



**PROPOSED KMBERLEY PHASE 3: CONSTRUCTION OF 400KV FERRUM
– MOOKODI POWERLINE AND ASSOCIATED SUBSTATION UPGRADE
WITHIN NORTHERN CAPE AND NORTH WEST PROVINCE
SITE SENSITIVITY VERIFICATION REPORT**

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1 INTRODUCTION

The National Transmission Company South Africa SOC Ltd (NTCSA) a subsidiary of Eskom Holdings SOC Ltd, has to supply reliable power to meet the increasing needs of electricity users. Therefore, NTCSA must continuously maintain, construct, and upgrade its transmission powerlines and substation infrastructure. According to Eskom TDP 2010–2019, some objectives involve transmission network strengthening plans and reliability projects, ensuring the transmission system's reliability and adequacy are sustained as load demand increases. A study done for the Northern Cape and North West grid indicated that based on the anticipated growing electricity demand, there may be a risk that demand will exceed the supply. As a result, they have identified the need to strengthen the transmission system between the Ferrum, Hotazel Transmission and Mookodi Substations by constructing two 400kV transmission powerlines and upgrade substations. The advantages of the proposed transmission powerline would include:

- (i) avoiding current and future possible voltage collapse;
- (ii) contributing towards a more flexible electrical network;
- (iii) Improve the overall reliability of the electrical systems, which would benefit electricity users in the region and sustain economic growth in the two Provinces.

The scope of work proposed by NTCSA to strengthen the network entails the following:

- (a) Construct a ± 260 km, 400kV transmission powerline from Ferrum Transmission Substation to Mookodi Substation.
- (b) Upgrade the Mookodi Substation by installing:
 - 1 X 100MVA_r busbar reactor at Mookodi 400kV busbar;
 - 1x400kV Mookodi feeder bay;
 - 1X400kV Line reactor at Mookodi 400kV.
- (c) Upgrade the Ferrum Substation by installing
 - 1 X 100MVA_r busbar reactor at Ferrum 400kV busbar;
 - 1x400kV Ferrum feeder bay; and
 - 1X400kV Line reactor at Ferrum 400kV

2 LOCATION

The proposed route is approximately 60km between Ferrum Substation and Hotazel and 200km between Hotazel and Mookodi substation. Ferrum Substation is approximately 3.4km southeast of Kathu, and the Mookodi Substation is 6.5km south of Vryburg town. The proposed route crosses the national road (N14), regional road R31, a few district roads between N14 and R31, and a railway line. Mine areas exist close to Hotazel town, and several settlements are near the proposed corridor.

Approximately 80% of the area affected by this proposed route is rural land, and 70% of the proposed powerline route is within the Northern Strategic Transmission Corridor. See Figure 1.

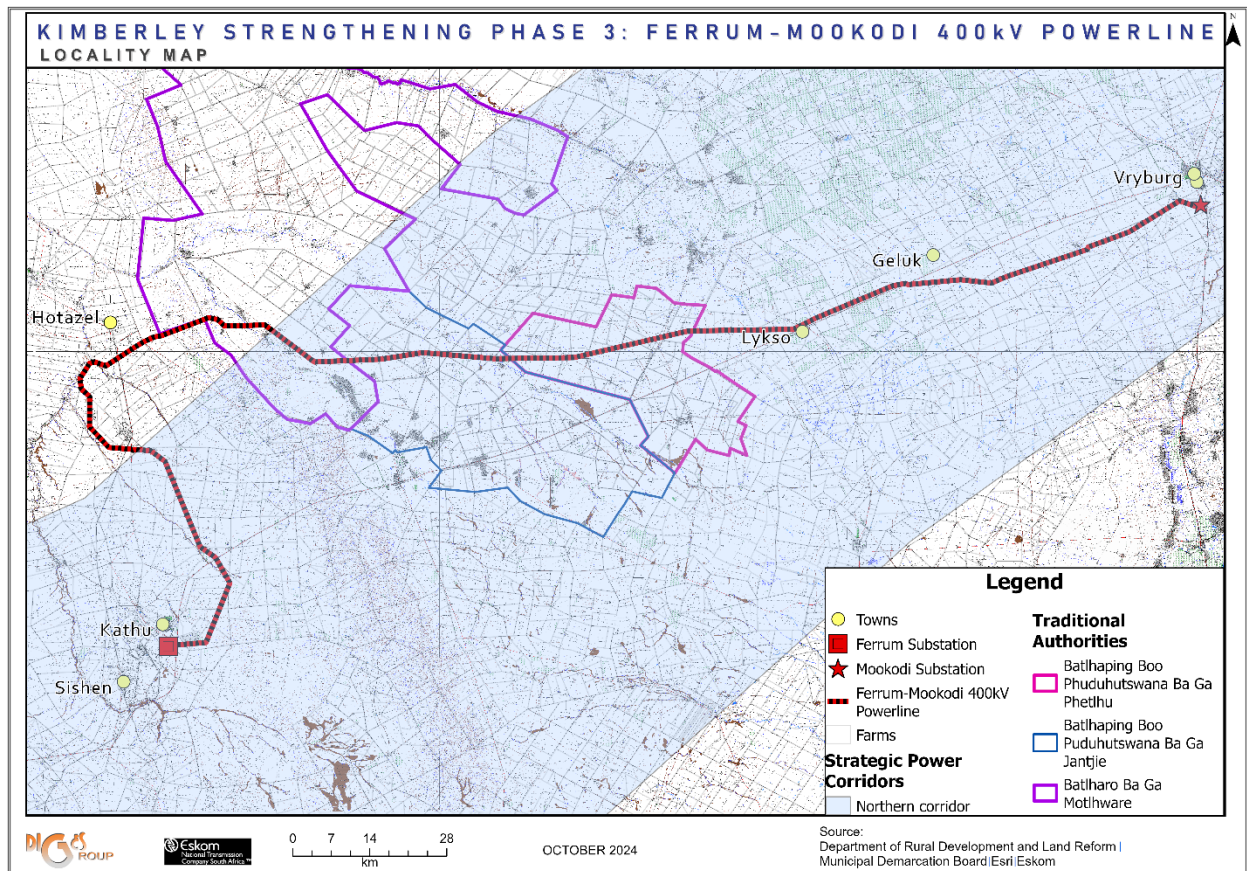


Figure 1: Location of the proposed corridor

3 SCREENING TOOL REPORT AND PROTOCOLS

Regulation 16(1)(b)(v) of the Environmental Impact Assessment Regulations, 2014, as amended, indicates that a report generated from the national web-based environmental screening tool must be submitted with an application for Environmental Authorisation in terms of Regulation 19 and 21 of the Environmental Impact Assessment Regulations, 2014. DIGES Group cc (herein DIGES), therefore, generated a Screening Tool Report (STR) for the construction of the powerline. An STR was not generated for the substation as upgrades will be done within the substation yards and the upgrades do not trigger a listed activity. Based on theme sensitivities, the reports have recommended specialist reports that must be undertaken and guided by the specific theme protocols (where they exist) or the general protocol.

