historic, scientific and social aspects are non-existent, and it is therefore of low heritage significance (GP C) unless associated with burial sites (e.g., still born graves) in which case the burial sites are of high social significance (GP A)
093	-26.158594, 29.577451	Cemetery	Four graves situated in a small fenced off area (4 x 10 m) near the main access road traversing the study area. New granite gravestones and skirting have been placed over the graves with the older material laying on the side of the small cemetery.	GP A High Social significance

Label	Location	Type Site	Description	Significance and Field Rating
094	-26.158772, 29.577805	Cemetery	A single grave similar to that of feature 093. This grave is also fenced off and is probably that of a child due to its size. The grave also has a fairly modern granite gravestone and cover. - Dated 1932.	GP A High Social significance
101	-26.1574507, 29.5768876	Grave	Possible packed stone grave situated in an area close to the aforementioned sites. The possible grave consists of multiple stones that seem to have been packed with a piece of corrugated iron situated nearby that could have formed part of a grave marker.	GP A High Social significance
102	-26.1208848, 29.5613845	Cemetery	Family graves of the Van Wyks dating to 1936 and 1942 respectively situated directly under the proposed lines. The grave markers are made from granite headstones and covers. These graves are older than 60 years and is classified as archaeological.	GP A High Social significance



Figure 25: Demolished remains of structures at Feature 091.



Figure 26: General site conditions showing the ephemeral remains of the structures at Feature 091.



Figure 27: Grave dressings at Feature 093.



Figure 28: Single grave at Feature 094.



Figure 29: Possible stone packed grave at 101.



Figure 30: Corrugated iron that could have been a grave marker at 101.

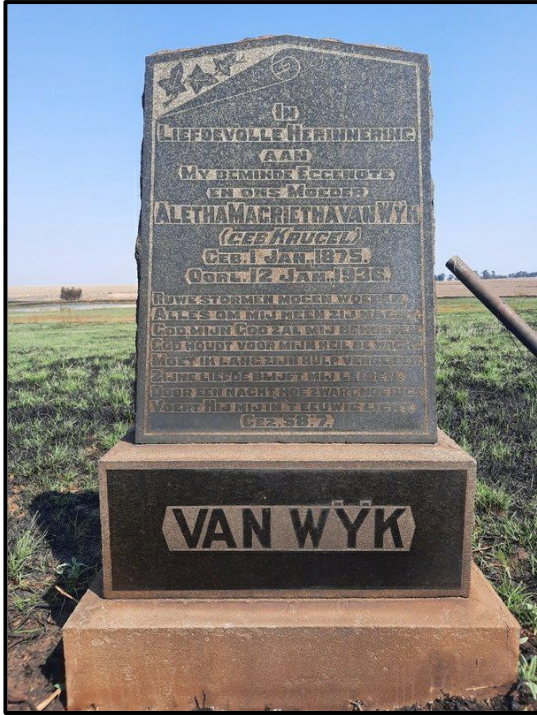


Figure 31: Headstone of Aletha van Wyk dating to 1936 at 102.

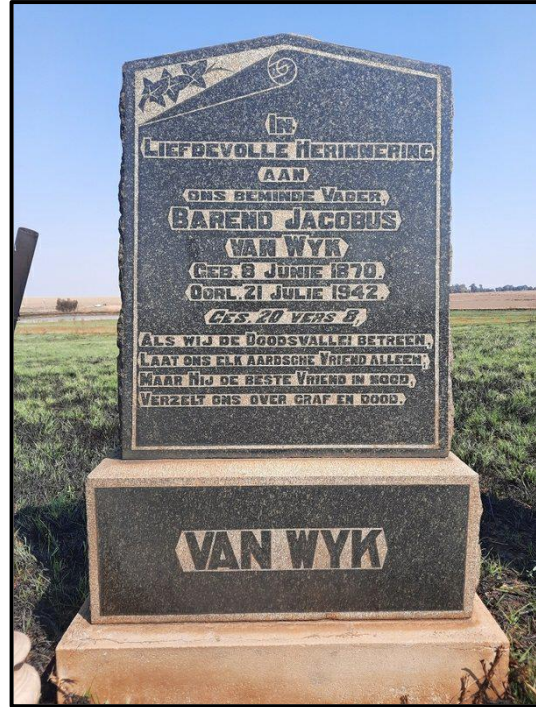


Figure 32: Headstone of Barend van Wyk at 102 dating to 1942.



Figure 33: General site conditions at 102.

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. Graves at 093, 094, 101 and ENERTRAG SOUTH AFRICA (PTY) LTD

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Project No. 17791
 Description Hendrina North Grid
 Revision No. 1.0

102 must be preserved in situ with a 30-meter buffer as mitigation measure (prescribed by SAHRA), which means that the line will have to be micro sited in the area where 101 and 102 were recorded. After mitigation the impact will be Low.

No direct impact is foreseen on ruins (089, 090, 091 and 092) and graves (093 and 094), but the features should be indicated on development plans and avoided. Although of low significance the possible presence of graves at the ruins is a risk, and the indirect impact, for both graves and ruins, is rated as low. Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure.

The impact to heritage resources can be mitigated to an acceptable level provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

10.2.2 Palaeontological

A phase 1 Desktop study Palaeontological Report was undertaken by Prof Marion Bamford (September 2022). The site lies in the northern part of the main Karoo Basin. The Karoo sediments unconformably overlie the rocks of the Transvaal Supergroup sequence. Exposed in this region are the non-fossiliferous rhyolite of the Selons River Formation and the granites of the Lebowa Granite Suite.

The Karoo Supergroup rocks cover a very large proportion of South Africa. They are bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

During the Carboniferous Period South Africa was part of the huge continental landmass known as Gondwanaland and it was positioned over the South Pole. As a result, there were several ice sheets that formed and melted, and covered most of South Africa. Gradual melting of the ice as the continental mass moved northwards and the earth warmed, formed fine-grained sediments in the large inland sea. These are the oldest rocks in the system and are exposed around the outer part of the ancient Karoo Basin and are known as the Dwyka Group.

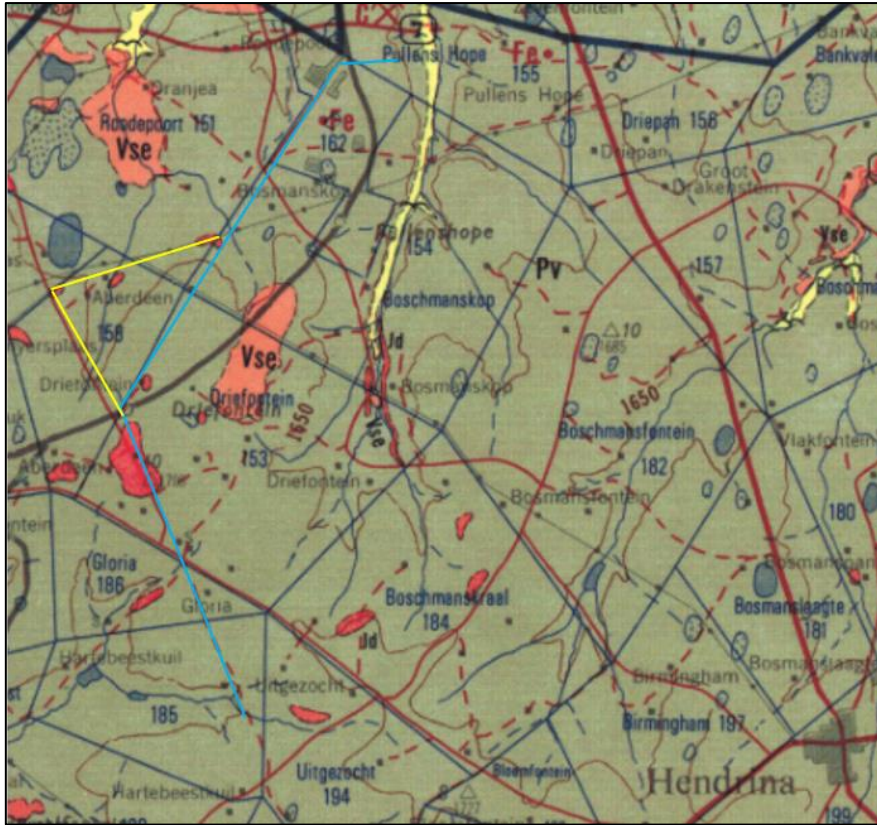


Figure 34: Geological map of the area around the Hendrina Substation and proposed power lines.

The palaeontological sensitivity of the grid routes under consideration are presented in **Figure 35**. The site for development is in the Vryheid Formation. The fossils preserved in this stratum are plants only and vertebrates are unknown. The plants are those of the Glossopteris flora comprising Glossopteris leaves, fructifications, wood and roots, and other plants such as lycopods, sphenophytes, ferns and early gymnosperms. Although the Vryheid formation shales and sandstones are potentially fossiliferous, fossils are sporadic, and their occurrence is unpredictable. Fossils do not occur in the coal seams as this organic material has been greatly altered by heat and compression to form coal. Soils are weathered products of sediments and so not contain any recognisable fossil material.

Hendrina is on the border between the Ermelo Coal Field (formerly the Eastern Transvaal Coal field) to the east, and the Witbank Coal Field to the west. Drill core logging from the Witbank Coal Field shows that the uppermost shales and siltstones (the lithology that might preserve fossils) are 5-8m below the surface because they are covered by soils. There is no chance, therefore, of finding shales as rocky outcrops, or fossils in the upper 5m of soils.

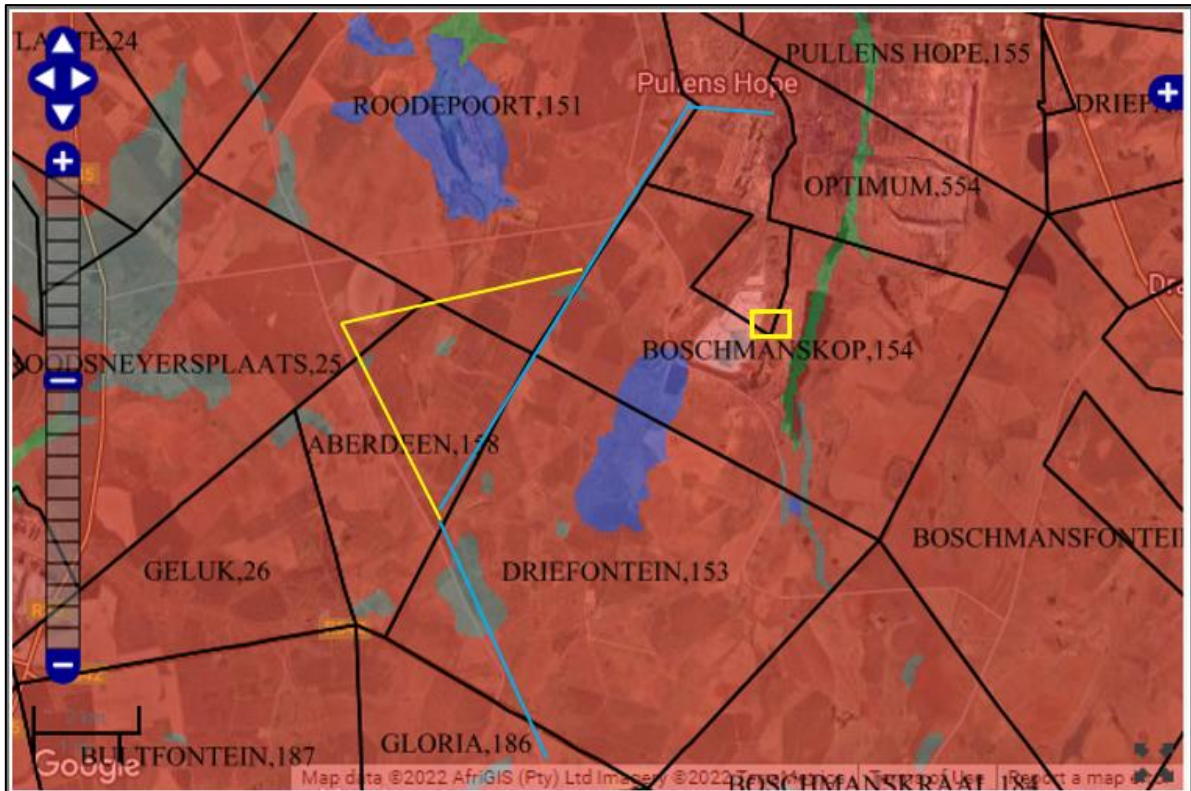


Figure 35: SAHRIS palaeosensitivity map for the site for the proposed northern routes for the Hendrina North Grid Connection

Most of the routes are along existing power line routes, farm borders and farm roads. The rest of the routes lie in recently or previously ploughed fields that would not have fossils because any stones have been removed before ploughing. Rocky outcrops, therefore, were targeted as there might be impressions of fossil plant in the shales of the Vryheid Formation. The routes are already very disturbed from roads, ploughed lands, a railway line and what appears to be underground water pipelines as there were several access points.

The routes were walked along (or driven along when roads were present), and the buffer zone was scanned visually. No fossils were seen on the land surface and no rocky outcrops were found.

Based on the nature of the Project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to contain fossils, namely the plants of the Glossopteris flora in the Vryheid Formation. Although no fossils were found during the site visit surveys, there is an extremely small chance that fossils from beneath soils in the Vryheid Formation may be disturbed if excavations for foundations are deeper than about 5m. Therefore, a Fossil Chance Find Protocol has been compiled. If fossils are found by the environmental officer or other responsible person once excavations for foundations and infrastructure have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low, therefore as far as the palaeontology is concerned the project should be authorised. There is no preferred route and there is no no-go area.

10.3 Visual

A Visual Impact Assessment was undertaken by SRK (Pty) Ltd (October 2022). According to the report, the visual quality is defined by the agricultural, mining and industrial activity as well as infrastructure. The naturally undulating landscape is interrupted by power lines, Hendrina Power Station, Afgri grain silo and the Optimum Coal Mine tailings dam. The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a rural agricultural area, albeit within a region blighted by development mostly associated with coal-fired power generation. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable.

- **Visual Exposure/ Visual Receptors**

The visual influence or viewshed zone determines visual exposure. The viewshed analysis makes the assumption that the project will have the greatest visibility possible in a space devoid of all plants and structures. The intended height of the pylons (around 40 m above ground) will make the two power line route alternatives highly visible. The viewshed suggests that some higher-elevation regions, such as those to the north and north-west of the power line route, will be able to see the proposed power line routes.

Visual receptors were identified based on surrounding land uses, primarily those in urban, farming and industrial areas. The visual receptors are briefly described below and linked to viewpoints (VP) indicated in **Figure 36** and **Table 18**:

- Residents in urban areas and farmsteads (VP 1–VP 7, VP 9–VP 14, VP 16, VP 18): The small town of Pullens Hope is located to the north-east of the power line alignment. Isolated farmsteads are interspersed throughout the area surrounding the power line alignment alternatives.
- Motorists (VP 1 – VP 8, VP 10, VP 12 – VP 13, VP 15, VP 17): The power line is routed parallel to numerous roads, including the R542, Pullens Hope Road and the gravel roads between farms. Both alignment alternatives are largely routed adjacent to roads, traversing some roads at few points.

The sensitivity of potential viewers identified are described below:

Residents in urban areas and farmsteads: The residents of Pullens Hope and the isolated farmsteads surrounding the site are considered to have varied visual sensitivities due to the few numbers of residents (of farmsteads) located in close proximity to the proposed power line alignments or substation. Residents of Pullens Hope located more than 1 km from the proposed alignments are not expected to have a view of the power line or substation. The residents of farmsteads, due to their proximity to the proposed power line alignments, are considered more sensitive than the residents of Pullens Hope.

Motorists: Motorists on the R542, Pullens Hope Road and the gravel roads between farms will be power line receptors, while motorists on the gravel road at the southern section of the power line route will be substation receptors. Motorists are considered to have relatively low sensitivity as in some cases their view of the project is fleeting and / or temporary. Furthermore, it is anticipated that these motorists are inured to power lines traversing the landscape as an existing, dense network of power lines is a characteristic of this region.

The high sensitivity of the visual receptors in close proximity to the proposed power line, e.g. residents of farmsteads, is moderated by the large number of transient motorists, as well as receptors' familiarity with and acceptance of views of power lines in the surrounding landscape. As such, the sensitivity of the viewers or visual receptors potentially affected by the visual impact of the project is considered to be moderate.

Table 18: Visibility from viewpoints

Viewpoint	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
VP 1	Pullens Hope, Pullens Hope Road	26° 1' 27.78" S 29° 35' 33.56" E	Looking south-west	Pullens Hope residents and motorists travelling on Pullens Hope Road.	Power line Alternative 1 & 2: Highly Visible The power line will be visible in the middle ground, however obscured by the many power lines connecting to Hendrina Power Station.
VP 2	Farmsteads 1	26° 2' 16.01" S 29° 34' 52.29" E	Looking north-east, east and south-west	Residents of farmsteads and motorists on Pullens Hope Road.	Power line Alternative 1 & 2: Highly Visible The power line will be visible in the foreground, routed along Pullens Hope Road.
VP 3	Bosmanskop Farm	26° 2' 35.97" S 29° 35' 2.98" E	Looking north and west	Residents of Bosmanskop Farm and motorists.	Power line Alternative 1 & 2: Visible The power line will be visible from the boundary of Bosmanskop Farm. It is anticipated that the vegetation around the farmstead will screen the power line from the residents.
VP 4	Farmstead 2	26° 2' 37.74" S 29° 33' 46.03" E	Looking east and south	Residents of farmstead and motorists on the gravel road.	Power line Alternative 2: Visible The power line will be visible in the background and partially obscured by the existing Hendrina-Abina power line to farmstead residents as well as motorists travelling along the gravel road
					Power line Alternative 1: Marginally Visible The power line will be marginally visible in the background, blending into the landscape as the power line extends southwards.
VP 5	Broodsnyersplaas BV Groendag	26° 1' 58.25" S 29° 31' 0.78" E	Looking east and south-east	Residents of farmstead and motorists on the gravel road.	Power line Alternative 2: Marginally Visible The power line will be marginally visible in the landscape.
					Power line Alternative 1: Not Visible The power line will not be visible to the south-east due to distance (> 5 kms) and intervening, elevated topography.