The Minister for the Department of Forestry, Fisheries and the Environment (DFFE) gazetted Protocols for various themes for national implementation purposes in March and October 2020. These protocols provide the criteria for the specialist assessment and minimum report content requirements for impacts

on various themes such as animal and plant species, agricultural, terrestrial biodiversity, civil aviation, for activities requiring environmental authorisation. Theme specific protocols replace the requirements of Appendix 6 of the Environmental Impact Assessment Regulations. However, where there is no theme specific protocol, specialist assessments must adhere to the requirements of Appendix 6 of the EIA Regulations, 2014. The protocols indicate that a site sensitivity verification must be done to validate or dispute the sensitivities assigned to the different themes. The verified sensitivity will inform the level of assessment required.

4 TERMS OF REFERENCE

The Terms of Reference for undertaking site sensitivity verification and the compilation of the report thereof are:

- i. To undertake a desktop analysis using satellite imagery.
- ii. To undertake a preliminary on-site inspection.
- iii. To utilise any other available and relevant information.
- iv. Compile a report confirming or disputing current land use and environmental sensitivity, including motivation and evidence.

5 METHODOLOGY

- i. **Desktop Study:** A desktop study was undertaken to assess the environmental baseline conditions of the project area. This involved spatial data analysis from different sources, satellite imagery and a literature review of the EIA reports compiled for the various solar photovoltaic plants and powerlines within the project area.
- ii. **Site Assessment:** A site assessment was undertaken from the 9 to 27 September 2024.

This report, therefore, considers the information in the generated screening report, literature review, GIS mapping and site assessment.

6 SITE SENSITIVITY AND SPECIALISTS' REPORTS

The screening report indicates the following sensitivities:

Table 1: Environmental Theme Sensitivities per the Screening Reports

THEME	POWERLINE
Agriculture	High
Animal Species	High
Aquatic Biodiversity	Very High

Archaeology & Heritage	Very High
Civil Aviation	High
Defence	Low
Palaeontology	Very High
Plant Species	Medium
Terrestrial Biodiversity	Very High

In addition to assigning theme sensitivities, the Screening Tool Reports have indicated that the following studies should also be undertaken:

- (i) Agricultural Impact Assessment
- (ii) Archaeological and Cultural Heritage Impact Assessment
- (iii) Palaeontology Impact Assessment
- (iv) Terrestrial Biodiversity Impact Assessment
- (v) Aquatic Biodiversity Impact Assessment
- (vi) Geotechnical Assessment
- (vii) Plant Species Assessment
- (viii) Animal Species Assessment
- (ix) Landscape/Visual Impact Assessment
- (x) Civil Aviation Assessment
- (xi) RFI Assessment

6.1 Specialist Assessments

The motivation for undertaking some of the specialist studies indicated in the Screening Report, whilst some have not been undertaken, are given below.

6.2 Agriculture (Soil and Land Capability)

The overall sensitivity of the agricultural theme indicated in the STR is high as shown in Figure 2. Although arable soils make up 91% of the site, which encourages root and water penetration at deeper depths, the soil scientist's desktop study and field assessment found that the extremely low clay content directly affects the soils' ability to hold water. This reduces the soil's suitability for long-term farming, especially in dryland environments. Without a reliable and sufficient water source, the potential productivity of the area would be severely compromised, as these soils would struggle to maintain optimal moisture levels necessary for healthy crop growth. Therefore, it can be concluded that the proposed project area has an overall "Low" sensitivity. Based on the protocols, an Agricultural

Compliance Statement has been prepared by a SACNASP-registered soil scientist. A summary of the verification is indicated in Table 2.

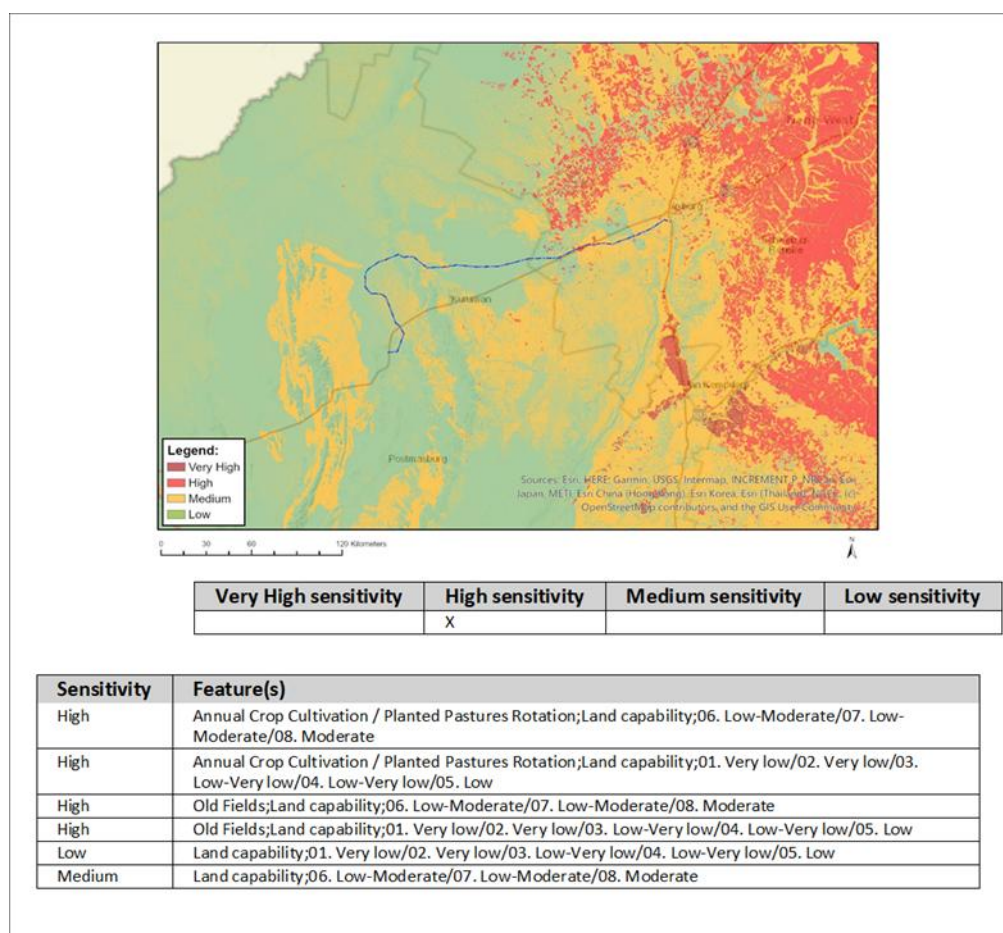


Figure 2: Agricultural sensitivity per the Screening Tool Reports

The summary is given in the Table below.

Table 2: Summary of Agricultural Site Sensitivity Verification

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
Agriculture (Soil and Land Capability)	High	Low	Disputed – The study area is primarily characterised by arable soils (Class II and IV); however, its suitability for successful dryland agriculture is low due to climatic constraints and a lack of irrigation options. The region experiences erratic and very low rainfall, which is essential	Agricultural Compliance Statement

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
			for successful dryland farming. Without an irrigation scheme and a robust fertilisation program, the study area will be limited to grazing and wildlife uses. Furthermore, the high evaporation rate typical of the hot, dry climate will necessitate regular irrigation if crops are to be grown successfully.	

6.3 Landscape/ Visual Assessment

The screening tool does not assign a sensitivity rating to the visual resources; hence, no site sensitivity verification was done for this project. Due to the scale of the proposed development within the landscape and the significance of the anticipated impacts of the visual receptors, a Visual Impact Assessment has not been done. Most of the study area is considered to have moderate landscape character sensitivity due to the monotonous shrubland landscape, the small settlements in the landscape, the generally low visual quality and low tourism value. As such, based on the terrain and land cover, there is a low visual screening for the proposed transmission line. A Visual Impact Assessment undertaken during the Screening Phase has been referenced.

6.4 Archaeology and Heritage

Due to the Grade I Heritage site within 5 km, the STR assigns a very high archaeological sensitivity factor. See Figure 4. Vhubvo, 2024, indicates that the proposed line is 10 kilometers from the graded site, which is located in the town of Vryburg. The powerline construction and operation will therefore have negligible aesthetic effects and no excavation-related damage on the graded site. Additionally, there were no Grade II, IIIA, or IIIB sites found in the vicinity of the servitude. Vhubvo, 2024, further indicates that though stone tools are practically common throughout Namaqualand, the several studies done in the area have not recorded any materials or sites of significance. As a result, the very high sensitivity is disputed; instead, a low archaeological sensitivity is assigned. An archaeological walkdown and impact assessment has been undertaken in line with the South African Heritage Resources Agency (SAHRA) interim comments. The summary of the verification is indicated in Table 3.

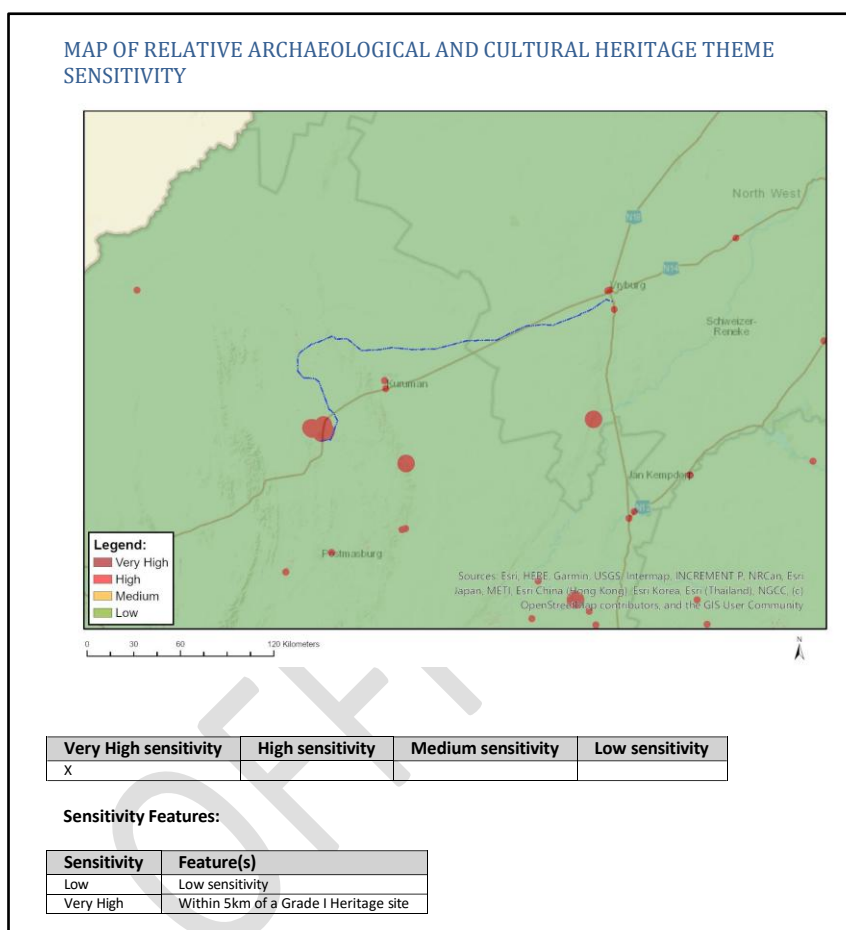


Figure 3: Archaeological Sensitivity Map generated from the Screening Tool

Table 3: Sensitivity verification for archaeology

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
Archaeology	Very High	Low	Disputed- No graded sites were found during the verification process, and none have been recorded during the several studies undertaken previously.	Archaeological Impact Assessment

6.5 Palaeontology

According to the specialist, the intensity/magnitude of a palaeontological impact is determined by the palaeontological sensitivity of the affected geological formation, together with the extent or volume of excavations made into the formation. According to the STR and the SAHRA PalaeoSensitivity map, the

proposed development is located within an area of low, moderate, high and very high Palaeontological sensitivity. The sensitivity of the servitude has therefore been assigned an overall Very High sensitivity. See the map below.