Viewpoint	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
VP 6	De Beer Farm	26° 3' 27.05" S 29° 31' 35.67" E	Looking east and south	Residents of De Beer Farm and motorists on gravel road.	Power line Alternative 2: Highly Visible The power line will be visible to the farmstead as well as motorists on the gravel road. The power line may be obscured and/or assimilated by the existing 132 kV power line that is visible in the landscape to the receptors.
					Power line Alternative 2: Not Visible The power line will not be visible to the receptors due to distance (> 3 kms).
VP 7	Farmstead 2	26° 4' 6.63" S 29° 31' 58.27" E	Looking north-east, east and south	Residents of farmstead and motorists travelling on the gravel road.	Power line Alternative 2: Highly Visible The power line will be visible to the north, north-east and west in the middle ground, but may be obscured by the existing 132 kV power line to the north and north-east. The farmstead is screened by vegetation.
					Power line Alternative 1: Visible The power line will be visible in the background.
VP 8	Afgri Grain Silo	26° 5' 18.32" S 29° 32' 37.67" E	Looking north-east and south	Motorists on the gravel road	Power line Alternative 2: Highly Visible The power line will be visible in the foreground as it is routed adjacent to the gravel road.
					Power line Alternative 1: Highly Visible The power line will be visible in the foreground and middle ground to the east and south, where the power line starts to route along the road.
VP 9	Farmstead 3	26° 4' 59.25" S 29° 33' 43.26" E	Looking north, west and south	Residents of the farmstead	Power line Alternative 2: Not Visible The power line will not be visible to receptors due to distance (> 3 kms) and intervening, elevated topography.
					Power line Alternative 1: Visible The power line will be visible to the north in the middle ground before it is screened by the grain silo in the north-west.
VP 10	Farmstead 4	26° 5' 53.83" S 29° 32' 54.06" E	Looking north-west and south-east	Residents of the farmstead and motorists on the gravel road.	Power line Alternative 1 & 2: Highly Visible The power line will be visible in the middle ground to residents of the farmstead set back from the gravel road.

Viewpoint	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
VP 11	WA de Klerk Farm	26° 6' 19.23" S 29° 33' 44.45" E	Looking north, south-west and north-west	Residents of WA de Klerk Farm	Power line Alternative 1 & 2: Not Visible The power lines are not visible to the farmsteads on WA de Klerk Farm due to the intervening, elevated topography and orientation of the dwelling to the north-east.
VP 12	Farmstead 5	26° 6' 34.05" S 29° 33' 16.35" E	Looking north-west and south-east	Residents of farmstead and motorists on the gravel road	Power line Alternative 1 & 2: Highly Visible The power line will be visible to the farmstead residents as well as motorists in the foreground.
VP 13	R542	26° 7' 11.35" S 29° 33' 32.89" E	Looking east and south	Residents of dwellings adjacent to the R542 and motorists on the R542.	Power line Alternative 1 & 2: Highly Visible The power line will be visible to farmstead residents as well as motorists in the foreground. There are no other power lines to screen and/or assimilate views of the proposed power line.
VP 14	Farmstead 6	26° 8' 20.34" S 29° 32' 31.81" E	Looking east and south-east	Residents of farmstead	Power line Alternative 1 & 2: Marginally Visible The power line may be marginally visible in the background from the farmstead and is not screened partially by vegetation or topography. An existing, large power line is visible in the foreground.
VP 15	Hendrina WEF Substation	26° 9' 24.07" S 29° 34' 39.38" E	Looking north and south-west	Motorists on the gravel road.	Power line Alternative 1 & 2: Highly Visible The power line will be highly visible in the foreground to motorists travelling on this gravel road. The substation will be visible in the foreground to motorists.
VP 16	Farmsteads 7	26° 9' 52.45" S 29° 34' 54.29" E	Looking north-west	Residents of the farmstead and motorists on the gravel road.	Power line Alternative 1 & 2: Visible The power line will be partially visible to residents and motorists when not screened by the topography.
VP 17	Unnamed Road (South)	26° 9' 38.37" S 29° 35' 27.31" E	Looking north-west	Motorists on the unnamed road (south)	Power line Alternative 1 & 2: Marginally Visible The power line will be marginally visible in the background across the landscape.
VP 18	Farmstead 8	26° 5' 50.20" S 29° 35' 57.71" E	Looking west	Residents of the farmstead.	Power line Alternative 1 & 2: Not Visible The power line is not visible to receptors due to distance (> 5 kms) and intervening, elevated topography.

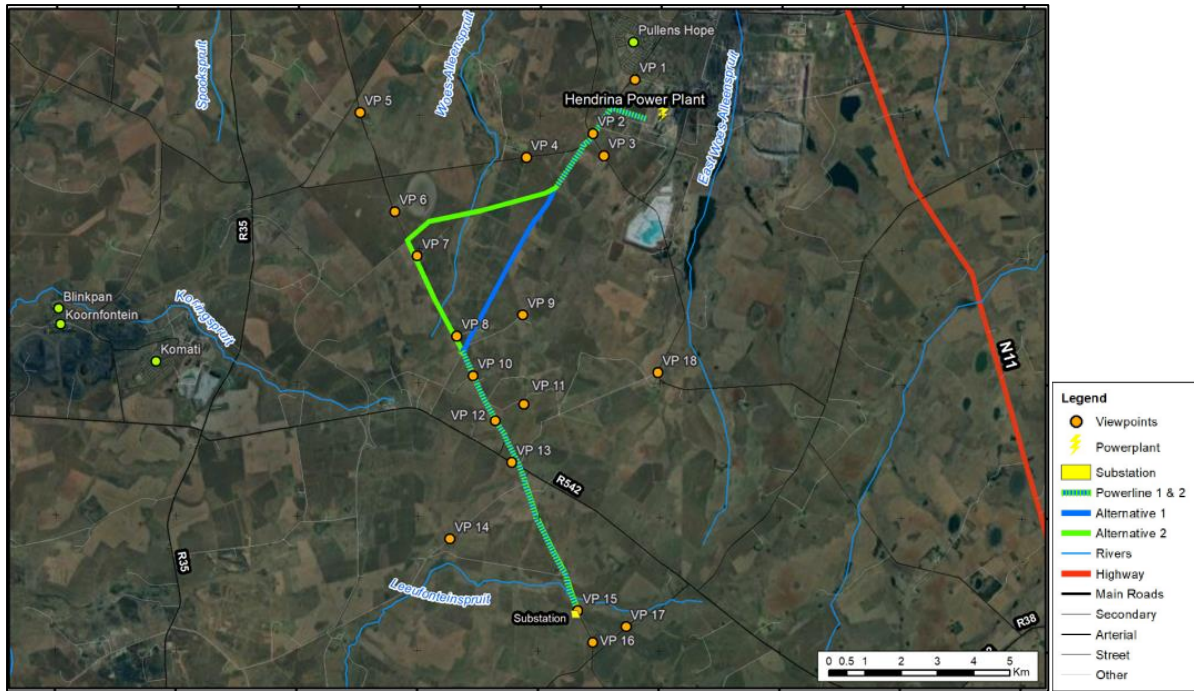


Figure 36: Viewpoints map

The proposed project is moderately congruent with and marginally affects the integrity of the landscape, as five power stations and the associated highly concentrated network of power lines exist within the project area and the wider region. Due to the high vertical profile of the pylons, the Visual Absorption Capacity of the project area is low, however the undulating topography is expected to increase the Visual Absorption Capacity to a degree. The substation will be screened by the topography to a limited degree and less so by the vegetation. The study area has a low VAC for the power line and substation.

11. POLICY AND LEGISLATIVE CONTEXT

The relationship between the project and certain key pieces of environmental legislation is discussed in the subsections to follow.

11.1 The Constitution

The Constitution of the Republic of South Africa, Act 108 of 1996 sets the legal context in which environmental law in South Africa occurs and was formulated. All environmental aspects should be interpreted within the context of the Constitution, National Environmental Management Act 107 of 1998 and the Environment Conservation Act 73 of 1989.

The Constitution has enhanced the status of the environment by virtue of the fact that an environmental right has been established (Section 24) and because other rights created in the Bill of Rights may impact on environmental management through, for example, access to health care, food and water and social security (Section 27). An objective of local government is to provide a safe and healthy environment (Section 152) and public administration must be accountable, transparent and encourage participation (Section 195(1) (e) to (g)).

Section 24 of the Constitution states that:

“Everyone has the right –

- *To an environment that is not harmful to their health or well-being; and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
 - *Prevent pollution and ecological degradation;*
 - *Promote conservation and*
 - *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”*

The Constitution is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

11.2 National Environmental Management Act (107 of 1998)

The National Environmental Management Act (Act No. 107 of 1998) was promulgated in 1998 but has since been amended on several occasions from this date.

The act intends to provide for:

- a) co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- b) institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
- c) to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment; and
- d) to provide for matters connected therewith.

NEMA is the overarching legislation which governs the BA process and environmental management in South Africa. Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA. Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

According to Section 2(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), “development must be socially, environmentally and economically sustainable”, which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The EIA Regulations, 2014 (as amended) identify lists of activities which have the potential to result in detrimental environmental impacts and thus require EA, subject to either “Basic Assessment” or “Scoping and Environmental Impact Assessment”. The Regulations prescribe the procedural and substantive requirements for the undertaking of EIAs and the issue of EA’s.

The proposed project triggers listed activities under Listing Notice 1, and 3 and thus requires an EA subject to a Basic Assessment (BA) Process. The listed activities are further detailed in Section 7 above.

11.3 Environmental Impact Assessment (EIA) Guideline for Renewable Energy Projects, DFFE Notice 989 of 2015

The purpose of this document is primarily to provide guidance on the environmental management legal framework applicable to renewable energy operations and all the role players in the sector. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders (e.g., Eskom, IDC, etc.);
- Private Sector Entities (as project funder / developer / consultant); and
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline seeks to identify activities requiring authorisation prior to commencement of that activity and provide an interface between national EIA Regulations and other legislative requirements of various authorities.

The guidelines are applicable for the construction, installation and/or development of the following renewable energy projects:

- Concentrating Solar Power (CSP) Plant;
- Wind Energy Facility (WEF);
- Hydropower Station; and
- Photovoltaic (PV) Power Plant.

As the proposed development is for electricity distribution infrastructure (namely an on-site substation and power lines) which will serve the Hendrina North WEF (part of a separate respective EIA process), it is subject to the recommendations proposed in the guidelines.

11.4 National Water Act (Act 36 of 1998)

The National Water Act (NWA) No 36 of 1998 was promulgated on the 20th of August 1998. This Act is important in that it provides a framework to protect water resources against over exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

Water resources as defined include a watercourse, surface water, estuary or aquifer. Specifically, a watercourse is defined as (inter alia):

- A river or spring;
- A natural channel in which water flows regularly or intermittently; and
- A wetland, lake or dam into which, or from which water flows.

Due to the possible encroachment into the wetland areas, the following Section 21 water uses in terms of the NWA may be triggered and require licensing:

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

In light of the above, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development. A Surface Water Impact Assessment (**Appendix 6**) has however been conducted to explore how the proposed development may impact on identified water resources as protected by the Act. Should the proposed development require a General Authorisation (GA) or Water Use Licence (WUL), it will be determined and applied for separately prior to construction.

11.5 The National Heritage Resources Act 1999 (25 of 1999)

The National Heritage Resources Act promotes good management of the heritage resources of South Africa which are deemed to have cultural significance and to enable and encourage communities to ensure that these resources are maintained for future generations.

The aim of the Act is to introduce an integrated, three-tier system for the identification, assessment and management of national heritage resources (operating at a national, provincial and local level). This legislation makes provision for a grading system for the evaluation of heritage resources on three levels which broadly coincide with their national, provincial and local significance.

This Act requires investigation to determine the impact of heritage resources when developments exceed the thresholds list in section 38 (1) of the act:

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50 m in length;
- (c) any development or other activity which will change the character of a site—
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

The proposed development would involve; (a) the construction of a power line exceeding 300m in length, (c) the development of grid connection infrastructure (substation) that will change the character of more than 0.5ha, and (d), the rezoning of a site that will exceed 1ha.

Under the legislation, the South African Heritage Resources Agency (SAHRA) was established, which replaced the National Monuments Council. SAHRA is responsible for the preservation of heritage resources with exceptional qualities of special national significance (Grade I sites). A Provincial Heritage Resources Authority, established in each province, will protect Grade II heritage resources which are significance within the context of a province or region. Buildings and sites of local interest (Grade III sites) is the responsibility of local authorities as part of their planning functions. In this case, the Mpumalanga Heritage Resources Authority (MHRA) will need to be consulted.

Within the scope of this project, Section 38 of the NHRA (25 of 1999), states that, as described above, an assessment of potential heritage resources in the development area needs to be done. An

Archaeological Impact Assessment (AIA) and Paleontological Impact Assessment (PIA) has therefore been commissioned to explore how the proposed development may impact on heritage resources and potential cultural artefacts as protected by the Act.

11.6 National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004, as amended)

As the principal national Act regulating biodiversity protection, the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004), which is administered by the DFFE, is concerned with the management and conservation of biological diversity, as well as the use of indigenous biological resources in a sustainable manner. The term biodiversity, according to the Convention on Biodiversity (CBD), refers to the variability among living organisms from all sources including, inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity in genes, species and ecosystems.

The overarching aim of the NEM:BA, within the framework of the NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

In terms of this Act, the developer has a responsibility to:

- Conserve endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations);
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity; and
- Limit further loss of biodiversity and conserve endangered ecosystems.

The South African National Biodiversity Institute (SANBI) was established in terms of the NEM:BA, its purpose being (inter alia) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems.

The NEM:BA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a 'restricted activity' involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 of the Act. According to Section 57 of the Act, 'Restricted activities involving listed threatened or protected species':

A Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on biodiversity as protected by the Act. Should the proposed development require offsets or permits, it will be determined and applied separately prior to construction.

In addition, all relevant conservation departments (such as the SANBI and Mpumalanga Tourism and Parks Agency) will be invited to provide comments with regards to the proposed development.

11.7 National Environmental Management: Protected Areas Act, 2003 (Act No.57 of 2003 as amended)

The overarching aim of the National Environmental Management: Protected Areas Act (NEMPAA) No. 57 of 2003, within the framework of NEMA, is to provide for:

- the declaration and management of protected areas;
- co-operative governance in the declaration and management of protected areas;
- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- a representative network of protected areas on state land, private land and communal land;
- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of protected areas, where appropriate; and
- the continued existence of South African National Parks.

The proposed project is not located in close proximity to any protected areas.

11.8 National Forests Act (NFA) (Act No. 84 of 1998)

The National Forest Act (NFA) (Act No. 24 of 1998) was enacted to:

- Provide for the protection, management and utilisation of forests;
- The protection of certain plant and animal life;
- The regulation of trade in forest produce; and
- The control and management of a national hiking way system and National Botanic Gardens.

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging, destroying or removing any protected tree. The list of protected trees is currently contained in GN 908 of 21 November 2014. Licenses are issued by the Minister and are subject to periods and conditions as may be stipulated.

Protected trees

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.

Forests

Prohibits the destruction of indigenous trees in any natural forest without a licence.

The NFA is relevant to the proposed development as the removal and/or disturbance and/or clearance of indigenous vegetation will be required and a license in terms of the NFA may be required for this to be done.

A Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on vegetation as protected by the Act.

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In addition, all relevant conservation departments (such as the SANBI and MTPA) will be invited to provide comments with regards to the proposed development.

11.9 National Veld and Forest Fire Act (Act No. 101 of 1998)

Provides requirements for veldfire prevention through firebreaks and required measures for firefighting. Chapter 4 of the Act places a duty on landowners to prepare and maintain firebreaks. Chapter 5 of the Act places a duty on all landowners to acquire equipment and have available personnel to fight fires.

11.10 Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) controls the utilisation of natural agricultural resources in South Africa. The Act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants. The Act requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

The primary objective of the Act is to conserve natural agricultural resources by:

- maintaining the production potential of land;
- combating and preventing erosion and weakening or destruction of the water resources;
- protecting vegetation; and
- combating weeds and invaders plants.

In terms of this Act, no degradation of natural land is permitted. Rehabilitation after disturbance to agricultural land is also managed by this Act. The CARA is relevant to the proposed development as the construction of a solar PV plant as well as other components (such as the on-site switching substation and permanent guard house) may impact on agricultural resources and vegetation on the site. The Act prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this. As such, measures will need to be taken to protect agricultural resources and prevent weeds and exotic plants from invading the site as a result of the proposed development.

Declared Weeds and Invaders in South Africa are categorised according to one (1) of the following categories:

- Category 1 plants: are prohibited and must be controlled.
- Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

An Agricultural and Soils Site Verification (**Appendix 6**) has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site. According to this assessment, the potential impact on the loss of agricultural land will be low and the

site is totally unsuitable for crop production and only suitable as grazing land. As such, no application in terms of CARA was recommended.