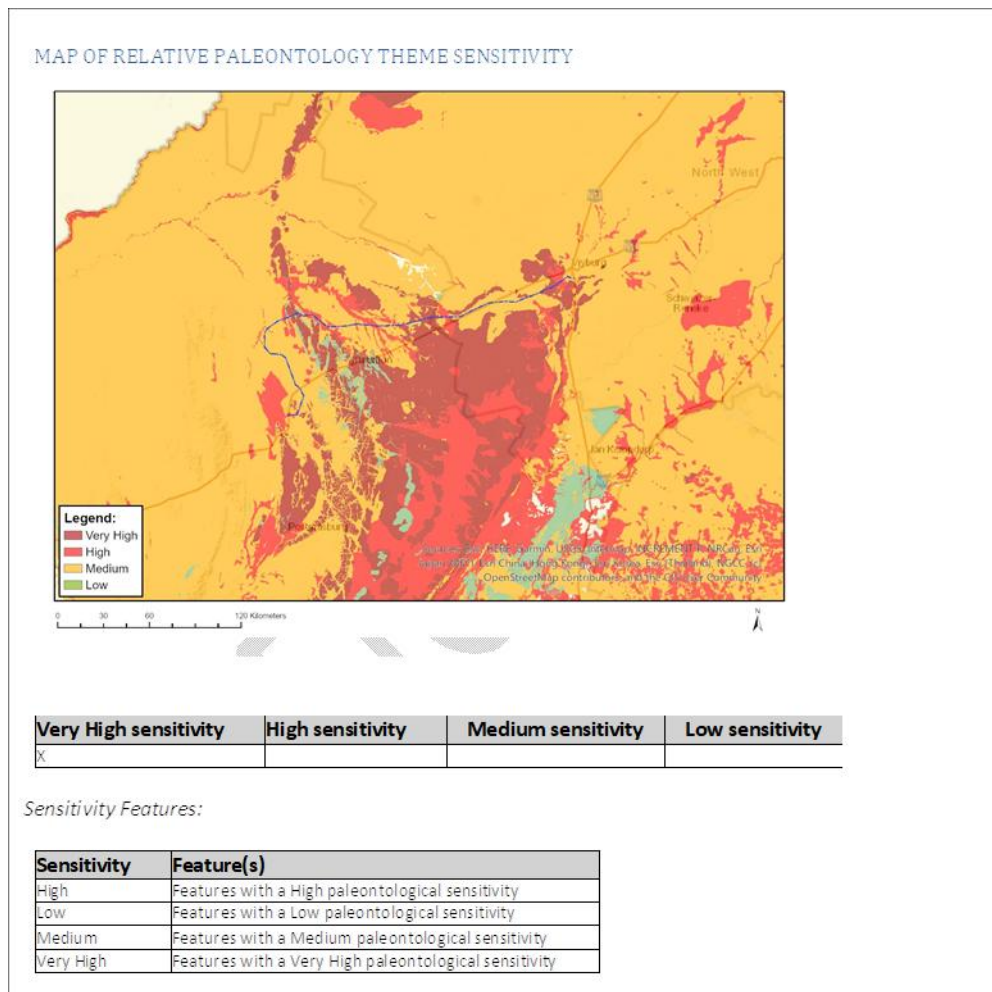


Figure 4: Paleo Map as per SAHRIS

Durand, 2024, indicates that the western part of the proposed Ferrum-Mookodi 400kV power line is mainly underlain by dune sand and aeolian sand that are considered with moderate palaeontological sensitivity. However, the line crosses alluvium associated with a dry riverbed south of Hotazel has a high palaeontological sensitivity. The Ferrum Substation and the southern end of the power line, east of Kathu, are underlain by surface limestone that is considered to have a high palaeontological sensitivity. The eastern part of the proposed Ferrum-Mookodi 400kV power line is mainly underlain by aeolian sand that has a moderate palaeontological sensitivity. There are however sections that are underlain by dolomite, limestone and chert of the Ghaap Group of the Griqualand West Supergroup that include rocks that are considered of Very High Palaeosensitivity. A section of the line that crosses over the hills west of Hotazel, in the Ga-Motsemai region, is underlain by the rocks of the Daniëlskuil Member of the Asbesberge Formation of the Asbestos Hills Subgroup that is also considered to have a very high

palaeontological sensitivity. A small section, southwest of Vryburg, is underlain by calcrete that has a high palaeontological sensitivity and south of Vryburg there are rocks of the Dwyka Group of the Karoo Supergroup that has a moderate palaeontological sensitivity. The site verification confirmed the occurrence of stromatolite-bearing dolomite hence the classification of the study area as having a Very High Palaeontological Sensitivity is supported. Per SAHRA's Interim comments, a field-based Palaeontological Impact Assessment (PIA) must be undertaken by a qualified palaeontologist. A Palaeontological Impact Assessment has therefore been commissioned and the Terms of Reference for the study are per the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments.

Table 4: Sensitivity verification for archaeology

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
Palaeontology	Very High	Very High	Validated- The stromatolites of the Ghaap Group of the Griqualand West Supergroup contain some of the oldest and best-preserved stromatolites on earth. The occurrence of stromatolite-bearing dolomite was confirmed during the field assessment.	Phase 1 Palaeontological Impact Assessment

6.6 Terrestrial Biodiversity, Animal and Plant Species

This section discusses Terrestrial biodiversity and animal and plant species' sensitivity.

6.6.1 Terrestrial Biodiversity

Terrestrial biodiversity is rated a very high sensitivity due to Critical Biodiversity Area (CBA1) and Ecological Support Areas (ESA) 1 in the Northern Cape and ESA in the North West. See the Figure below.

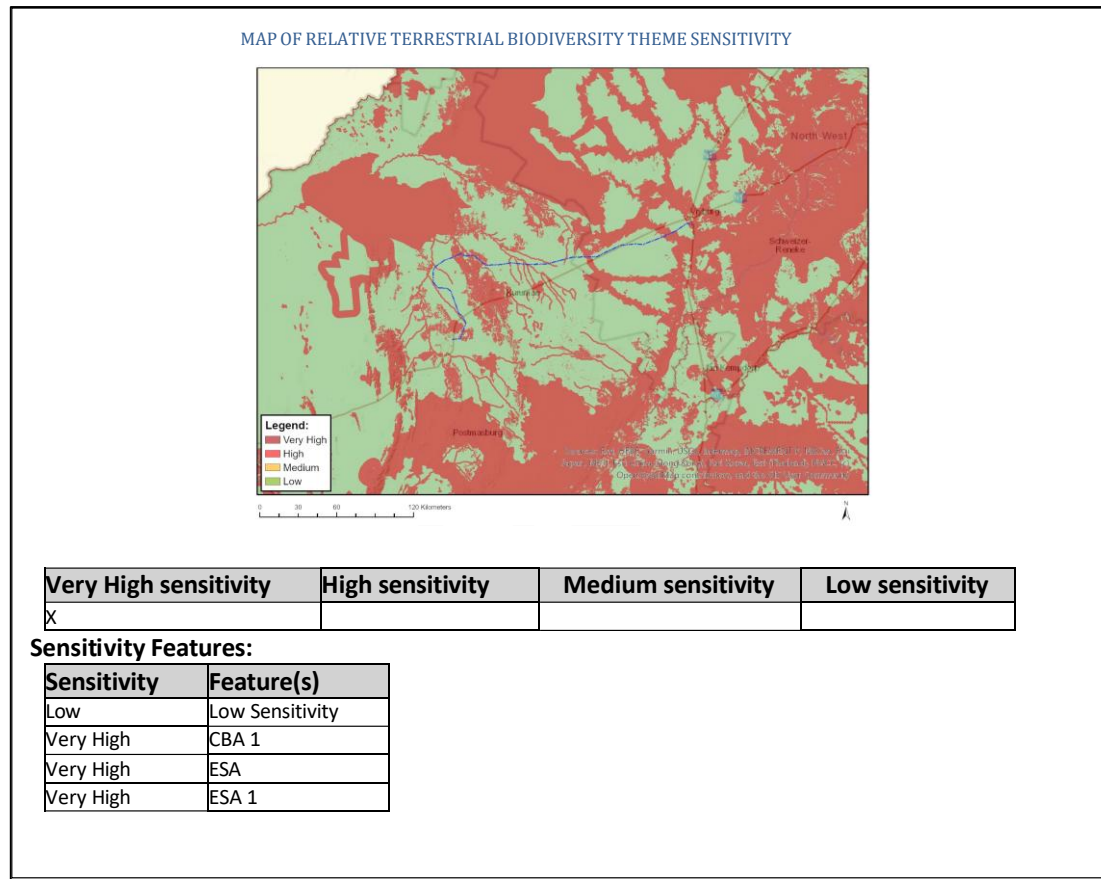


Figure 5: Terrestrial Biodiversity Sensitivity Map generated from STR

Spatially, the CBA1 is less than 1 hectare near the rocky ridges. However, the ecologist has indicated that there are CBAs. Ecological Support Areas (ESAs) in the study area are corridors that have been aligned to coincide with major topographical features to provide connectivity between CBA1 and 2 areas. The ESA is therefore a drainage valley and an associated landscape corridor that links other areas with high biodiversity conservation value. There are three such corridors in the NW part of the project area. In the NC the ridge is also a corridor and, on the Kathu side, all drainage lines are ESAs. The presence of the ESAs indicate that the site has importance in a wider ecological context for supporting biodiversity patterns. The ESAs on site correspond to those parts of the site flagged in the Screening Tool report as being of Very High sensitivity and confirms this pattern. These parts of the landscape have Very High sensitivity with respect to the Terrestrial Biodiversity Theme.

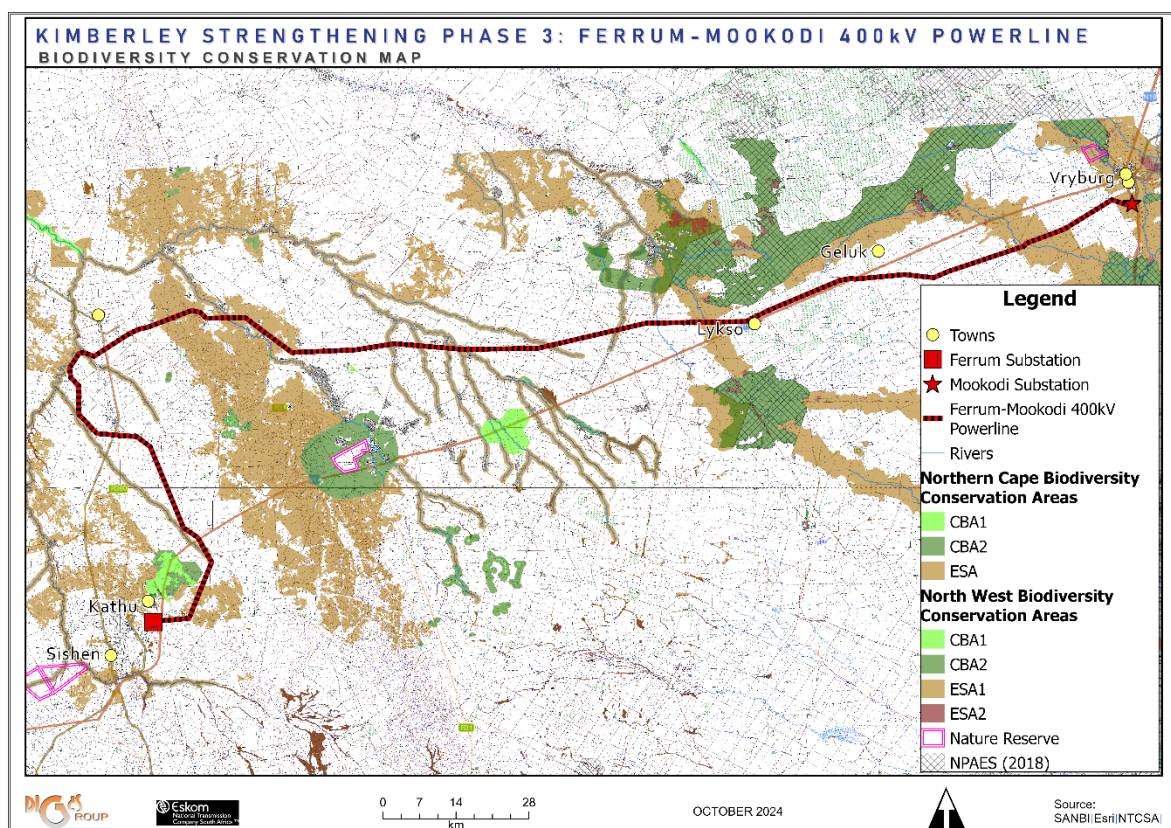


Figure 6: Terrestrial Biodiversity Map

A summary of the verification is indicated in the table below:

Table 5: Site Sensitivity Verification for Terrestrial Biodiversity

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
Terrestrial Biodiversity	Very High	Very High	Validated- ESA mapped is correspond to those parts of the site flagged, i.e., drainage valley and an associated landscape corridor that links other areas with high biodiversity conservation value. There are three such corridors in the NW part of the project area. In the NC the ridge is also a corridor and, on the Kathu side, all drainage lines are ESAs.	Included in the Terrestrial Plant Species Compliance Statement and Freshwater Assessment

6.6.2 Animal

The site sensitivity as identified by the National Web-Based Environmental Screening Tool shows that the animal species theme over the extent of the project varies from high (in the west), to medium and low in the east. See Figure 7. All the species listed for the medium and high sensitivity rating are birds, no mammals, amphibia or reptiles have been noted; hence it has been assumed the fauna sensitivity is low. The specialist undertook a desktop study and a tower walkdown assessment from 9-27 September 2024 to confirm the sensitivity of the site. Though several red data species are indicated in the general animal list for the area, no species were found onsite. The low sensitivity is therefore validated.