11.11 National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended)

The National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended) provides for all road traffic matters and is applied uniformly throughout South Africa. The Act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed development.

11.12 Civil Aviation Act (CAA) (Act No. 13 of 2009)

The Civil Aviation Act (CAA) (Act No. 13 of 2009) controls and regulates aviation within South Africa. It provides for the establishment of a South African Civil Aviation Authority (SACAA) and independent Aviation Safety Investigation Board in compliance with Annexure 13 of the Chicago Convention. It gives effect to various conventions related to aircraft offences, civil aviation safety and security, and provides for additional measures directed at more effective control of the safety and security of aircrafts, airports and matters connected thereto.

Although the Act is not directly relevant to the proposed development, it should be considered as the establishment of electricity distribution infrastructure (such as a substation and power lines) may impact on aviation and air traffic safety, if located directly within aircraft flight paths.

The Air Traffic and Navigation Services Company Limited (ATNS) and the SACAA will be consulted throughout the BA process and the required approvals will be obtained, where necessary. It is not however anticipated that any approvals will be required.

11.13 Astronomy Geographic Advantage Act (Act No. 21 of 2007)

The Astronomy Geographic Advantage Act (Act No. 21 of 2007) provides for:

- The preservation and protection of areas that are uniquely suited for optical and radio astronomy; and
- Intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas and matters connected therewith.

Under Section 22(1) of the Act, the Minister has the authority to protect the radio frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may under section 23(1) of the Act, declare that no person may undertake certain activities within a core or central Astronomy Advantage Area (AAA). These activities include the construction, expansion or operation; of any fixed radio frequency interference source, facilities for the generation, transmission or distribution of electricity, or any activity capable of causing radio frequency interference or which may detrimentally influence the astronomy and scientific endeavours.

In terms of section 7(1) and 7(2) of this Act, national government established the following AAAs:

- Central Karoo AAA (GN 198 of 2014) – proposed development falls outside this AAA

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- Sutherland Central AAA – proposed development falls outside this AAA
- Northern Cape AAA (GN 115 of 2010) – proposed development falls outside of this AAA

Even though the proposed development falls outside the respective AAAs, the relevant authorities, including the Square Kilometre Array (SKA) and South African Large Telescope (SALT), will be consulted throughout the BA process.

11.14 National Energy Act (Act No. 34 of 2008)

South Africa has two (2) acts that direct the planning and development of the country's electricity sector, namely:

- i. The National Energy Act of 2008 (Act No. 34 of 2008); and
- ii. The Electricity Regulation Act (ERA) of 2006 (Act No. 4 of 2006).

The National Energy Act (Act No. 34 of 2008), promulgated in 2008, has, as one (1) of its key objectives, the promotion of diversity of supply of energy and its sources. From this standpoint, the Act directly references the importance of the renewable energy (RE) sector, with a mention of the solar energy sector included. The aim is to ensure that the South African economy is able to grow and develop, fast-tracking poverty alleviation, through the availability of a sustainable, diverse energy mix. Moreover, the goal is to provide for the increased generation and consumption of RE (Republic of South Africa, 2008).

11.15 Electricity Regulation Act (Act No. 4 of 2006)

In 2011, the electricity regulation on new generation capacity was published under Section 35(4) of the Electricity Regulation Act (ERA) (Act No. 4 of 2006). These regulations apply to the procurement of new generation capacity by organs of state.

The objectives of the regulations include:

- To facilitate planning for the establishment of new generation capacity;
- The regulation of entry by a buyer and a generator into a Power Purchase Agreement (PPA);
- To set minimum standards or requirements for PPAs;
- The facilitation of the full recovery by the buyer of all costs efficiently incurred by it under, or in connection with, a PPA including a reasonable return based on the risks assumed by the buyer thereunder and to ensure transparency and cost reflectivity in the determination of electricity tariffs; and
- The provision of a framework for implementation of an Independent Power Producer (IPP) procurement programme and the relevant agreements concluded.

The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

11.16 Protection of Public Information Act (Act No. 4 of 2013)

The Protection of Public Information Act (Act No. 4 of 2013) (POPIA) recognises the Constitutional requirement that everyone has a right to privacy.

Ultimately the Act promotes “the protection of personal information processed by public and private bodies; to introduce certain conditions so as to establish minimum requirements for the processing of personal information; to provide for the establishment of an Information Regulator to exercise certain powers and to perform certain duties and functions in terms of this Act and the Promotion of Access to Information Act, 2000 (PAIA); to provide for the issuing of codes of conduct; to provide for the rights of persons regarding unsolicited electronic communications and automated decision making; to regulate the flow of personal information across the borders of the Republic; and to provide for matters connected therewith”.

Due to the requirements around the Public Participation Process, SIVEST will process, and capture information aligned to the POPIA and always obtain consent for I&APs information to be gathered, stored and distributed for the purpose of this project.

11.17 Additional Relevant Legislation

- White Paper on the Energy Policy of the Republic of South Africa (1998)
- Occupational Health and Safety Act (Act No. 85 of 1993) [OHSA];
- Environment Conservation Act (Act 73 of 1989) [ECA]
- Road Safety Act (Act No. 93 of 1996) [RSA];
- National Environmental Management: Air Quality Act (Act No. 39 of 2004) [NEM:AQA];
- National Environmental Management: Waste Act (Act No. 59 of 2008, as amended) [NEM;WA];
- Development Facilitation Act (Act No. 67 of 1995) [DFA];
- Promotion of Access to Information Act, (Act No. 2 of 2000); [PAIA]
- The Hazardous Substances Act (Act No. 15 of 1973) [HSA];
- Water Services Act (Act No. 108 of 1998) [WSA];
- Municipal Systems Act (Act No. 32 of 2000) [MSA];
- Subdivision of Agricultural Land Act, 70 of 1970 [SALA], and
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended) [MPRDA].

12. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

In his 2021 State of the Nation Address, President Cyril Ramaphosa announced government are taking the following measures to rapidly and significantly increase generation capacity outside of Eskom:

- *One of the priority investment areas is to rapidly expand energy generation capacity.*
- *Restoring Eskom to operational and financial health and accelerating its restructuring process is central to achieving this objective. Eskom has been restructured into three separate entities for generation, transmission and distribution.*
- *A Section 34 Ministerial Determination will be issued shortly to give effect to the Integrated Resource Plan 2019, enabling the development of additional grid capacity from renewable energy, natural gas, hydro power, battery storage and coal.*
- *We will initiate the procurement of emergency power from projects that can deliver electricity into the grid within 3 to 12 months from approval.*
- *The Department of Mineral Resources and Energy gazetted the Amended Schedule 2 of the Electricity Regulation Act 4 of 2006 on 12 August 2021, for 100 Megawatts of embedded electricity generation as approved by Minister Gwede Mantashe.*

- *We will negotiate supplementary power purchase agreements to acquire additional capacity from existing wind and solar plants.*
- *We will also put in place measures to enable municipalities in good financial standing to procure their own power from independent power producers.*

Policy decisions taken in the next decade will largely determine the dimension of the impact of climate change. Local government is in the front line of implementation and service delivery, and thus needs to pursue adequate mitigation and adaptation strategies which should include participation from the public sector, the private sector and NGOs.

The DoE gazetted its White Paper on Renewable Energy in 2003 and introduced it as a ‘policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.’ At that time, the national target was fixed at 10 000GWh (0.8Mtoe) renewable energy contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should be utilised for power generation and non-electric technologies such as solar water heating and biofuels. Since the White Paper was gazetted, South Africa’s primary and secondary energy requirements have remained heavily fossil-fuel dependent, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this, the projected electricity demand of the country has led the National utility Eskom, to embark upon an intensive build programme to secure South Africa’s longer-term energy needs, together with an adequate reserve margin.

The National Development Plan (NDP), 2011 – 2030, aims to address parts of the South African triple development challenges of poverty and inequality by 2030. In order to achieve this, numerous enabling milestones and critical actions have been formulated. One (1) of the critical actions is the formulation and implementation of interventions that aim to ensure environmental sustainability and resilience to future shocks.

The emphasis is on South African investment and assistance in the exploitation of various opportunities for low-carbon energy in the clean energy sources of Southern Africa (National Planning Commission, 2011). A more efficient and competitive infrastructure is envisaged, particularly infrastructure that facilitates economic activity and is conducive to growth and job creation. The plan identifies key services that need strengthening; namely commercial transport, energy, telecommunications and water, while ensuring their long-term affordability and sustainability. The National Planning Commission maintains that South Africa has missed a generation of capital investment in many infrastructure opportunities including electricity. Therefore, one (1) infrastructure investment priority is in the procurement of at least 20000MW of renewable energy-efficiency (National Planning Commission, 2011).

The proposed project is thus well aligned with the aims of the NDP which is further detailed in the following national and provincial plans:

- National Integrated Resource Plan for Electricity (2010-2030).
- Integrated Resource Plan (IRP 2019)
- National Infrastructure Plan 2012, as amended.
- The Mpumalanga Spatial Development Framework (SDF) (MPSDF, 2018)
- Nkangala District Municipality Integrated Development Plan, 2020-2021
- Tshwete Local Municipality Integrated Development Plan (2020/21)

12.1 The Mpumalanga Spatial Development Framework (SDF) (MPSDF, 2018)

Mentions mining as the predominant Regional Spatial Development Initiative in the area where the site is located. Mining and Energy-related development is identified as one of nine key drivers of the Mpumalanga Vision 2030 and states the following: “Infrastructure investment aimed at enhancing the mining and electricity industry should be consolidated in the western Highveld of Mpumalanga where the vast majority of coal mines and power stations are located.

The SDF recognises the proposed development area as a coal mining centre. The prevalence of coal mines in the immediate vicinity is illustrated in Plan 7. However, much of the land is used for agricultural purposes as well.

12.2 Nkangala District Municipality Integrated Development Plan, 2020-2021

According to the Nkangala DM IDP, the region's coal reserves have a considerable potential for usage in the production of energy. However, coal power is viewed as an unsustainable and environmentally harmful energy source in line with the development goals of the Nkangala DM, and it is urged that alternatives to highly polluting businesses and energy generation technologies should be taken into account whenever possible.

Four of Eskom's coal-fired power stations (Komati, Camden, Grootvlei, and Hendrina) have been targeted for decommissioning in the short term. Simultaneously Eskom has been looking at options for repurposing these power stations with the core aims of reusing existing power transmission infrastructure, developing new generation capacity, providing ancillary services, and mitigating socio-economic impact. The project is ideally located to form part of this proposed repurposing of the Hendrina power station and will help Eskom achieve its diversification goals. Development of the Project is required to connect the proposed Hendrina North WEF to the Hendrina Power Station substation and the National Grid.

Wind energy will be used in the proposed designs, which is less damaging to the environment than coal-fired technology. A sufficient number of operational power plants and a dependable grid network for delivering electricity to users are required for a reliable electricity supply.

12.3 Steve Tshwete Local Municipality Integrated Development Plan (2020/21)

With Eskom struggling to provide all energy demands, the Municipality is in the process of exploring alternate energy sources for Commercial, Residential and Industrial use. This will have a direct impact on the Municipality's income and will need to be undertaken with careful consultations and input from the local communities.

In terms of access to electricity, the Steve Tshwete Local Municipality also mentions that it will investigate, develop and implement municipal laws that promote renewable energies and energy efficiency while reducing dependence on imported fuels by providing affordable energy. creation of basic, free alternative energy for those in need who live far from the power grid. Construction of Solar Power Plants and other Alternative Energy. Additionally, power will come sourced from independent power producers.

Development of free basic alternative energy for indigents located way from the power grid.
Development of the Solar Plant - any other alternative Energy

13. NEED AND DESIRABILITY

13.1 National Renewable Energy Requirement

In 2010, South Africa had 44,157MW of power generation capacity installed. Current forecasts indicate that by 2025, the expected growth in demand will require the current installed power generation capacity to be almost doubled to approximately 74,000MW (SAWEA, 2010).

This growing demand, fueled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. Despite the worldwide concern regarding Greenhouse Gas (GHG) emissions and climate change, South Africa continues to rely heavily on coal as its primary source of energy, while most of the countries renewable energy resources remain largely untapped (DME, 2003). There is therefore an increasing need to establish a new source of generating power in SA within the next decade.

The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process. It must be remembered that wind energy is plentiful, renewable, widely distributed, clean and reduces GHG emissions when it displaces fossil-fuel derived from electricity. In this light, renewable wind energy can be seen as desirable.

The REIPPP programme and the competitive nature of the bidding process has resulted in significant lowering of solar and wind tariff prices since 2011. Further projects will increase the competitive nature of the REIPPP program and further result in cost savings to South African consumers.

13.2 National Renewable Energy Commitment

In support of the need to find solutions for the current electricity shortages, the increasing demand for energy, as well as the need to find more sustainable and environmentally friendly energy resources, South Africa has embarked on an infrastructure growth programme supported by various government initiatives. These include the National Development Plan (NDP), the Presidential Infrastructure Coordinating Commission (PICC), the DoE's IRP, the National Strategy for Sustainable Development, the National Climate Change Response White Paper, the Presidency of the Republic of South Africa's Medium-Term Framework, and the National Treasury's Carbon Tax Policy Paper.

The Government's commitment to growing the renewable energy industry in South Africa is also supported by the White Paper on Renewable Energy (2003) which sets out the Government's principals, goals and objectives for promoting and implementing renewable energy in South Africa. In order to achieve the long-term goal of achieving a sustainable renewable energy industry, the DoE has set a target of contributing 17,8GW of renewable energy to the final energy consumption by 2030. This target is to be produced mainly through, wind and solar; but also through biomass and small scale hydro

(DME, 2003; IRP, 2010). Further renewable energy targets have been proposed within the latest IRP, which was gazetted in 2019.

The 2019 Integrated Resource Plan (2019) (IRP2019) was released on 18 October 2019 and includes the following capacity allocation:

- 1 500 MW of new coal power (noting that there will be decommissioning of coal capacity over the period);
- 2 500 MW of hydro power;
- 6 000 MW solar;
- 14 400 MW wind;
- 2 000 MW of storage;
- 3 000 MW from gas.

13.3 Realisation of Global and Local Commitments

The Hendrina North WEF (along with this Project, to connect the WEF to the National Grid) will contribute to the countries' efforts to reduce our carbon emissions and play our role as part of various international commitments to combat climate change and promote sustainable development. South Africa is a signatory to the Paris Climate Accord (Paris Agreement), the United Nations' Development Programmes' (UNDP) Sustainable Development Goals (SDGs) and the Kyoto Protocol.

The Paris Agreement is a legally binding international treaty signed by 196 countries at the COP 21 in Paris, on 12 December 2015, to combat climate change. The goal of the Paris Accord is to limit global warming to well below 2 degrees Celsius, compared to industrial levels to avoid catastrophic natural disasters which are driven by the global temperature increase. To achieve this long-term temperature goal, countries aim to reach global peaking of GHG emissions as soon as possible to achieve a climate-neutral world by 2050.

The SDGs were adopted by all member states to the United Nations in 2015 as a universal call to action to end poverty, protect the planet and ensure peace and prosperity of all people by 2030. There are 17 integrated SDGs (recognizing that action in one area will influence other areas).

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) aims to curb air pollution associated with accelerated global climate change. The South African Government acceded to the Kyoto protocol in July 2012.

The authorisation of the WEF and associated infrastructure to connect it to the National Grid (i.e., this Project) will further align with South Africa's National Climate Response White Paper which outlines the country's efforts to manage the impacts of climate change and to contribute to the global efforts to stabilise the GHG concentrations in the atmosphere

13.4 Just Energy Transition

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

The Project (in the context of the Hendrina North WEF) will pave the way for the Just Energy Transition in South Africa, specifically in Mpumalanga, which will be hit hardest by the transition away from coal-fired electricity generation (as most of the country's coal mines and power stations are located in Mpumalanga).

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

The transition towards renewable energy will improve the socio-economic conditions of the Nkangala District. The total number of unemployed people in Nkangala in 2019 constituted 36% of the total number of unemployed people in Mpumalanga; The Nkangala District Municipality experienced an average annual increase of 5.18% in the number of unemployed people during the reporting period (2009 to 2019) (COGTA, 2019). The development of the Project (and associated WEF) will aid in solving two of the leading challenges faced by the Nkangala District Municipality, namely the cost of electricity and lack of adequate employment opportunities. The Hendrina WEFs and associated infrastructure will be the first large-scale wind energy project being developed in Mpumalanga. The Applicant foresees this Project as being the catalyst to realising a true Just Energy Transition for Mpumalanga.

Various career opportunities are presented by the wind industry, and these are divided into four pillars that are aligned with the value chain. These four pillars are project development, component manufacturing, construction, operation and maintenance

13.5 Multiple Land use

Unlike opencast coal mining, wind energy and power line developments facilitate multiple land use functions within the development area. As wind turbines are spread out across the development area this allows multiple land use functions such as operating the wind farm in tandem with agricultural activities or even underground coal mining. This will boost the economic activities in the area which will in turn increase job opportunities in that area and help improve the local community's welfare without jeopardising the environment or national food security.

The possibility of multiple land use is evident in existing agricultural activities in the project area continuing underneath existing power line development and it is expected that the Project will similarly not impede agricultural development with the exception of substation development comprising a very small footprint.

13.6 Site Suitability

The proposed substation and power line development will serve the Hendrina North WEF and once fully developed, the intention is to feed the electricity generated by the above-mentioned WEF project into the national grid.