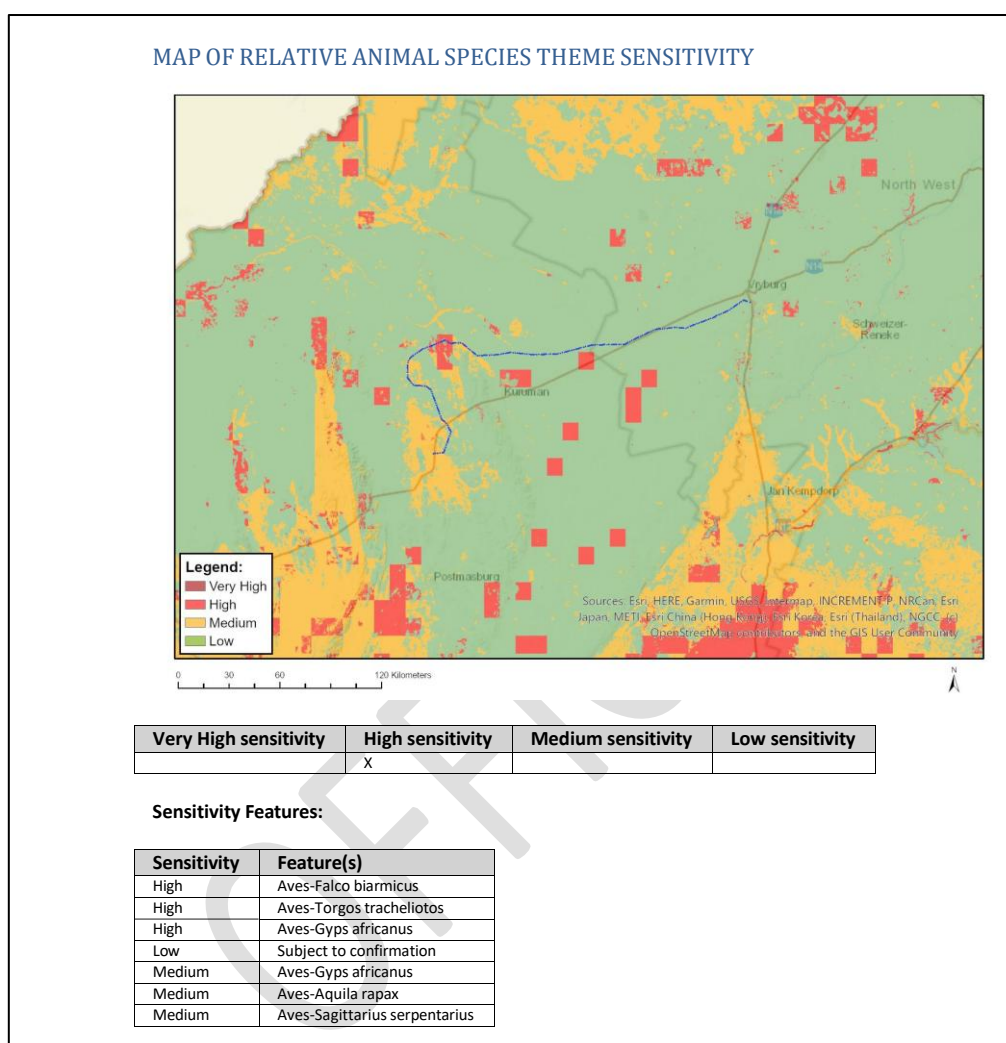


Figure 7: Terrestrial Animal Sensitivity Map generated from STR

6.6.3 Avifauna

In terms of avifauna, the high sensitivity indicated for the powerline is linked to the potential occurrence Aves-Falco biarmicus (Lanner Falcon), Aves-Torgos tracheliotos (Lappet-faced vulture) and Aves-Gyps africanus (white-backed vulture). This rating has been confirmed during the site sensitivity assessment as vultures and other SCC were observed on-site. The high numbers of SCC observed,

especially vultures, which have collision and electrocution incidents recorded nearby the proposed powerline in the EWT/Eskom Central Incident Register. This results in the project area being classified as high avifaunal. See the map below for Avifauna SEI.

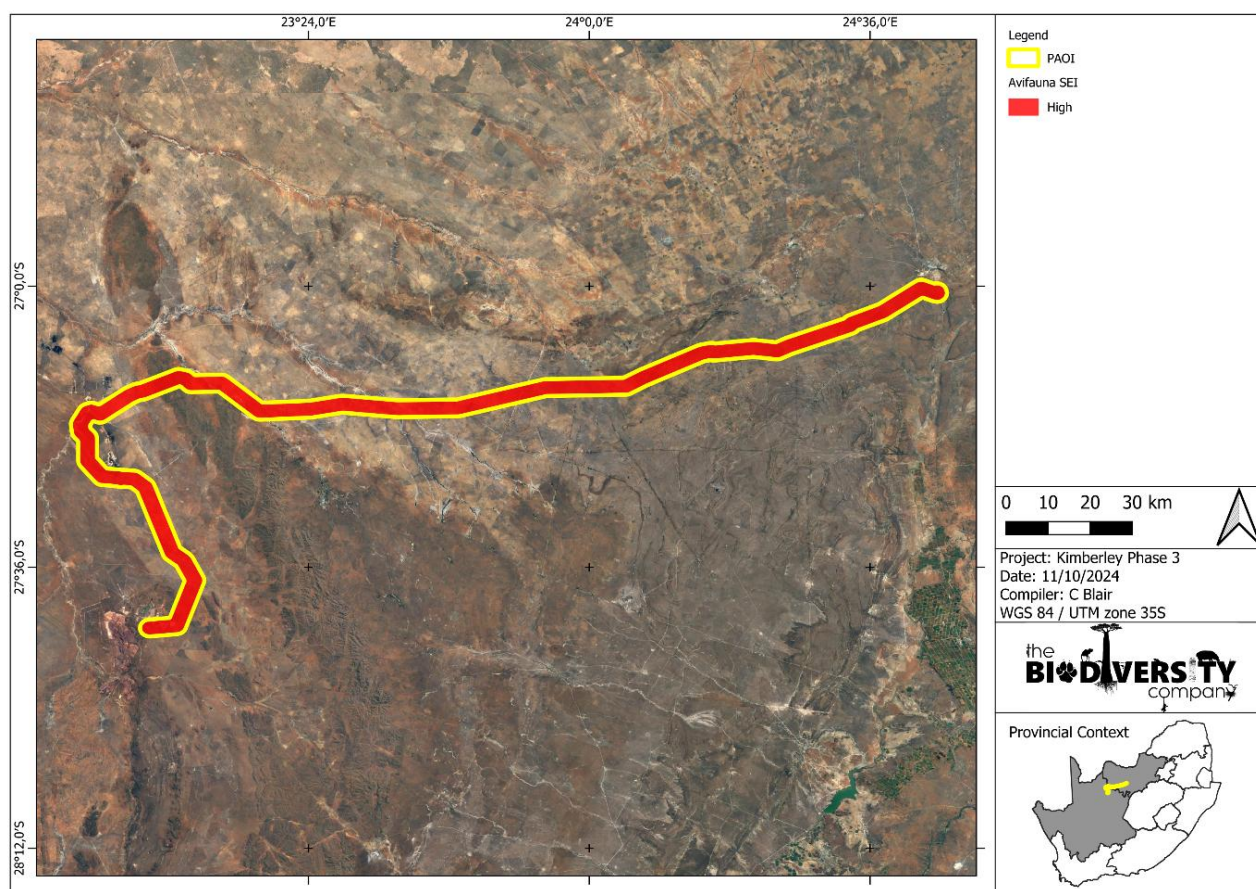


Figure 8: Sensitivities of the Ferrum Mookodi powerline project.

The table below summarises site verification.

Table 6: Site sensitivity Verification for Animal theme

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
Animal Theme (Other)	Low	Low	Validated – Though several red data species are indicated in the general animal list for the area, no species were found onsite.	Terrestrial Animal Compliance Statement
Animal Theme (Avifauna)	High	High	Validated– – The habitat shows limited impacts and does support SCC, including White-backed Vulture, Lappet-faced Vulture	Avifauna Impact Assessment

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
			and Kori Bustard. A number of additional SCC are also expected to occur in the area.	

6.6.4 Plant Species

The map below indicates the sensitivity rating of the plant species within the proposed development area as medium due to the presence of *Dicoma kurumanii* and the *Barleria media*. See Figure 8.

The desktop undertaken by David Hoare Consulting noted that both species are poorly known with very few historical collections and no observations on iNaturalist. For *Barleria media* (listed as Vulnerable), according to World Flora Online (worldfloraonline.org) and iNaturalist, this is a synonym of *Barleria macrostegia*, but according to SANBI Biodiversity Advisor, it is a separate and valid species. Assuming it is a valid taxonomic entity, the habitat is described as Kuruman Mountain Bushveld. For the other species, *Dicoma kurumanii* (rare), there are only two historical records. The locality information strongly suggests that this species would also only occur in Kuruman Mountain Bushveld (or similar) habitat. The servitude assessment showed that the areas of Kuruman Mountain Bushveld are in poor condition, overgrazed and possibly cleared, but currently heavily dominated by blackthorn, *Senegalia mellifera*. See Photos below. The specialist concluded that there is therefore a small possibility that either of these species could occur on site, but it is not considered to be likely. In addition, there are no threatened plant species that occur on site, and none that are likely to occur in the corridor. It is therefore verified that the Plant Species Theme has LOW sensitivity for this project on the basis of the following:

- (i) Suitable habitat for SCC, but habitat degraded.
- (ii) No SCC found on site that are listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria.

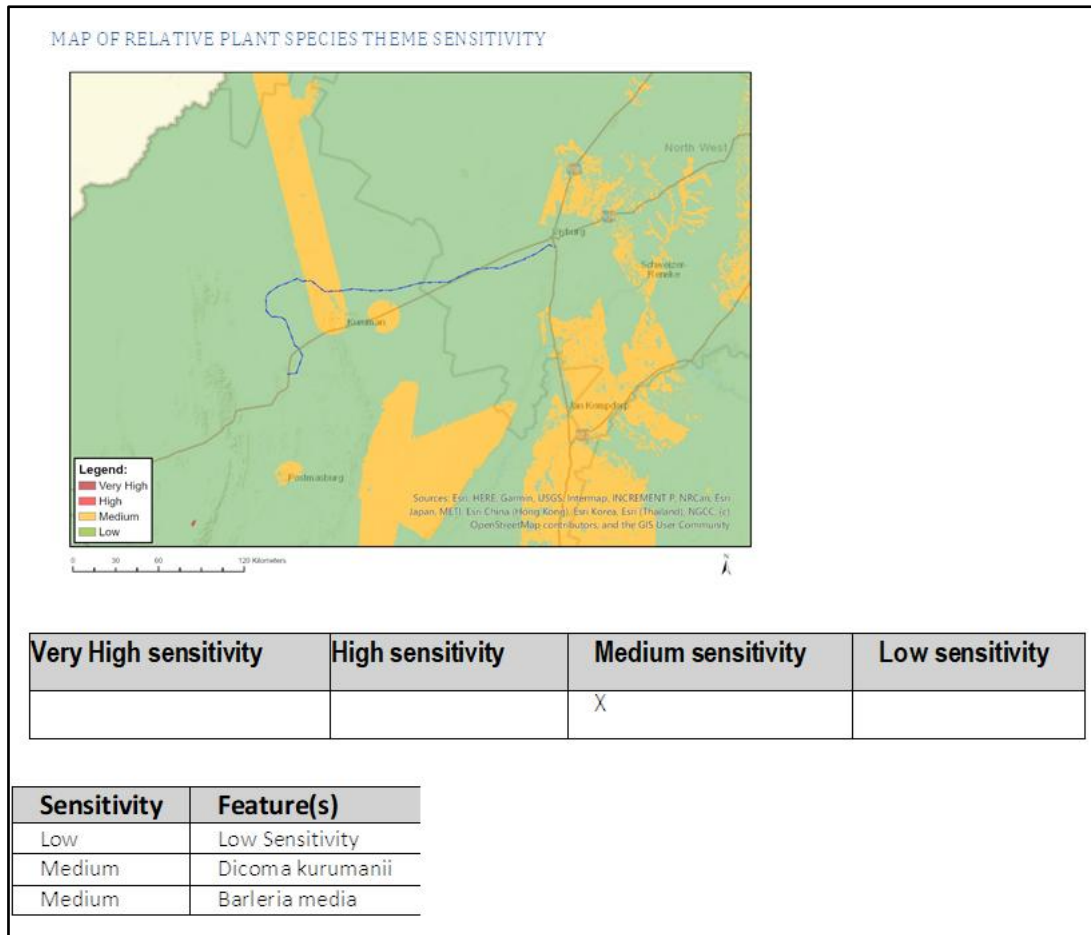


Figure 9: Map of the Plant Species theme sensitivity



27° 12' 25.96" S, 23° 10' 51.73" E

Areas dominated by impenetrable thickets of blackthorn, *Senegalia mellifera*.