The location of the proposed on-site Switching / Collector Substation and associated 132kV Power Line development (this application) that will serve the Hendrina North WEF (part of a separate respective

EIA process). included several key aspects including wind resource, grid connection suitability as well as environmental, competition, topography and access.

1. Wind resource is the first of the main drivers of project viability across South Africa.
2. Environmental suitability is the second key aspect that the Applicant considers when evaluating a wind energy project. The project should be developed in a sustainable and ecologically friendly manner ensuring its development has the least possible impact on the land on which it will be built.
3. The third primary driver of site selection is the capacity on the local transmission system to evacuate the power into the national grid.
4. Land availability is another driver of site selection. The applicant has however secured sufficient land for the development of the proposed project with landowners within the respective cadastral portions indicating their support and willingness for the Project to proceed to development via entering into agreement with the Applicant.
5. Other key criteria which refine the site selection on a micro level include competition, topography and access.

13.7 Reduce dependency on fossil fuels

At present, more than 90% of South Africa's energy is generated by coal-fired power stations. Apart from the fact that these are finite resources that will eventually run out, fossil fuels are also harmful to the environment when used to produce electricity. During combustion, fossil fuels such as coal emit many by-products into the atmosphere, two (2) of which are carbon dioxide (CO₂) and sulphur dioxide (SO₂). Both these gases have been shown to contribute to the worsening climate crisis. Wind is a free and infinite resource that occurs naturally in the environment. Converting wind energy into electricity releases no harmful by-products into the environment and will reduce the dependency on fossil fuels.

13.8 Stimulate the economy

A significant portion of the capital expenditure envisaged for the project will be spent on procurement of goods and services within South Africa and specifically within the Western Cape Province. If goods and services are procured locally (i.e., within South Africa), it increases the production of the respective industries. This has a positive impact on the national economy and economies of the municipalities where inputs are procured.

The proposed development has the potential to stimulate the demand for other industries, among others construction services, engineering service, transport services, steel structures, cement and other aggregates, and electrical equipment. At the local level, increase in demand for accommodation, personal services, perishable and non-perishable goods is expected, which will stimulate the local economies of the towns and settlements, where labour will be procured from or where migrant workers will be temporarily located.

Some of the local businesses could benefit from sub-contracting opportunities, if the construction companies appointed by the developer implement a local community procurement policy, and consumer expenditure of the construction crew. Furthermore, the demand for hospitality services

(including accommodation and catering in the towns Pullens Hope, Hendrina and other nearby towns) is expected to increase and provide for much-needed stimulus for the local economy.

13.9 Job opportunities and household livelihoods

The unemployment rate of Steve Tshwete decreased slightly from 19.7% in 2011 to 16.4% in 2015 and was the lowest among all the municipal areas of Mpumalanga. In 2018, the municipality has recorded a slight increase yet again from 2015 figures to just 17,9%. Unemployment rate for females has increased from 21.8% in 2015 to 23.1% in 2018 and that of males from 12.9% in 2015 to 14.5% in 2018. Though there is a high growth rate of unemployment, Steve Tshwete still has the lowest percentage in the province. Youth unemployment rate according to the 2011 Census figures 27.1% - challenge with especially very high youth unemployment rate of females. The largest employing industries in Steve Tshwete are trade (including industries such as tourism), community/government services and mining. High labour intensity in industries such as agriculture, trade and construction.

The proposed project will create both temporary and permanent job opportunities in South Africa for both skilled and unskilled workers. Many of the low and semi-skilled employment opportunities will probably be available to residents in the area, specifically residents from Hendrina and Pullens Hope. Many of the beneficiaries are likely to be historically disadvantaged members of the community and the project will provide opportunities to develop skills amongst these people.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will, in turn, stimulate consumer spending, creating another round of multiplier effect, positively impacting on the employment situation in the area.

Household earnings are linked closely with trends in employment and, as such, will be affected positively by the creation of jobs as discussed above. The creation of temporary jobs during the construction period will temporarily increase affected households' income. Some of this income will be earned by workers from the local communities. A temporary increase in living standards based on the additional monthly income will thus ensue. Employees working for local businesses that will be sub-contracted to supply goods and services to the Grid during construction are also expected to benefit indirectly.

13.10 Skills development

In addition to the job creation, there is valuable opportunities for skills enhancement and knowledge transfer as quite often input from experts are required in this field. Therefore, opportunities for guiding and training of local workers is created. A variation of skill sets is required ranging from semi-skilled construction workers to highly skilled engineers. The skill set of the majority of the municipality's residents comprises of low skills, which means that with proper planning and recruitment strategies, many of the local unemployed residents could be hired as temporary construction workers on site provided, they satisfy any other recruitment criteria.

Those employed will either develop new skills or enhance current skills. This implies that inexperienced workers will have the opportunity to attain and develop new skills, while experienced workers will further improve their existing skills. Albeit the employment is temporary, the skills attained will be of long-term

benefit to employees. However, as any skills set it will need to be supported and practised on a regular basis to maintain its currency.

13.11 Proximity to substation and Eskom Grid

Five of Eskom's coal-fired power stations are targeted for decommissioning in the short term. These coal-fired power stations include the Komati, Camden, Grootvlei, Arnot, and Hendrina Power Stations. Komati Power Station's decommissioning is scheduled to commence between 2020 - 2026. These power stations range between 50 - 60 years of age. According to the 2019 IRP, over an 11-year period Eskom are expected to decommission over 11GW of its coal fired capacity. Eskom recently requested proposals from the market on how to repurpose these power stations in order to support low-carbon growth. The Project site is therefore strategically located such that the power generated from the Hendrina North WEF can replace the power previously generated by the Komati and Hendrina Power Stations should these be decommissioned in the future.

The project location is close to the Hendrina Power Station substation, consequently reducing the length of the power line that will be required for connection and thus reducing the capital costs, energy losses and environmental impact. In addition, further existing power lines are located within proximity to the Project site, allowing for potential direct connection to these existing lines where insufficient allocation may be available at the Hendrina substation, or where Eskom planning indicates different future use.

14. DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED ALTERNATIVE

14.1 Details of alternatives

14.1.1 Introduction

As per the 2014 EIA Regulations (as amended), feasible and reasonable alternatives are required to be considered during the BA process. Alternatives are defined in Chapter 1 of the 2014 EIA Regulations (as amended) as "different means of meeting the general purpose and requirements of the activity". These alternatives may include:

- (a) The property on which or location where it is proposed to undertake the activity;
- (b) The type of activity to be undertaken;
- (c) The design or layout of the activity;
- (d) The technology to be used in the activity;
- (e) The operational aspects of the activity; and
- (f) The option of not implementing the activity.

Each of the alternatives in relation to the proposed development is discussed in the sections below.

14.1.2 Location/Site alternatives

There are several factors which are favourable for the placement of power lines and substations at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, wind resource, site accessibility and current land use. The project site for the WEF, power lines and substation has been identified based on wind resource, grid connection suitability, competition, topography, land availability and site access.

Only two grid corridors alternatives for the proposed development are being considered as the placement of the proposed grid infrastructure is dependent on the location of the proposed Hendrina North WEF.

14.1.3 Activity/technology alternatives

Activity alternatives refer to the consideration of alternatives requiring a change in the nature of the proposed activity to be undertaken.

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the terrain, the climatic conditions and current land use being agricultural, it was determined that the proposed site would be best suited for a substation and power line associated with WEF, instead of any other type of renewable energy technology. It is generally preferred to install WEFs on elevated ground. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is WEF with associated infrastructure and as such this is the only technology alternative being considered.

One (1) type of activity is therefore considered (namely 132kV overhead power line and on-site switching substation and/or combined collector substation) in order to feed the electricity / energy generated from a renewable source of energy, wind energy (namely the Hendrina North WEF), into the national electricity grid.

14.1.4 Design or Layout alternatives

Layout alternatives have been considered and assessed as part of the BA process. The alternatives which have been considered and assessed as part of the grid connection infrastructure application include two (2) power line corridor route alignment alternatives. All alternatives have been comparatively assessed by the respective specialists and assessed against the 'no-go' alternative (i.e., status quo). The various alternatives are described below:

Grid corridors

Two (2) power line corridor route alignments are being considered and have been comparatively assessed by EAP and specialists as follows:

- **Grid Connection Alternative 1 (Preferred):** The proposed power line will be approximately 17km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative is shorter span over existing road and farm boundaries. This is the landowners preferred routing. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.
- **Grid Connection Alternative 2:** The proposed power line will be approximately 20km and will connect to the Hendrina North WEF to the Hendrina Power Station. This alternative follows an existing a dirt road until it meets the Eskom HENDRINA-ABINA 132kV power line. It then follows the Eskom power line into the Hendrina Power Station. The preferred pylon and power line will be 132 kV Intermediate Self-Supporting single circuit or double circuit Monopole.

Power line corridors are being assessed to allow flexibility when determining the final route alignment. As mentioned, the power line corridors which are being assessed are up to approximately 500m wide

(250m on either side of power line) to allow for flexibility to route the power line within the assessed corridor. Based on the specialist assessments, a few potentially sensitive and/or 'no-go' areas have been identified within the application site. These areas were used to inform the development area for the substation within the application site as well as the routing of the power line corridors. The identified sensitive / 'no-go' areas were also used to perform a comparison of route alternatives.

14.1.5 No – go option

The 'no-go' alternative is the option of not undertaking the proposed grid connection infrastructure project. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the BA process.

The option of not implementing the activity, or the "no-go" alternative, has been considered in this BA process. South Africa is under immense pressure to provide clean sources of electricity generating capacity in order to reduce the current electricity demand from aging and polluting coal-fired power stations. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although wind energy is not the only solution to solving the energy crisis in South Africa, not establishing the proposed WEF and associated infrastructure would be detrimental to the mandate that the government has set to promote the implementation of renewable energy. It is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will thus aid in achieving South Africa's goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

The no-go alternative will result in the current status quo being maintained as far as the avifauna, aquatic, terrestrial, visual agricultural and heritage are concerned. The above-mentioned alternatives (including 'no-go' alternative) were all assessed by the appointed specialists as part of the BA process (this application). All the above-mentioned power line corridor route alternatives were informed by the identified environmental sensitive and/or 'no-go' areas (i.e., status quo). The respective alternatives which were considered as part of the BA process for the proposed development were also comparatively assessed.

14.1.6 Comparative Assessment of Alternatives

The proposed power line route alternatives which were investigated and comparatively assessed as part of the BA process are shown in **Figure 37** below.

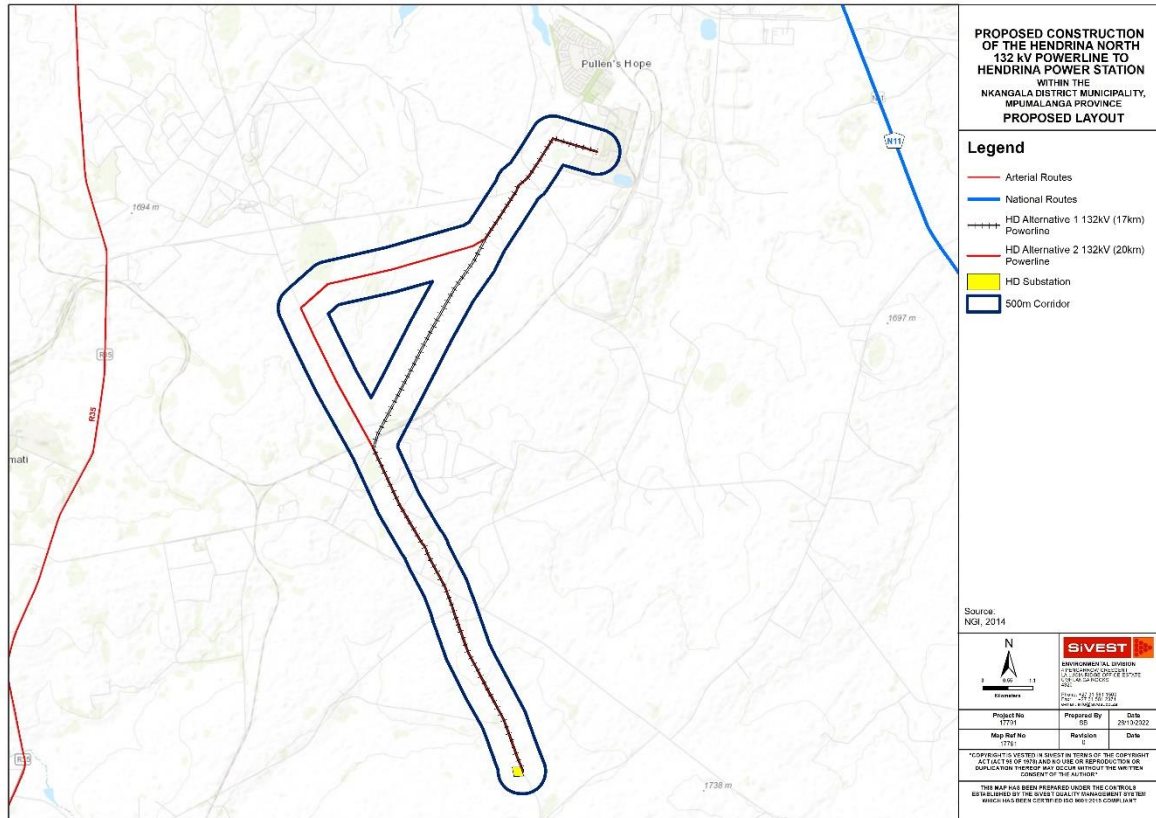


Figure 37: Preliminary Layout

Each of the alternatives has been comparatively assessed in terms of the findings from the specialist assessments conducted as part of the BA process and is summarised in the table below.

Key

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 19: Summary of comparative assessment of power line corridors

	Power line corridors	
	Alternative 1	Alternative 2
Geotechnical Assessment	Preferred	Least Preferred
Visual Assessment	Acceptable	Preferred
Avifaunal Assessment	Preferred	Least Preferred
Agricultural Assessment;	No Preference	No Preference
Surface Water Assessment	Preferred	Least Preferred
Heritage Assessment – Archaeological	No Preference	No Preference

	Power line corridors	
	Alternative 1	Alternative 2
Heritage Assessment – Paleontological	No Preference	No Preference
Biodiversity Assessment	Preferred	Least Preferred

14.2 Motivation and concluding statement for preferred alternative

No activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Wind energy installations are more suitable for the site because of the high wind resource. The choice of technology selected for the Hendrina grid was based on environmental constraints and technical and economic considerations.

The site locations have been based on proximity to the WEF and the project site has been assessed by the specialists in their respective specialist studies. All specialists' sensitivities have been taken into consideration when determining the preferred alternative to take forward for approval.

Based on the results of the comparative assessment of power line alternatives, the power line alternative 1 is preferred. However, both are deemed acceptable for authorisation since none are fatally flawed. It is therefore requested that **power line alternative 1 be authorised** as part of the proposed development since this is the preferred alternative (should the EA be granted). While the wetland specialist identified power line route alternative 1 as favorable, the specialist advised that the location of the proposed substation be revised so as to avoid the freshwater ecosystem associated with the project area.

The results of the comparative assessment undertaken by the specialists for the power line alternatives resulted in power line alternative 1 as the most preferred from a biophysical point of view as it is the shortest alternative, alternative 2 was the least preferred.

Based on the information presented above, the applicant has opted for power line alternative 1 to be authorised (should EA be granted). The preferred alternatives, including maps, is further presented in **Figure 40** below as well as in Appendix 3. The selected preferred power line route alternative has been based on both environmental constraints and design factors.

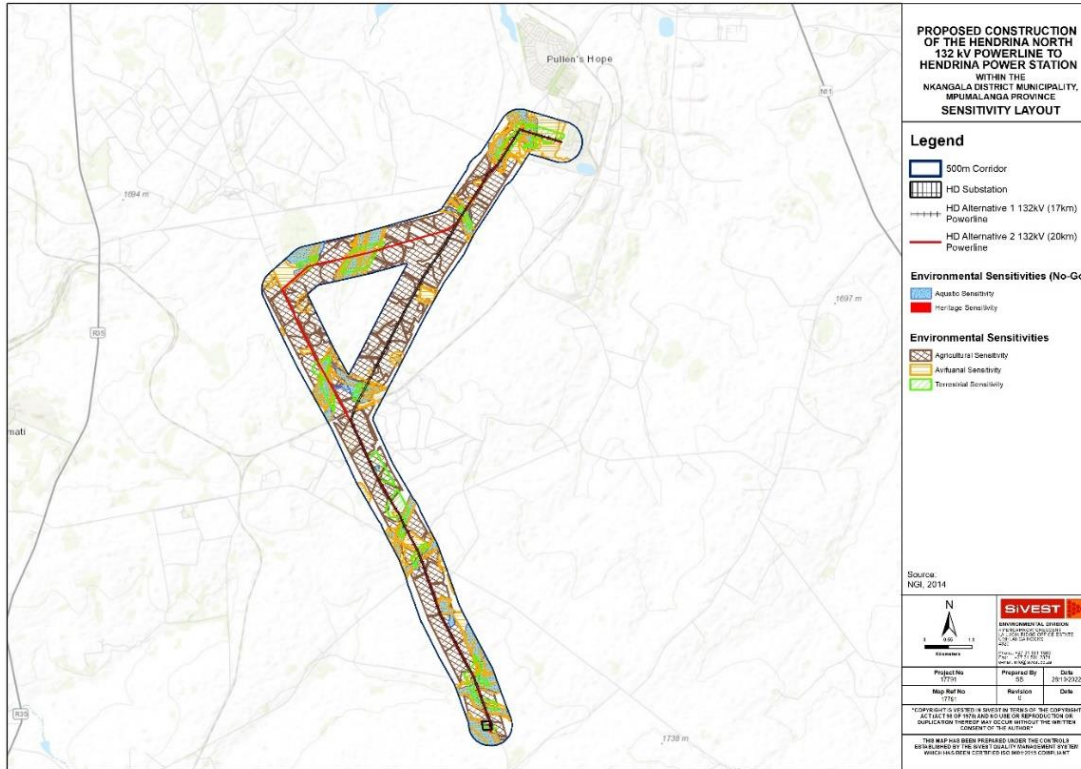


Figure 38: Sensitivity mapping of the assessed alternatives

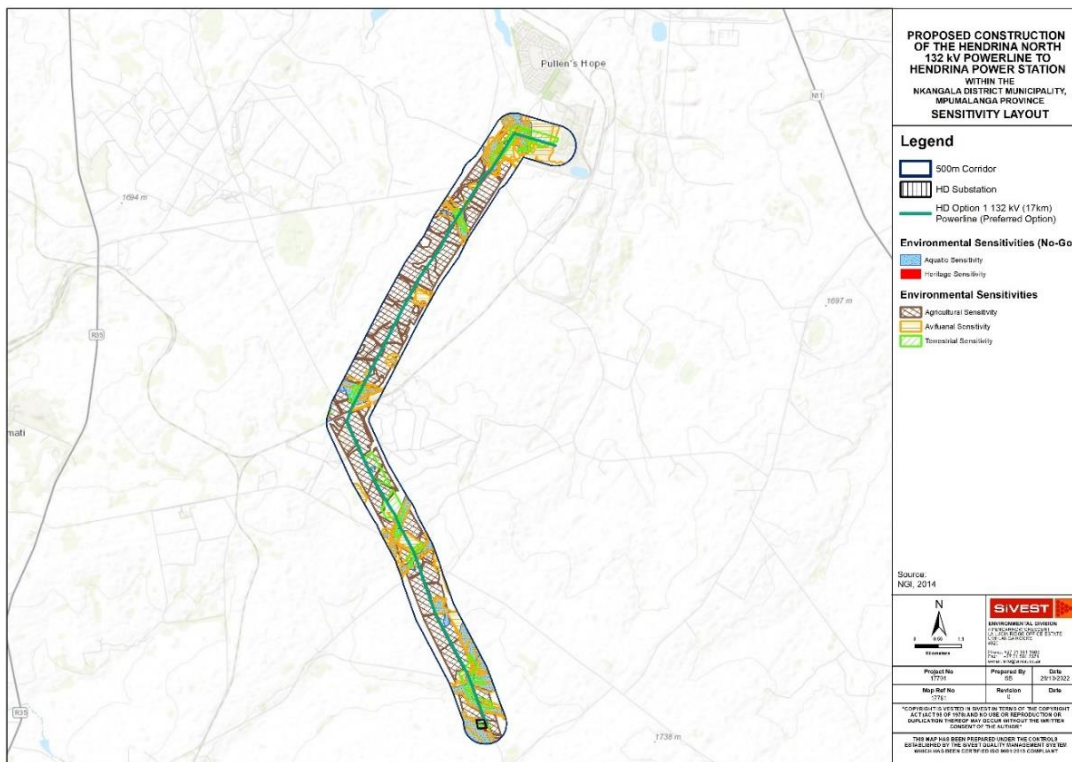


Figure 39: Sensitivity mapping of preferred alternative

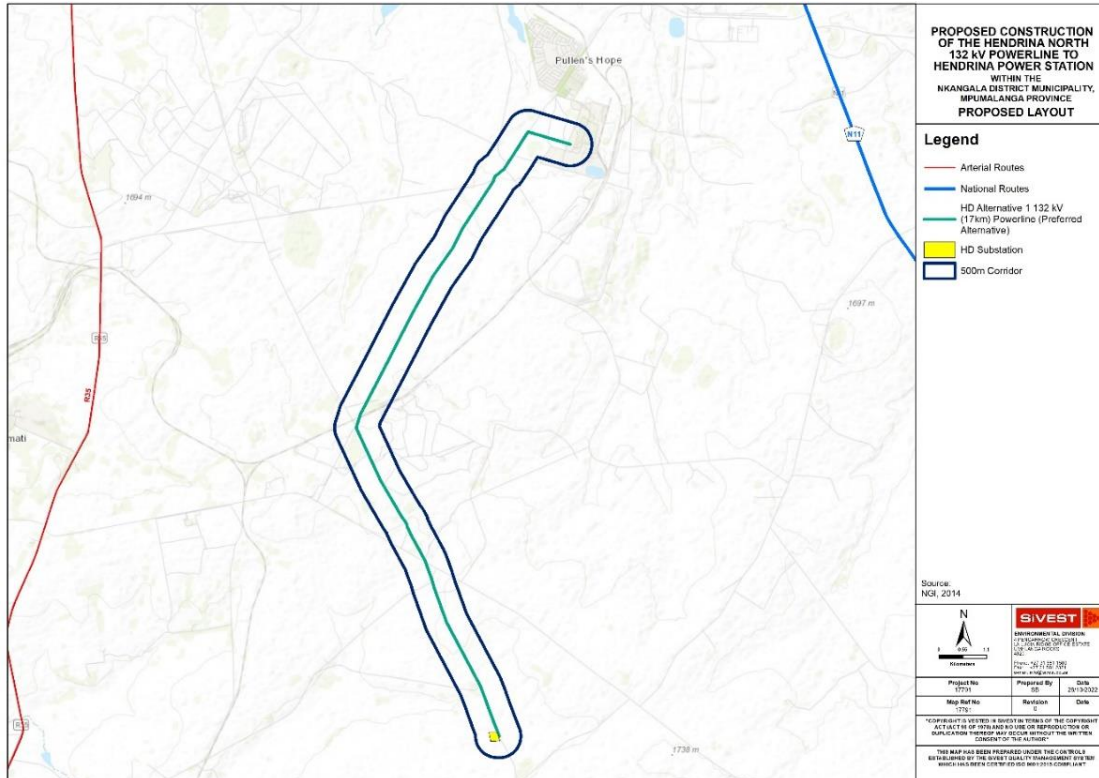


Figure 40: Preferred layout being put forward for approval

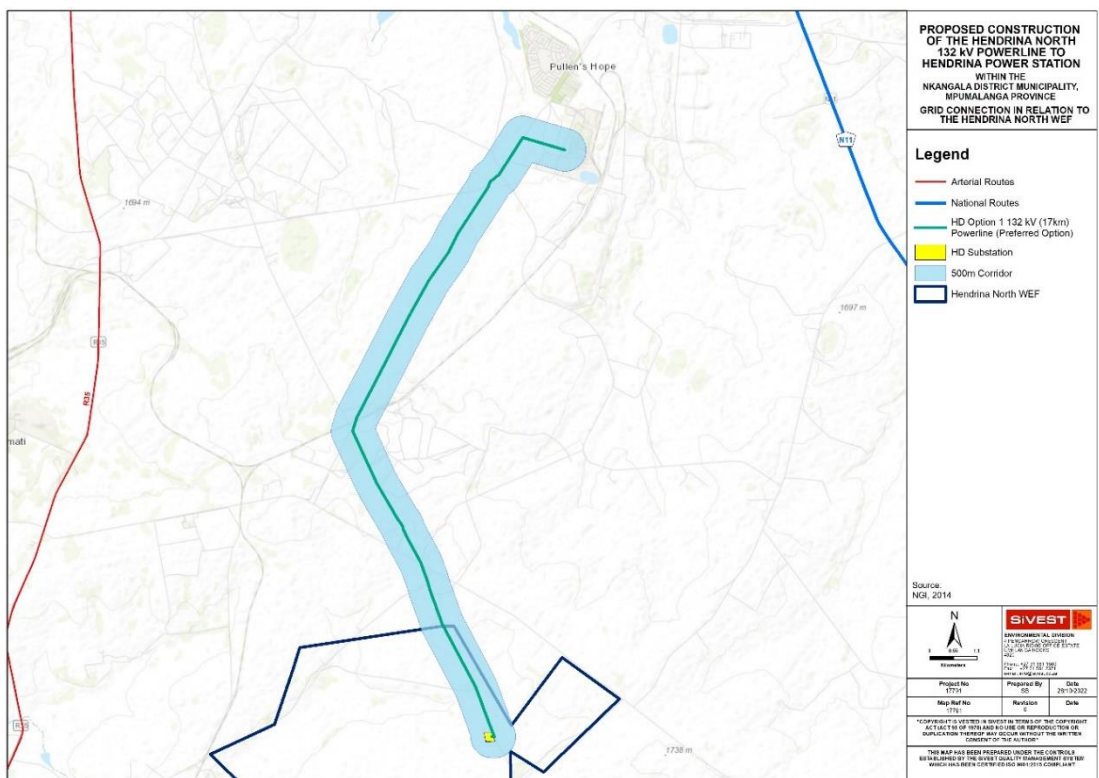


Figure 41: Preferred layout being put forward for approval in relation to the Hendrina North WEF

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14.3 Public Participation Process undertaken

Public participation is the cornerstone of any EIA. The principles of the National Environmental Management Act (NEMA) as well as the EIA Regulations (as amended 2017) govern the EIA process, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth. All documents relating to the PP process have been included in **Appendix 5**.

The aim of the Basic Assessment Process is to collect the issues, concerns and queries of interested and affected parties (I&APs). The main objective is to:

- Inform the stakeholders about the proposed project and the environmental assessment process to be followed;
- Provide opportunity to all parties to exchange information and express their views and concerns;
- Obtain contributions from stakeholders (including the client, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented;
- Evaluate the issues raised and identify the significant issues; and
- Provide comment on how these issues are to be assessed as part of the Environmental Assessment Process.

14.3.1 Identification of Key Stakeholder and I&AP's

Liaison with the relevant authorities plays a crucial role in the successful completion of any environmental assessment process. In addition to the competent authority, DFFE, key stakeholders, the local municipality as well as other potentially affected I&APs, including adjacent property owners and dwellers, are identified.

The following key stakeholders were identified for this project:

• Agri SA;	• Department of Public Works;
• SANRAL;	• Air Traffic Navigation Services;
• Sentech;	• Steve Tshwete Local Municipality;
• ATNS	• DARDLEA (Agriculture);
• Eskom Transmission Limited;	• DARDLEA (Environmental Affairs)
• SALT – The Southern African Large Telescope;	• National Department of Economic Development;
• South African Weather Services;	• Department of Mineral Resources;
• South African Astronomical Observatory;	• Department of Transport;
• Mpumalanga Provincial Heritage Resource Authority (MPHRA)	• Department of Public Works Roads and Transport (MP)
• Birdlife South Africa;	• WESSA;
• Nkangala District Municipality;	• SA Civil Aviation Authority;
• Department of Agriculture;	• Telkom SA;
• DFFE	• Mpumalanga Provincial Government;
• Department of Water and Sanitation;	• Transnet;
• Square Kilometre Array	

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This list will be updated as the project progresses and based on responses received.

14.3.2 Responsibilities of interested and affected parties (I&AP's)

Members of the public who want to participate in the assessment process need to register and are referred to as I&AP's. Registered I&APs are entitled to comment, in writing, on all written submissions to the authority and to raise any issues that they believe may be significant, provided that:

- Comments are submitted within the timeframes set by the competent authority or extensions of timeframes agreed to by the applicant, EAP and competent authority.
- A copy of the comments submitted directly to the competent authority is served on the applicant or EAP.
- The I&AP discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

14.3.3 Steps taken to notify key stakeholders and potential I&APs

Notification of BA process to be undertaken as follows:

- Issuing of the notifications and initial landowner consultation (to be circulated to all I&APs in October 2022 respectively as part of the Draft BAR (proof to be included in Final BAR).
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on 31 August 2022 (proof included in the BAR).
- Notification letters to be sent via E-mail or sms (if cellphone number / email is available, it is assuming the I&AP have an email or cellphone).
- Public notification of the BA process was advertised, in a local newspaper (namely Middleburg Observer) on the **28th of October 2022**, as required according to Regulation 41(2) (c) of the EIA Regulations (2014), as amended. Proof to be included in the Draft/Final BAR.

Availability of report for review:

- Report available on SiVEST's website for download.
- Electronic copies can be made available to parties via a secure digital link that will be emailed upon request for the documentation.
- CDs / Flash drive to be posted, only if requested.
- The Draft BAR will be located and available for review at the following locations:
 - Hendrina Public Library, 44 Kerk Street, Hendrina, Mpumalanga, South Africa

14.3.4 Summary of issues raised

To be updated once the Public Comment Period has been completed.

14.3.5 Details of notification of landowners

Regulation 39 (1) of the EIA Regulations, 2014 (as amended), states that 'if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must,

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before applying for an EA in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land’.

Regulation 39 (2) of the 2014 NEMA EIA Regulations, 2014 (as amended), further states that ‘sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014’.

The proposed Hendrina grid connection development constitutes a linear activity and landowner consent is therefore not required. The proposed substation will be located on Portion 3 of Hartebeestkuil 185IS, the landowner’s consent has been obtained from the landowner. Furthermore, the landowners and/or occupants of the applicable farm portions will however be notified accordingly.

15. IMPACTS AND RISKS IDENTIFIED FOR THE PREFERRED ALTERNATIVE

The SiVEST Impact Assessment method dated 28 July 2017 (attached as **Appendix 7**) has been utilised to assess the following potential impacts identified in the assessment phase and is presented in the following sections.

The method used in this impact assessment determines significance (can be both positive and negative) of an impact by multiplying the value of the environmental system or component affected by the magnitude of the impact on that system or component (System or Component Value x Impact Magnitude).

In this method, all significant impacts on the natural or biophysical environment are assessed in terms of the overall impacts on the health of ecosystems, habitats, communities, populations and species. Thus, for example, the impact of an increase in stormwater runoff generated by a development can only be assessed in terms of the impact on the health of the affected environmental systems.

Similarly, all significant impacts on the social and socio-economic environment are assessed in terms of the overall impacts to the quality of life, health and safety of the affected population, communities and/or individuals, with the exception of impacts on resources that are assessed on their own.

The following impacts have been identified for the proposed project:

15.1 Impact Assessment

The potential impacts for the identified environmental aspects have been assessed and mitigation measures identified below. The detailed impact assessments on the preliminary layouts are in the respective specialist studies (**Appendix 6**).

15.1.1 Planning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater																				
None identified																				
Terrestrial Ecology																				
None identified																				
Agricultural																				
None identified																				
Avifaunal																				
None identified																				
Archaeology																				
Unidentified heritage resources	Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	1	3	4	2	4	2	28	-	MEDIUM	A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	1	3	4	2	4	1	14	-	LOW
Heritage (Palaeontology)																				
None identified																				
Visual																				
None identified																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Geotech																				
None identified																				

15.1.2 Construction Phase

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater																				
Vehicular movement (transportation of construction materials).	<ul style="list-style-type: none"> Loss of freshwater ecosystem vegetation, associated habitat and ecosystem services; • Transportation of construction materials can result in disturbances to soil, and increased risk of sedimentation/erosion; and Soil and stormwater contamination from potentially spilled oils and hydrocarbons originating from construction vehicles. 	1	1	1	1	1	1	5	-	LOW	<ul style="list-style-type: none"> It is assumed that the proposed power line support structures will be located outside of the delineated extent of the freshwater ecosystems and at least 32 m (as far as possible/feasible) from the delineated edge of the freshwater ecosystems – this in itself is considered a mitigation measure, which entails no direct negative impacts from occurring to the freshwater ecosystems. Should the following mitigation measures (pertaining to the construction of the power line) be applied, a Low-risk significance can be expected: It is imperative that all construction works (with specific mention of potential upgrading of any road crossings) be undertaken during the driest period of the year when the flow is very low in the freshwater ecosystems; • Use must be made of existing freshwater ecosystem crossings only to access the project sites. This will limit edge effects, erosion and sedimentation of the freshwater ecosystems during the construction phase; 	1	1	1	1	1	1	5	-	LOW
Removal of vegetation and associated disturbances to soil, and access to the site, including grading of existing informal farm roads	<ul style="list-style-type: none"> Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream freshwater ecosystem areas. Exposure of soil, leading to increased runoff, and erosion, and thus increased sedimentation of the freshwater ecosystems. 	2	3	2	2	3	2	24	-	MEDIUM	<ul style="list-style-type: none"> The reaches of the freshwater ecosystems where no activities are planned (i.e., no support structures and no spanning of the power line over the freshwater ecosystems) must be considered no-go areas; Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the freshwater ecosystems and their associated 32 m NEMA ZoR; 	1	3	2	1	2	2	18	-	LOW

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
(access roads will be maintained as informal gravel roads, or a typical jeep track type road).	<ul style="list-style-type: none"> Increased sedimentation of the freshwater ecosystems, leading to smothering of vegetation associated in the freshwater ecosystems; and Proliferation of alien and/or invasive vegetation as a result of disturbances. 											<ul style="list-style-type: none"> Removed vegetation must be stockpiled outside of the delineated boundary of a freshwater ecosystems. The footprint areas and height of these stockpiles should be kept to a minimum; The removed indigenous vegetation should be reinstated after the construction phase. However, alien/invasive vegetation species present and removed should not be reinstated but must be disposed of at a registered garden refuse site and may not be burned or mulched on site. The location of the proposed substation must be moved outside the delineated extent of the valley bottom wetland and the associated 32m NEMA ZoR in order to avoid the loss of freshwater ecosystem habitat. 								
Installation of the support structures (outside the 32 m ZoR of the delineated extent of the freshwater ecosystems and spanning of the proposed power line.	<ul style="list-style-type: none"> Excavation of pits for the support structures leading to stockpiling of soil; and Potential movement of construction equipment and personnel in the areas surrounding freshwater ecosystems. Mixing and casting of concrete for foundations. 	1	3	2	2	3	3	33	-	MEDIUM	<ul style="list-style-type: none"> Excavation of pits for the support structures foundation may result in loose sediments within the landscape, specifically if works are undertaken during a period of rainfall (if applicable); During excavation activities, soil must be stockpiled upgradient of the excavated area. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum. This soil must be used to backfill the pits (support structures), immediately after installation of the support structures and/or other infrastructure; Material used as bedding material (at the bottom of the excavated pit) should be stockpiled outside of the 32m NEMA ZoR and as close as possible to the support structures footprint area. Once the pit has been excavated, the bedding material should directly be placed within the pit, rather than stockpiling it alongside the pit; When the power line is strung between the support structures, no vehicles may indiscriminately drive through the freshwater ecosystems, use must be made of the existing access roads. 	1	3	2	1	2	2	18	-	LOW
Construction of the proposed substation and associated infrastructure within a valley bottom wetland.	<ul style="list-style-type: none"> Loss of approximately 2, 50 ha of valley bottom wetland and indirect impacts on the wetland; Disturbance to soil, vegetation, biota and potentially water quality as a result of construction activities; Altered runoff patterns as a result of excavation and casting of concrete within the valley bottom wetland, leading to increased erosion and sedimentation of the wetland; Removal of freshwater ecosystem vegetation; and 																			

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
	<ul style="list-style-type: none"> Potential spillage and ingress of hydrocarbons from maintenance vehicles into the valley bottom wetland. 																			
Terrestrial Ecology																				
Vegetation and plant species in the Agricultural fields: Low species richness, Low ecological sensitivity	<ul style="list-style-type: none"> Agricultural Fields. Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species 	2	1	1	1	1	1	6	-	LOW	<ul style="list-style-type: none"> Agriculture will continue - no natural indigenous vegetation- 	2	1	1	1	1	1	6	-	LOW
Vegetation and plant species in the Dry Grassland: Low species richness, ecological sensitivity	<ul style="list-style-type: none"> Northern dry grassland at Hendrina power station - entrance of power line into power station and Southern Dry Grassland at WEF. Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species 	1	4	1	2	1	2	18	-	LOW	<ul style="list-style-type: none"> Rehabilitate cleared area at pylons. allow natural succession where possible, sow indigenous grass if needed 	1	4	1	2	1	1	9	-	LOW
Vegetation and plant species in the Moist Grassland and drainage Lines: High species richness, High ecological sensitivity	<ul style="list-style-type: none"> Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species 	2	4	2	2	1	2	22	-	LOW	<ul style="list-style-type: none"> If possible, avoid putting pylons in Moist Grassland, if not possible rehabilitate at pylons, avoid access road under power line, use existing roads. The clearing of vegetation must be kept to a minimum and remain within the footprint development – leave the rest of the area with natural vegetation intact, but there is very little, if any, natural vegetation left. . The clearing of vegetation must be kept to a minimum and remain within the footprint development – leave the rest of the area with natural vegetation intact, but there is very little, if any, natural vegetation left Remove alien invasive species wherever possible Construction must be completed as quickly as possible Disturbed open areas must be rehabilitated immediately after construction has been completed During the construction phase workers must be limited to areas under construction and access to adjacent private areas must be strictly controlled Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. Plant only indigenous grass – no alien species 	2	2	1	2	1	1	8	-	LOW
Vegetation and plant species at the Pan: High species richness, High ecological sensitivity	<ul style="list-style-type: none"> Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species 	1	1	2	3	1	3	24	-	MEDIUM	<ul style="list-style-type: none"> Do not use alternative close to Pan If possible, avoid putting pylons in the Pan's Moist Grassland, if not possible rehabilitate at pylons, avoid access road under power line, use existing roads 	1	1	1	1	1	1	5	-	LOW

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Increase of alien and invasive plant species	<ul style="list-style-type: none"> Alien invasive plant species and weeds may encroach into any disturbed areas particularly areas cleared for the proposed development 	2	2	2	2	1	2	18	-	LOW	<ul style="list-style-type: none"> An alien invasive management programme must be incorporated into the Environmental Management Programme; Ongoing alien plant control must be undertaken; Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Avoid planting of exotic plant species, use indigenous grass species. 	2	1	1	2	1	1	7	-	LOW
Mammals, unlikely to occur in the way of the power line corridor, if present likely to move away.	<ul style="list-style-type: none"> Direct impacts on mammals and habitat destruction 	2	2	2	2	1	2	18	-	LOW	<ul style="list-style-type: none"> Should any mammal species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. The contractor must ensure that no indigenous mammal species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance. The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. Any post-development re-vegetation or landscaping exercise should use grass species indigenous to the area are preferred 	1	4	1	2	1	1	9	-	LOW
Herpetofauna Should any reptile or amphibia species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. The contractor must ensure that no indigenous herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. During the construction phase there may be	<ul style="list-style-type: none"> Direct impact on herpetofauna and habitat destruction, unlikely to be present at power line transect, is present may move away, slower movement. The current habitat is mostly disturbed terrestrial habitat. The footprint for the proposed residential development will result in clearing most of the vegetation area. This will result in some loss of herpetofauna habitat. After clearing the vegetation, construction will commence. 	2	2	2	2	1	2	18	-	LOW	<ul style="list-style-type: none"> Should any reptile or amphibia species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. The contractor must ensure that no indigenous herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. During the construction phase there may be increased surface runoff and a decreased water quality Completing construction during the winter months would mitigate the environmental impact. The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. 	1	4	1	2	1	1	9	-	LOW

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
increased surface runoff and a decreased water quality. Completing construction during the winter months would mitigate the environmental impact. The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred.																				
Agricultural																				
None identified																				
Avifaunal																				
Noise pollution and environmental disruption from construction activity	<ul style="list-style-type: none"> Displacement of priority species from breeding/feeding/roosting areas 	1	4	2	3	1	3	33	-	MEDIUM	Conduct a walkthrough inspection to identify Red List species that may be breeding within the project footprint to ensure that the impacts to breeding species (if any) are adequately managed.	1	2	1	2	1	2	14	-	LOW
Habitat transformation resulting from the 132kV power line and associated infrastructure	<ul style="list-style-type: none"> Displacement of priority species from breeding/feeding/roosting areas 	1	3	1	2	3	3	33	-	MEDIUM	Vegetation clearance should be limited to what is necessary. The mitigation measures proposed by the biodiversity specialist must be strictly enforced. Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.	1	3	1	2	2	2	18	-	LOW
Geotechnical																				
Disturbance/displacement/removal of soil and rock	<ul style="list-style-type: none"> Ground disturbance during access road construction, foundation earthworks, platform earthworks 	1	4	2	2	3	1	12	-	LOW	1) Design access roads and pylon locations to minimise earthworks and levelling based on high resolution ground contour information 2) Correct topsoil and spoil management	1	4	2	1	3	1	11	-	LOW

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Soil Erosion	<ul style="list-style-type: none"> Increased erosion due to vegetation clearing, alteration of natural drainage 	1	4	2	2	2	1	11	-	LOW	1) Avoid development in preferential drainage paths 2) Appropriate engineering design of road drainage and watercourse crossings 3) Temporary berms and drainage channels to divert surface runoff where needed 4) Landscape and rehabilitate disturbed areas timeously (e.g. regressing) 5) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	2	1	1	2	1	17	-	LOW
Heritage (Archaeology)																				
Impact assessment of the proposed project on the potential grave (WPT 101) and the cemetery at WPT 102.	<ul style="list-style-type: none"> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects. 	2	3	3	3	4	3	45	-	HIGH	<ul style="list-style-type: none"> The line should be micro sited at Feature 101 and 102 so that the graves can be retained with a 30m buffer zone. Implementation of the ENERTRAG Chance Find Procedure for the project (Appendix A); Pre-construction heritage walkdown of final pylon positions. 	2	1	3	3	4	2	26	-	MEDIUM
Impact on ruins and graves at Feature 089, 090, 091, 092, 093 and 094.	<ul style="list-style-type: none"> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects. 	1	1	3	3	3	2	22	-	LOW	<ul style="list-style-type: none"> Recorded ruins (089, 090, 091 and 092) and burial sites (093 and 094) must be indicated on development plans and avoided during construction with a 30 m buffer. Implementation of the ENERTRAG Chance Find Procedure for the project (Appendix A); Pre-construction heritage walkdown of final pylon positions. 	1	1	3	3	3	2	22	-	LOW
Visual																				
Altered Sense of Place and Visual Intrusion caused by Construction Activities	<ul style="list-style-type: none"> Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction site (power line alignment and substation footprint) and access roads/tracks, during the construction period. 	2	4	1	2	1	2	20	-	LOW	Limit vegetation clearance and the construction footprint, including access road footprints, to what is absolutely essential. Consolidate the footprint of the construction camp to a functional minimum. Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. Keep stockpiled aggregates and sand covered to minimise dust generation. Keep construction site tidy.	2	3	1	2	1	2	18	-	LOW

15.1.3 Operational Phase

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater																				
<ul style="list-style-type: none"> Potential indiscriminate movement of maintenance vehicles within the freshwater ecosystems or within close proximity to the freshwater ecosystems ; and Increased risk of sedimentation and/or hydrocarbons entering the freshwater ecosystems via stormwater runoff 	<ul style="list-style-type: none"> Disturbance to soil and ongoing erosion as a result of periodic maintenance activities; and Altered water quality (if surface water is present) as a result of increased availability of pollutants. 	2	3	2	2	3	3	36	-	MEDIUM	<ul style="list-style-type: none"> A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. This stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks 	1	1	1	1	1	1	5	-	LOW
Terrestrial Ecology																				
Vegetation and plant species in the Agricultural fields: Low species richness, ecological sensitivity	Maintenance of power line	2	1	2	1	4	1	10	-	LOW	<ul style="list-style-type: none"> Agriculture will continue - no natural indigenous vegetation. Remain in designated corridor. No access to adjacent private agricultural land. 	2	2	4	1	4	1	13	-	LOW
Vegetation and plant species in the Dry Grassland: Low species richness, ecological sensitivity	Maintenance of power line	2	3	1	2	4	2	24	-	MEDIUM	Remain in designated corridor. No access to adjacent private grassland veld.	2	2	1	2	4	1	11	-	LOW
Vegetation and plant species in the Moist Grassland and drainage Lines: High species richness, High ecological sensitivity	Maintenance of power line	2	3	3	2	4	2	28	-	MEDIUM	Remain in designated corridor. No access to adjacent wetland areas	2	1	2	1	4	1	10	-	LOW
Mammals, unlikely to occur in the way of the power line corridor, if present likely to move away.	Maintenance of power line	2	1	1	1	4	1	9	-	LOW	Remain in designated corridor. No access to adjacent wetland areas	2	1	1	1	4	1	9	-	LOW

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Herpetofauna direct impact or habitat loss	Maintenance of power line	2	1	1	1	1	1	5	-	LOW	Remain in designated corridor. No access to adjacent wetland areas	2	1	1	1	4	1	9	-	LOW
Agricultural																				
None identified																				
Avifaunal																				
Avifauna	Bird mortality and injury resulting from collisions with the 132kV power line	3	4	2	3	3	3	45	-	HIGH	The authorised alignment must be inspected by an avifaunal specialist by means of a "walk-through" inspection i.e., through a combination of satellite imagery supplemented with in situ inspections by vehicle and where necessary, on foot, once the pole positions have been finalised. The objective would be to demarcate the sections of the power line that need to be fitted with Bird Flight Diverters. Once the relevant spans have been identified, Bird Flight Diverters must be fitted according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines).	3	2	1	2	3	2	22	-	LOW
Avifauna	Electrocution of priority species in the onsite sub-station	2	2	2	2	3	2	22	-	LOW	The hardware within the proposed substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List power line sensitive species are unlikely to frequent the substation.	2	1	1	1	3	1	8	-	LOW
Geotechnical																				
Soil Erosion	Increased erosion due to alteration of natural drainage	1	2	1	1	2	1	7	-	LOW	1) Maintain drainage channels 2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	LOW
Heritage																				
None identified																				
Visual																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Altered Sense of Place and Visual Intrusion caused by the 132kV Power line Alternative 1	Alternative 1 is routed along a gravel road and farm boundaries. Unlike Power line Alternative 2, Alternative 1 is not routed adjacent to an existing 132 kV power line. As such, this alternative is anticipated to interrupt views across the landscape to both motorists and farmstead receptors, and will be visually intrusive and increase visual clutter in the landscape.	2	4	1	2	1	2	20	-	LOW	Do not install or affix lights on pylons.	2	4	2	2	3	2	26	-	MEDIUM
Altered Sense of Place and Visual Intrusion caused by the Substation	Due to the shape, form and texture of the infrastructure comprising the substation, it will be visually intrusive to receptors and exacerbate visual clutter. This potential impact is ameliorated insofar as affected motorists will largely have fleeting views of the substation.	2	4	2	2	3	2	26	-	MEDIUM	Fence the perimeter of the substation with green or black fencing. Ensure that the roof colour of the proposed buildings blends into the landscape.	2	4	2	2	3	2	26	-	MEDIUM
Altered Visual Quality caused by Light Pollution at Night.	The installation of lighting around the substation is anticipated to generate nightglow, altering the sense of place and visual quality to those (farmstead) receptors not currently exposed to nightglow emanating from surrounding residential / developed areas. Lighting is not easily screened by vegetation or topography, and the proposed lighting for the power line and substation is anticipated to alter visual quality of the surrounding area.	2	4	1	2	3	2	24	-	MEDIUM	Reduce the height of lighting masts to a workable minimum. Direct lighting inwards and downwards to limit light pollution.	1	2	1	2	3	2	18	-	LOW

15.1.4 Decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Agricultural																				
None identified																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Avifaunal																				
Avifauna	Total/partial displacement of priority species from breeding/feeding/roosting areas	1	4	2	3	1	3	33	-	MEDIUM	Decommissioning activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of power line sensitive species. Measures to control noise and dust should be applied according to current best practice in the industry. Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.	1	2	1	2	1	2	14	-	LOW
Geotechnical																				
Disturbance/ displacement/ removal of soil and rock	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	3	2	2	2	1	10	-	LOW	1) Restore natural site topography 2) Landscape and rehabilitate disturbed areas timeously (e.g. regrassing)	1	3	2	1	2	1	9	-	LOW
Soil Erosion	Increased erosion due to ground disturbance during rehabilitation activities	1	2	2	2	2	1	9	-	LOW	1) Temporary berms and drainage channels to divert surface runoff where needed 2) Restore natural site topography 3) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	1	1	1	2	1	6	-	LOW
Heritage																				
None identified																				
Visual																				
Altered Sense of Place caused by the decommissioning activities	Dust generated during decommissioning activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period.	2	4	1	2	1	2	20	-	LOW	Limit vegetation clearance and the footprint of decommissioning, and access road footprints, to what is absolutely essential. Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. Keep stockpiled aggregate and sand covered to minimise dust generation. Keep site tidy.	2	3	1	2	1	2	18	-	LOW

15.1.5 Cumulative

The proposed WEF is located adjacent to several other renewable projects within 35km of Hendrina WEF. SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments, however, many of the documents are not currently publicly available to download. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.

The WEFs that were considered are indicated in the figure below:

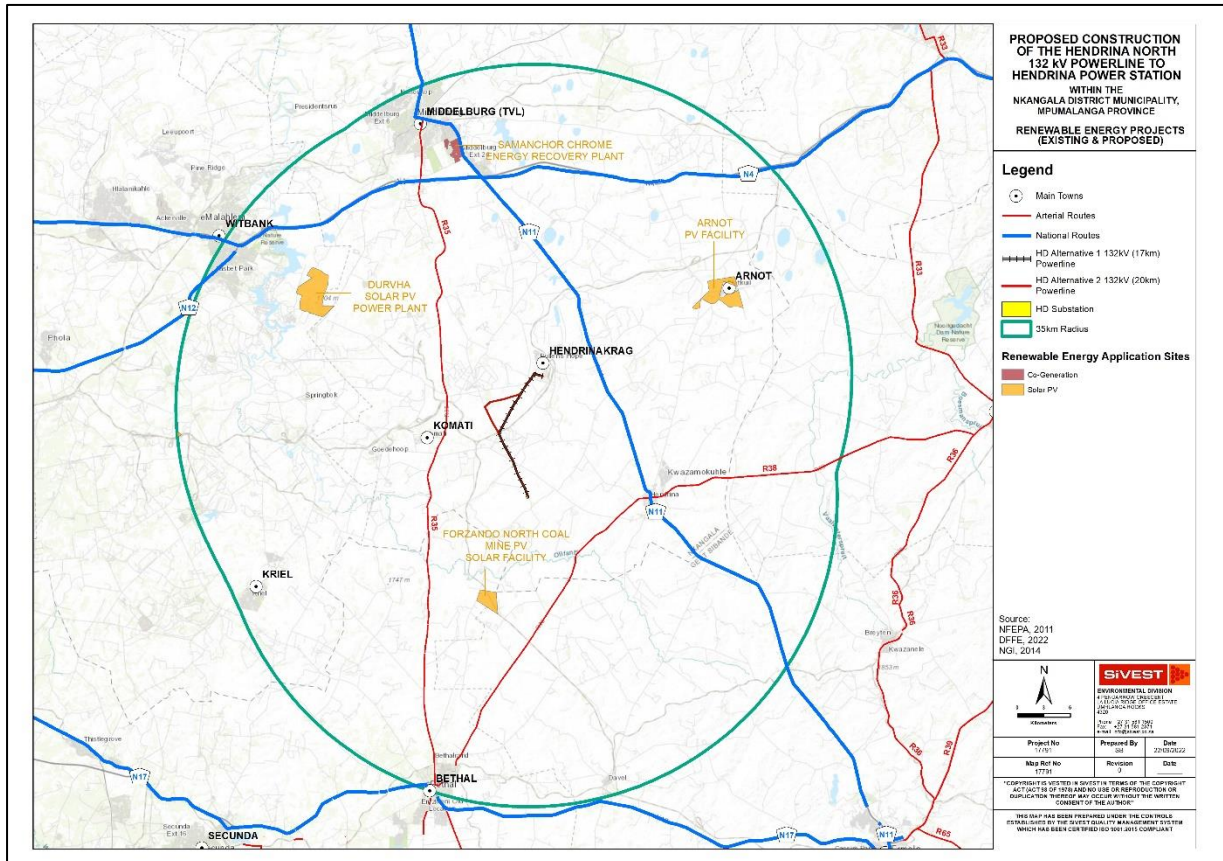


Figure 42: Renewable Energy Projects within 35km of the Hendrina Grid Connection infrastructure

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	S		E	P	R	L	D	I / M	TOTAL	S				
Aquatic / Freshwater																						
None identified																						
Terrestrial Ecology																						
The power line will only very slightly affect Broad-scale ecological processes	Transformation and presence of the facility will only slightly contribute to cumulative habitat loss and impacts on broad-scale ecological	2	2	2	2	4	2	2	4	-	MEDIUM	» If possible, avoid putting pylons in Moist Grassland, if not possible rehabilitate at pylons, avoid access road under power line, use existing roads. The clearing of vegetation must be kept to a minimum and remain within the footprint development – leave the rest of the area with natural vegetation intact, but there is very little, if any, natural vegetation left. · The clearing of vegetation must be kept to a minimum and remain within the footprint development – leave the	2	1	2	1	4	1	2	2	-	LOW

ENERTRAG SOUTH AFRICA (PTY) LTD
Project No. 17791
Description Hendrina North Grid
Revision No. 1.0

Prepared by: 

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										rest of the area with natural vegetation intact, but there is very little, if any, natural vegetation left <ul style="list-style-type: none"> · Remove alien invasive species wherever possible · Construction must be completed as quickly as possible · Disturbed open areas must be rehabilitated immediately after construction has been completed · During the construction phase workers must be limited to areas under construction and access to adjacent private areas must be strictly controlled · Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. · Plant only indigenous grass no alien species 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
Agricultural																						
None identified																						
Avifaunal																						
Avifauna	(1) Transformation and presence of the facility will contribute to cumulative habitat loss and impacts on broad-scale ecological processes, namely population declines and displacement of priority bird species	3	4	2	3	3	3	4	5	-	HIGH	Combined mitigation measures against each environmental parameter associated with the construction, operation, and decommissioning phases of the project.	3	2	1	2	3	2	2	2	-	LOW
Geotechnical																						
Disturbance/ displacement/ removal of soil and Rock	No Cumulative effect																			0		

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Revision No. 1.0

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ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								S	RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								S		
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)			E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)			
Soil Erosion																						
Heritage																						
None identified																						
Visual																						
<ul style="list-style-type: none"> Altered Sense of Place caused by the Power line 	<ul style="list-style-type: none"> Additional power lines installed across the surrounding area will interrupt views and result in visual intrusion and altered sense of place 	2	4	2	3	3	3	4	2	-	MEDIUM	<ul style="list-style-type: none"> Do not install or affix lights on pylons. Align proposed power lines along existing power line routes 	2	4	2	3	3	2	2	8	-	MEDIUM

16. POSITIVE AND NEGATIVE IMPACTS OF THE HENDRINA NORTH GRID PROJECT

A summary of the impacts pre-mitigation and post-mitigation are provided below:

16.1 Mitigation measures

Refer to Section 15 above. The assessment of each issue/ impact is included in Section 15 above and mitigation measures are provided for each impact identified in **Table 20**.

Table 20: Summary of impacts pre-mitigation and post-mitigation

Impact	Pre-mitigation	Post-mitigation
PLANNING		
Impacts to Biophysical Systems		
CONSTRUCTION		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Loss of freshwater ecosystem vegetation, associated habitat and ecosystem services; Transportation of construction materials can result in disturbances to soil, and increased risk of sedimentation/erosion; and Soil and stormwater contamination from potentially spilled oils and hydrocarbons originating from construction vehicles.	Low	Low
Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream freshwater ecosystem areas; Exposure of soil, leading to increased runoff, and erosion, and thus increased sedimentation of the freshwater ecosystems ; Increased sedimentation of the freshwater ecosystems, leading to smothering of vegetation associated in the freshwater ecosystems ; and Proliferation of alien and/or invasive vegetation as a result of disturbances.	High	Low
Disturbances of soil leading to potential impacts to the freshwater ecosystem vegetation, increased alien vegetation proliferation in the footprint areas, and in turn to altered freshwater ecosystem habitat; and Altered runoff patterns, leading to increased erosion and sedimentation of the freshwater ecosystems .	Low	Low
• Potential contamination of surface water (when present).	High	Low
Loss of approximately 2, 50 ha of valley bottom wetland and indirect impacts; Disturbance to soil, vegetation, biota and potentially water quality as a result of construction activities; Altered runoff patterns as a result of excavation and casting of concrete within the valley bottom wetland, leading to increased erosion and sedimentation of the wetland; Removal of freshwater ecosystem vegetation; *Potential spillage and ingress of hydrocarbons from maintenance vehicles into the valley bottom wetland.	Low	Low
Terrestrial Ecology		
Agricultural Fields. Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species	Low	Low
Northern dry grassland at Hendrina power station - entrance of power line into power station and Southern Dry Grassland at WEF. Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species	Low	Low
Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species	Low	Low

Impact	Pre-mitigation	Post-mitigation
Vegetation clearing for access roads, pylons, power line and their service areas may impact on vegetation and plant species	Medium	Low
Alien invasive plant species and weeds may encroach into any disturbed areas particularly areas cleared for the proposed development	Low	Low
Direct impacts on mammals and habitat destruction	Low	Low
Direct impact on herpetofauna and habitat destruction, unlikely to be present at power line transect, is present may move away, slower movement. The current habitat is mostly disturbed terrestrial habitat The footprint for the proposed residential development will result in clearing most of the vegetation area. This will result in some loss of herpetofauna habitat. After clearing the vegetation, construction will commence.	Low	Low
Avifauna		
Displacement of priority species from breeding/feeding/roosting areas	Medium	Low
Heritage		
During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	High	Low
Geotech		
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Visual		
Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction site (power line alignment and substation footprint) and access roads/tracks, during the construction period.	Low	Low
OPERATIONAL		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Disturbance to soil and ongoing erosion as a result of periodic maintenance activities; and Altered water quality (if surface water is present) as a result of increased availability of pollutants.	Medium	Low
Terrestrial Ecology		
Impacts on vegetation and fauna during Maintenance of power line	Low	Low
Avifauna		
Population reduction of priority species	High	Low
Electrocution of priority species in the onsite sub-station	Low	Low
Geotech		
Increased erosion due to alteration of natural drainage	Low	Low
Visual		
Alternative 1 will be routed parallel to an existing power line, for at least half the route, which may obscure and/or assimilate the proposed power line and minimise additional visual clutter in the surrounding area. The power line is not expected to be absorbed or obscured by any infrastructure and is expected to be visually intrusive to motorists travelling along the gravel road and R542. The power line will be visually intrusive to some farmstead receptors, with views across the landscape	Medium	Medium
Alternative 2 is routed along a gravel road and farm boundaries. Unlike Power line Alternative 1, Alternative 2 is not routed adjacent to an existing 132 kV power line. As such, this alternative is anticipated to interrupt views across the landscape to both motorists and farmstead receptors and will be visually intrusive and increase visual clutter in the landscape.	Medium	Medium
Due to the shape, form and texture of the infrastructure comprising the substation, it will be visually intrusive to receptors and exacerbate visual clutter. This potential impact is ameliorated insofar as affected motorists will largely have fleeting views of the substation.	Medium	Medium
The installation of lighting around the substation is anticipated to generate nightglow, altering the sense of place and visual quality to those (farmstead) receptors not currently exposed to nightglow emanating from surrounding residential / developed areas. Lighting is not easily screened by vegetation or topography, and the proposed lighting for the power line and substation is anticipated to alter visual quality of the surrounding area.	Medium	Low

Impact	Pre-mitigation	Post-mitigation
DECOMMISSIONING		
Impacts to Biophysical Systems		
Avifauna		
Total/partial displacement of priority species from breeding/feeding/roosting areas	Medium	Low
Geotech		
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Visual		
Dust generated during decommissioning activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period.	Low	Low
CUMULATIVE		
Impacts to Biophysical Systems		
Terrestrial Ecology		
Transformation and presence of the facility will only slightly contribute to cumulative habitat loss and impacts on broad-scale ecological	Medium	Low
Avifauna		
Transformation and presence of the facility will contribute to cumulative habitat loss and impacts on broad-scale ecological processes, namely population declines and displacement of priority bird species	High	Low
Visual		
Altered Sense of Place caused by the Power line	Medium	Medium

17. SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

Table 21: Summary of specialist findings and recommendations

Specialist Study	Findings	Recommendations
Agricultural Assessment	<p>The proposed development will have low agricultural impact and will therefore be acceptable in terms of its impact on the agricultural production capability of the site. The only impact of this development is the loss of up to 3 hectares of agricultural land on the site of the substation. This is assessed as being of low significance because the amount of land loss is small, and the production potential of the land is limited to being unsuitable for crop production and only suitable as grazing land.</p> <p>The power line itself has insignificant agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath the power line and there will therefore be no loss of agricultural production potential underneath it.</p> <p>The only potential source of impact from the power line is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning).</p> <p>Because of the negligible agricultural impact of the power line, there is no material difference between the agricultural impacts of the proposed route alternatives within the assessed corridor. Both proposed route alternatives are considered equally acceptable in terms of agricultural impact.</p>	<p>The only potential source of impact from the power line is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). This impact can be completely mitigated with standard, generic mitigation measures that are included in the EMPr.</p> <p>From an agricultural impact point of view, it is recommended that the development be approved subject to the condition that the pylon locations minimize agricultural impacts by being located, wherever possible, outside of or on the edges of cropland so that they do not interfere with crop production. Pylon locations should be assessed and approved by an agricultural specialist during the final micro-siting walk-through exercise that occurs after EA and prior to construction. A desktop assessment of the pylon positions using satellite imagery will be adequate for this purpose.</p>
Biodiversity Assessment (Flora & Fauna)	<p>Vegetation</p> <p>SANBI and DEAT (2009) and NEMBA, Government Notice 1002 (2011) indicate that the Eastern Highveld Grassland is a Vulnerable ecosystem, as so</p>	<p>The construction of the proposed power line can be supported. Care should be taken with positioning of pylons in the larger Moist Grassland areas and the crossing of Drainage Lines.</p>

Specialist Study	Findings	Recommendations
	<p>much is already transformed. On the specific site the vegetation is mostly transformed by agriculture, with very little original natural vegetation remaining.</p> <p>No Irreplaceable CBAs occur along the transect area. A small CBA Optimal site occurs in the wetland in the north, close to the Hendrina Power Station. Most of the transect is Heavily Modified or small local areas Moderately Modified. Most wetlands are classified as Other Natural Areas.</p> <p>The vegetation study of the proposed power line transects resulted in the identification of five different plant communities</p> <ul style="list-style-type: none"> • Agricultural Fields At several places within the study area, cultivated lands were observed under existing power lines. • Dry Grassland Two small patches of Dry Grassland were recognised, one in the north, east of the Hendrina (Pullens Hope) power station, where the proposed power line enters the power station, and the other on the south at the proposed Wind Energy Facility site. The grassland at the northern site is highly disturbed, with several existing power lines crossing the area. The southern Dry Grassland at the proposed Wind Energy Facility site is less disturbed but appears to be secondary, totally dominated by <i>Eragrostis curvula</i> with patches of old planted Kikuyu grass and several scattered weedy species. Two planted exotic trees are present at some old ruins. • Moist Grassland The Moist Grasslands are regarded as wetlands. All wetland systems in South Africa have legal protection (National Water Act (2004)). These Grassland therefore have -High ecological sensitivity and therefore High conservation 	<p>From a biodiversity perspective, there is no objection against the development on condition that the development adheres to the mitigation measures concerning the wetlands on the site.</p>

Specialist Study	Findings	Recommendations
	<p>value. In some cases, the Moist Grassland has been ploughed. It is suggested that, if feasible, no pylons should be located within pristine (not previously ploughed) Moist Grassland. This may be a problem on Rietfontein and Aberdeen.</p> <ul style="list-style-type: none"> • Drainage Lines <p>The Drainage Lines are all regarded as wetlands. All wetland systems in South Africa have legal protection (National Water Act (2004)). The wetlands within the transect corridor have High ecological sensitivity and therefore High conservation value. It is suggested that, if feasible, no pylons should be located within a drainage line, but the power lines should easily cross over most of the drainage lines on the route.</p> <ul style="list-style-type: none"> • Pan <p>A single Pan is located just north of the Alternate Route. This pan is added to the report as a cautionary measure, as all pans in the area are regarded to be highly sensitive, with specialised habitat for fauna and flora. The pan edge vegetation is very similar to the Drainage Lines and are not described further.</p> <p>Fauna</p> <ul style="list-style-type: none"> • Mammals <p>Although many mammal species may from time to time occur in the area of the site transect, only few may probably be encountered at any one time. This is due to low densities of small species, not easily seen. Many smaller mammals are either secretive, nocturnal, hibernators and/or seasonal, and some are seasonal migrators. However, by applying the standard methods of deducing probable presence by using the recognised literature on distribution and habitat preferences, and knowledge of habitats present on the site, a list</p>	

Specialist Study	Findings	Recommendations
	<p>of mammals could successfully be compiled with a acceptable level of confidence.</p> <p>None of the mammal species predicted to visit the area of the site, will be threatened by the construction of the pylons and power line, or the during the operational phase. These mammal species are all quite motile and if present in the way of the power line during construction, will easily move away from the danger. Although linear and stretching over about 20 km, the area affected is way too small to affect any of the mammal species.</p> <ul style="list-style-type: none"> • Herpetofauna <p>No threatened herpetofauna species were recorded from the area of the site. Should wetland areas be protected, most herpetofauna species will not be threatened. by the construction of the pylons and power line, or the phase of operation.</p>	
Avifaunal Assessment	<p>The proposed Hendrina WEF grid connection will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> • Displacement due to disturbance associated with the construction of the onsite substation and grid connection power line. • Displacement due to habitat transformation associated with the construction of the onsite substation and grid connection power line. • Collisions with the overhead line in the operational phase. • Electrocutions within the onsite substation. • Displacement due to disturbance associated with the decommissioning of the onsite substation and grid connection power line. 	<p>The proposed project will have a range of pre-mitigation impacts from medium to high on priority avifauna, but it is expected to be reduced to acceptable low levels with appropriate mitigation. No fatal flaws were discovered during the investigations, therefore the authorisation of the project is supported, provided the recommendations in this report is strictly implemented.</p>
Geotechnical Assessment	<p>The site area is underlain by sandstone, shale and coal beds of the Vryheid Formation, Ecca Group, Karoo Supergroup. A particularly significant feature of the formation is the close intercalation of the different rock types within it. It is not unusual for a lenticular body of coarse sandstone to occur within a</p>	<p>No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective.</p>

Specialist Study	Findings	Recommendations
	<p>predominantly finer siltstone horizon, while a weak lens of mudstone or siltstone occurring within a competent layer of sandstone is equally common. Similarly, bands of rock may be laterally discontinuous and may suddenly pinch out and may reappear some distance away.</p> <p>The siltstone and mudrock residual soils are generally soft to stiff, clayey silty to sandy silt material and no excavation difficulties are expected. Hard rock sandstone bands may cause excavation difficult but will provide good founding conditions. The dolerite usually occupies the high lying areas and is generally deeply weathered and exhibits loose, red, clayey silt material to depths greater than 3.00 m BGL. Ferricrete usually occurs on the midslopes and adjacent to streams. The ferricrete and sandstone can cause sub-surface flow to become return flow causes seasonal wet conditions at surface. Seasonal wetlands are known to be a common occurrence in this region and geology.</p> <p>The lower-lying valleys, defined by streams, is expected to comprise thick (>1.50 m), unconsolidated, alluvial material. The alluvium may be clayey sand to clayey material and will be variable in composition. No highly expansive or severely collapsible soils are expected to occur on the site. Some low to medium potential expansive may exist on the site. Steep slopes or slope instabilities are not expected anywhere within the corridor areas.</p> <p>Most the corridor areas are accessible via existing good gravel and small farm roads. The quality of the farm roads may vary and becoming non-trafficable during and after heavy rainfall due to loose to soft upper soil. The crop areas that have been ploughed will cause trafficability issues and 4x4 vehicles may bog down in these areas during and after heavy rainfall.</p> <p>These constraints may be mitigated via standard engineering design and construction measures.</p>	<p>The proposed route alignment corridors are assessed to have a “Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation” provided that the recommended mitigation measures are implemented. The remaining mitigation measures provided to minimise the impacts relate to the appropriate engineering design of earthworks and site drainage, erosion control and topsoil and spoil material management. These do not exceed civil engineering and construction best practices.</p>

Specialist Study	Findings	Recommendations
Archeological Impact Assessment	<p>The project area is characterised by extensive cultivated fields and is considered to be of low archaeological potential. This was confirmed during the field survey and no archaeological sites of significance were noted and finds were limited to burial sites (Feature 093, 094, 101 and 102) as well as ruins (Feature 089, 090, 091 and 092). Both power line alternatives (alternative 1 & 2) will direct impact the potential grave at Feature 101 and the cemetery at Feature 102. The line should be micro sited to ensure avoidance of both sites with a 30-meter buffer zone. A secondary impact to ruins (089, 090, 091 and 092) and graves (093 and 094) is possible but unlikely due to the distance from the power line (between 50 and 130 meters respectively). Although of low significance the possible presence of graves at the ruins is a risk, and the indirect impact for both graves and ruins is rated as low.</p>	<p>The impact to heritage resources can be mitigated to an acceptable level provided that the below recommendations are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> Recorded ruins (089, 090, 091 and 092) and burial sites (093 and 094) must be indicated on development plans and avoided during construction with a 30 m buffer. The line should be micro sited at Feature 101 and 102 so that the graves can be retained with a 30m buffer zone. Implementation of the ENERTRAG Chance Find Procedure for the project Pre-construction heritage walkdown of final pylon positions.
Paleontological Impact Assessment	<p>The proposed routes lie almost entirely in the potentially fossiliferous Vryheid Formation (Ecca Group, Karoo Supergroup) that could preserve fossils of the Glossopteris flora. The site visit and walk through showed that the routes are disturbed by current and earlier agriculture, existing roads and other infrastructure. The site visit showed that there were no fossils on the land surface and there were no rocky outcrops that could preserve fossils.</p> <p>According to the SAHRA Paleontological sensitivity map the study area is of very high paleontological significance and an independent study was conducted for this aspect. Bamford (2022) concluded that it is extremely</p>	<p>A Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or drilling activities have commenced. Any impact would only occur during the Construction Phase. As far as the palaeontology is concerned, the impact will be low to insignificant; there is no preferred route and there is no no-go area.</p>

Specialist Study	Findings	Recommendations
	<p>unlikely that any fossils would be preserved in the loose soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales and siltstones of the early Permian Vryheid Formation, but only more than 5m below the surface, therefore, a Fossil Chance Find Protocol should be added to the EMPr.</p>	
Surface Water Assessment	<p>The site assessment confirmed the presence of numerous Hydrogeomorphic (HGM) units, and were classified as follows:</p> <ul style="list-style-type: none"> ➤ Eight (8) valley bottom wetlands (includes channelled valley bottom HGM units and unchannelled valley bottom HGM units); ➤ Three (3) depression wetlands; and ➤ One (1) seep wetland. <p>The activities associated with the construction and operation of the proposed power line alternative 1 and 2 pose a “low” risk significance to the freshwater ecosystems within the study and investigation areas, provided that the supporting structures are placed outside the 32m ZoR of the freshwater ecosystems. However, the construction phase of the proposed substation poses a “high” risk significance to the valley bottom wetland, whilst the operational phase of the proposed substation poses a “low” risk significance, as the majority of impacts are likely to have occurred during the construction phase.</p> <p>Alternative 1 of the proposed power line is the preferred alternative from a freshwater ecological management perspective. Alternative 1 traverses fewer freshwater ecosystems and thus poses a lower risk to the freshwater environments. Sections of Alternative 1 are also located along an existing power line. As such, if the existing supporting structures are upgraded or new pylons erected adjacent to existing pylons, the potential risks associated with the construction of supporting structures will be significantly reduced.</p>	<p>It is advised that the layout footprint of the substation be revised so as to avoid the freshwater ecosystems and the associated 32m NEMA ZoR associated with the study and investigation areas. All mitigation measures as stipulated in this report must be implemented to prevent any edge effects and cumulative impacts from occurring on the freshwater ecosystems within the study and investigation areas.</p>

Specialist Study	Findings	Recommendations
Visual Impact Assessment	<p>Visual quality is defined by agricultural, mining and industrial activity as well as infrastructure. The naturally undulating landscape is interrupted by power lines, Hendrina Power Station, Afgri grain silo and the Optimum Coal Mine tailings dam. The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a rural agricultural area, albeit within a region blighted by development mostly associated with coal-fired power generation. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable.</p> <p>Impacts of the 132 kV power line and substation will be associated with visual intrusion and visual quality and have been assessed in this report. Construction (and decommissioning) activities associated with the 132 kV power line and substation are anticipated to be visually intrusive. The impact is assessed to be of low significance with and without the implementation of mitigation.</p> <p>During the operational phase, the 132 kV power line and substation will alter the sense of place and be visually intrusive. These impacts are assessed to be of medium significance with and without the implementation of mitigation. The visual impact of nightglow is anticipated to be of medium significance and with the implementation of mitigation is reduced to low. The comparative assessment of Power line Alternative 1 and 2 indicates that Power line Alternative 1 is the preferred power line alignment from a visual perspective as it minimises additional visual intrusion and clutter.</p> <p>Five other power stations are located within a 35 km radius of the proposed Hendrina Power line. Power lines radiate from each of these power stations, forming a dense network of large- and small-scale power lines, affecting visual quality and sense of place in this transitional landscape. The proposed power</p>	<p>Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project (Power line Alternative 1 and 2) are both acceptable and there is no reason not to authorise the project. Power line Alternative 1 is the preferred alternative from a visual perspective.</p>

Specialist Study	Findings	Recommendations
	<p>line and substation associated with this project will add to these accumulating impacts. Therefore, the cumulative impact of the 132 kV power line and substation is assessed to be of medium significance with and without the implementation of mitigation.</p> <p>The proposed project comprises the development of a substation and 132 kV power line, further altering the visual landscape of the project area. This project is moderately congruent with and marginally affects the integrity of the landscape, as five power stations and the associated highly concentrated network of power lines exist within the project area and the wider region. Due to the high vertical profile of the pylons, the VAC of the project area is low; however, the undulating topography is expected to increase the VAC to a degree. The substation will be screened by the topography to a limited degree and less so by the vegetation.</p>	

18. ENVIRONMENTAL IMPACT STATEMENT

Specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that all alternatives (including the preferred alternative) contain no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorisation be granted, and that the layout being proposed as part of this BA process also be authorised (provided there are no concerns raised during the public participation process).

A layout of the development and the environmental sensitivities is included below:

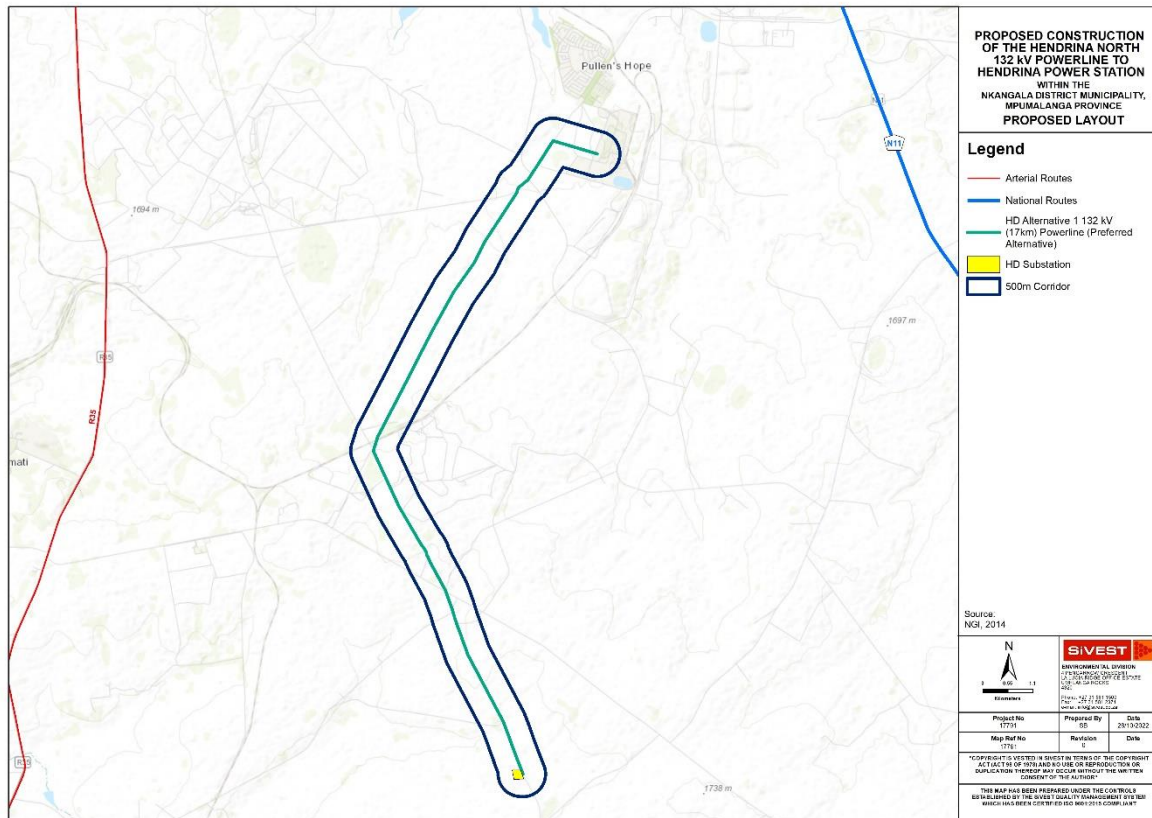


Figure 43: Layout of preferred alternatives with sensitives overlaid

The following specialist studies have been undertaken for the project:

- Visual Impact Assessment
- Heritage Impact Assessment
- Palaeontological Impact Assessment
- Archaeological Assessment
- Desktop Geotechnical Assessment
- Agriculture and Soils Impact Assessment (desktop)
- Surface Water Impact Assessment
- Biodiversity Impact Assessment

ENERTRAG SOUTH AFRICA (PTY) LTD

Prepared by:



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- Avifaunal Impact Assessment

All specialist studies are included in **Appendix 6**. The specialist assessments concluded the following:

The **visual** specialist confirmed that the potential visual impacts associated with the proposed Hendrina Grid infrastructure development are of moderate significance. Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project (Power line Alternative 1 and 2) are both acceptable, and there is no reason not to authorise the project.

In terms of **palaeontological** heritage resources, the specialist confirmed that the proposed Hendrina North grid connection will have low impacts, therefore as far as paleontology is concerned the project should be authorised. There is no preferred route and there is no go area.

The **archeologist** confirmed that the overall impact of the Hendrina North Grid, on the heritage resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorized.

The **geotechnical specialist** confirmed that no fatal flaws, from a geotechnical perspective, were identified during this desktop study. The impact was found to be a negative low impact. The anticipated impact will have negligible negative effects and will require little to no mitigation. The site from a desktop level geotechnical study is considered suitable for the proposed development.

The **agricultural specialist** concluded that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site and the proposed development was identified as acceptable. From an agricultural impact point of view, it is recommended that the development be approved.

The **surface water** specialist confirmed that, based on the findings of the study, there is no reason to withhold authorisation of any of the proposed activities. It is advised that the layout footprint of the substation be revised so as to avoid the freshwater ecosystem. Furthermore, all mitigation measures as stipulated in this report must be implemented to prevent any edge effects and cumulative impacts from occurring on the freshwater ecosystems within the study and investigations areas.

The **biodiversity specialist** advised that Care should be taken with positioning of pylons in the larger Moist Grassland areas and the crossing of Drainage Lines. The proposed development is supported from the biodiversity perspective.

The **avifaunal specialist** confirmed that the proposed Hendrina North grid connection will have a range of pre-mitigation impacts from medium to high on priority avifauna, but it is expected to be reduced to acceptable low levels with appropriate mitigation. No fatal flaws were discovered during the investigations, therefore the authorisation of the project is supported, provided the recommendations in this report is strictly implemented.

The main findings of the specialist studies are included in **Section 17** above.

A summary of the positive and negative impacts associated with the proposed project is included in **Section 16** above.

It is trusted that the DBAR provides adequate information to the I&APs / stakeholders to provide input and for the competent authority to make an informed decision regarding the proposed development.

It should be noted that this section is deemed to be in line with the requirements of Appendix 1 of the EIA Regulations 2014, as amended, and contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers (**Figure 40**) and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

19. ENVIRONMENTAL MANAGEMENT PROGRAMME AND CONDITIONS TO BE INCLUDED IN THE EA

In accordance with Appendix 4 of the EIA Regulations, 2014 (as amended), a draft EMPr has been included within the DBAR. The draft EMPr includes the impact management measures formulated by the various specialists and the recording of the proposed impact management outcomes for the development have also been included in the draft EMPr (**Appendix 8**).

The draft EMPr provides suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored. The relevant management plans have also been incorporated into the draft EMPr (where required), which will assist in this regard.

The draft EMPr will need to be finalized once specialist walk downs have been undertaken prior to construction.

Taking into account the potential negative and significant positive impacts that the proposed development could have on the biophysical and social environment, it is the opinion of the EAP that the proposed development should be authorised subject to the following conditions of authorisation:

- All of the mitigation measures identified in this BA Report must be made conditions of the authorisation.
- It is important that all of the listed mitigation measures are costed for in the construction phase financial planning and budget so that the contractor and/or developer cannot give financial budget constraints as reasons for non-compliance.
- All feasible and practical mitigation measures recommended by the various specialists must be incorporated into the Final Environmental Management Programme (EMPr) and implemented, where applicable;
- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists; and
- The final layout should be submitted to the Competent Authority (namely the DFFE) for approval prior to commencing with the activity.
- The activity-specific construction EMPr must be adhered to.
- An independent Environmental Control Officer (ECO) must be appointed by the applicant to monitor the implementation of the construction EMP. The ECO should undertake regular site inspections and compile an environmental audit report.

20. ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR SPECIALIST WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

None.

21. UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE

The assessment has been based by SiVEST on information sourced and provided by the Applicant, site visits conducted, specialist findings and the application of the SiVEST assessment criteria. The EAP is of the opinion that the assessment method applied is acceptable. SiVEST assumes that:

- All the information provided by the Applicant is accurate and unbiased.
- The available data, including Topocadastral maps, Orthophotographs, geological maps and Google Earth images, are reasonably accurate.
- It is not always possible to involve all Interested and/or Affected Parties (I&APs) individually, however, every effort has/will be made to involve as many interested parties as possible. It is also assumed that individuals representing various associations or parties convey the necessary information to these associations / parties.
- It is not possible to determine the actual degree of the impact that the development will have on the immediate environment without some level of uncertainties. Actual impacts can only be determined following construction and/or operation commences.
- SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments. However, many of the documents are not currently publicly available to download. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.
- Refer to specialist studies (**Appendix 6**) for their specific assumptions and limitations.

22. AUTHORISATION OF THE PROPOSED HENDRINA NORTH GRID PROJECT

Specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that all alternatives (including the preferred alternative) contain no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorization be granted, and that the layout being proposed as part of this BA process also be authorized (provided there are no significant concerns raised during the public participation process).

Conditions to be included in the EA for the construction phase are listed in **Section 19** above.

The environmental authorization should be valid for a period of 5 to 10 years. It is anticipated that the construction period will however commence shortly after authorization.

23. EAP DECLARATION

The EAP declarations, CV's and qualifications for the EAP's responsible for the preparation of this report have been attached in **Appendix 1**.

24. INFORMATION REQUIRED BY THE CA (IF APPLICABLE)

Currently not applicable.

25. CONCLUSION

This BAR has covered activities and findings related to the BA process for the proposed Hendrina Substation and Power line. Professional experience, specialist knowledge, relevant literature and local knowledge of the area have all been used to identify the potential issues associated with the proposed project.

There is no guarantee that all the potential impacts arising from the proposed project have been identified within the Basic Assessment phase, however the report provides an outline of the established measures that were taken to best identify all the potential impacts.

26. WAY FORWARD

The Draft BAR is currently being circulated for public participation for a period of 30 days (excluding public holidays) from **28 October 2022** until **27 November 2022**.

All comments received will be responded to in a C&RR, which will be included prior to submission of the FBAR to the decision-making authority, namely the DFFE. Comments received on the report will be taken into consideration, incorporated into the report (where applicable) and will be used when compiling the FBAR.

Once the FBAR has been submitted and the DFFE has acknowledged receipt thereof, a decision to either grant or refuse the EA for the proposed development will be made by the DFFE. In addition, once a decision regarding the EA has been received from the DFFE, it will be made available to the public and all registered I&APs, stakeholders and OoS / authorities will be notified accordingly and provided details regarding the appeal process. The BA process will thus come to an end once appeals (if any) have been dealt with adequately and the appeal process closes.

All I&APs and key stakeholders are invited to register as I&APs in order to be kept informed throughout the process. To register as an I&AP / stakeholder and/or to obtain additional information, please submit your name, contact details (telephone number, postal address and email address) and the interest which you have in the application to SiVEST Environmental Division, as per the details below:

Contact: Hlengiwe Ntuli
□ PO Box 2921, RIVONIA, 2128
□ Phone: (011) 798 0600
□ E-mail: sivest_ppp@sivest.co.za
□ Fax: (011) 803 7272
Website: www.sivest.com

Please reference '*Hendrina North Grid*' in your correspondence, should your comments be project specific. SiVEST shall keep all registered I&APs / key stakeholders informed of the BA process.



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