27° 15' 41.95" S, 23° 24' 33.62" E

Heavily grazed areas north of Kuruman.

Figure 10: Areas near Kuruman where the STR assigned medium plant species sensitivity

The table below summarises site verification.

Table 7: Site Sensitivity Verification for Plant Species

Screening Tool Theme	Screening Tool	Verified Sensitivity	Tool Validated or Disputed by Specialist - Reasoning	Report Submitted
Plant	Medium	Low	Disputed– The areas of Kuruman Mountain Bushveld are in poor condition, overgrazed and possibly cleared, but currently heavily dominated by blackthorn, <i>Senegalia mellifera</i> . There is a small possibility that either of these species could occur on site, but it is not considered to be likely. In addition, there are no threatened plant species that occur on site, and none that are likely to occur in the corridor.	Terrestrial Plant Species Compliance Statement

6.7 Aquatic Biodiversity

It should be noted that the screening tool is based on the presence or absence of watercourse features. Therefore, the screen tool presents either a “Very High” or “Low” sensitivity rating. The aquatic biodiversity theme is presented as predominantly “Low” with “Very High” sensitivity for portions of the proposed powerline route. The “Very High” sensitivities are attributed to the presence of:

- CBAs 1 and 2;
- ESA’s 1 and 2
- Rivers and Wetlands;
- Eastern Kalahari Bushveld Bioregion wetlands (depressions, seeps and valley bottoms).

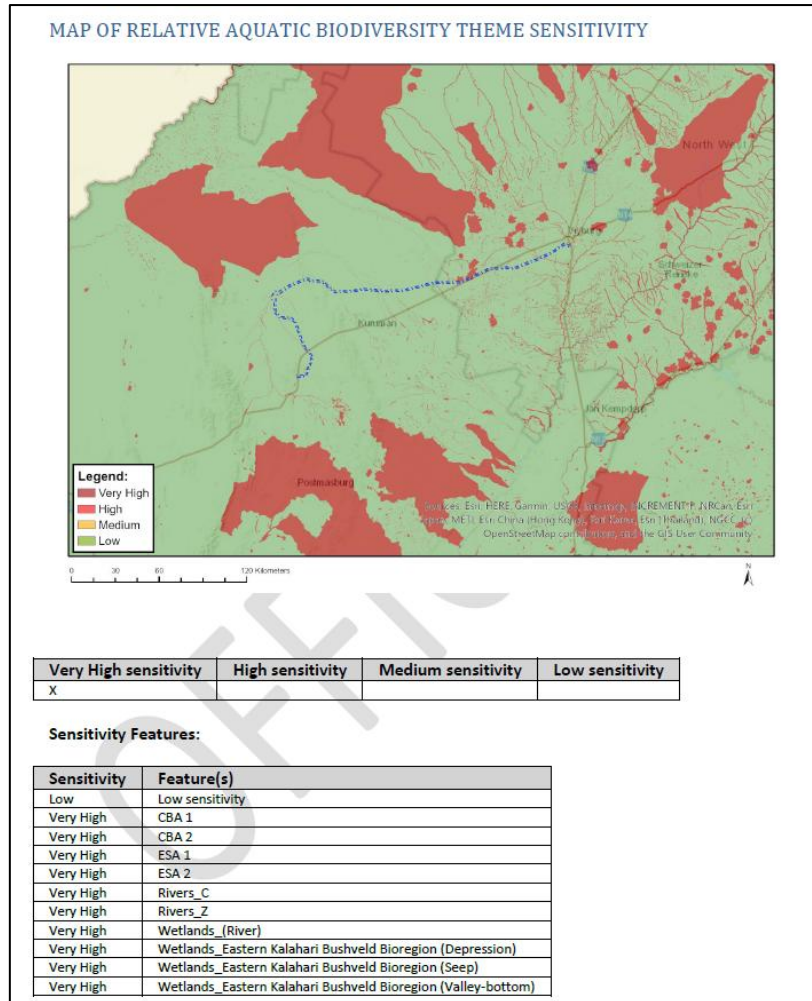


Figure 11: Aquatic Biodiversity Theme Sensitivity for the project area

The STR for the powerline has characterized the aquatic sensitivity of the rivers of the project area as 'Very High'. The sensitivities associated with the watercourses include CBAs, ESAs, Rivers, Wetland NFEPA's, Strategic Water Source Area's as well as being freshwater ecosystem priority areas (quinary catchments). The specialist-assigned sensitivity ratings are based largely on the PES and EIS assessment processes and consideration is given to any observed or likely presence of sensitive fauna and flora. The site verification undertaken by a registered aquatic ecologist confirmed the assigned sensitivity due to the following:

- (i) **River systems & Riparian Zones:** These are main river systems in the area characterized by an active flow. The size, hydrological nature of the system and the provision of aquatic, riparian and wetland habitat increases its importance in the maintenance of biodiversity. Furthermore, the system has connectivity with larger rivers downstream where it would contribute sediment and nutrients into. Although some level of modification to the system exists from anthropogenic influence and natural erosional processes, the rivers remain largely intact and have a high

potential to deliver ecosystem services on a significant scale. The sensitivity is therefore very high.

- (ii) **Wetlands:** These wetlands are relatively large in size, exhibiting surface saturation in some approaches with the presence of hydrophytes. They have connectivity to surrounding systems and are therefore considered to be a hydrological, sediment and nutrient source to these systems. Although these systems have suffered historical impacts from anthropogenic influences, the potential for them to support biodiversity remains. The sensitivity is therefore high.
- (iii) **Drainage Features & Wetland Buffers:** These features present as shallow drainage areas or flow paths. These drainage features are not associated with a baseflow; however, they contribute significantly to the connectivity of surrounding watercourses as they are orientated to flow into the downstream watercourses within their paths. The wetland buffer zones provide habitat to the surrounding flora, and contribute towards the health and functioning of the watercourse systems. The sensitivity is moderate.
- (iv) **Remaining Areas:** Much of the PAOI has been historically modified through agricultural activity and is not perceived to contribute significantly to freshwater resources apart from providing hydrological inputs. The proposed activities are not anticipated to modify the hydrological characteristics of the entire area significantly or extensively.

The different water resources found onsite are shown below.



Figure 12: Examples of the different water resources found during the walk down. A & B) Riverine systems; C) Riverine system with riparian zone; and D) Riparian zone (The Biodiversity Company, 2024)

The summary of the verification is given in the Table below.

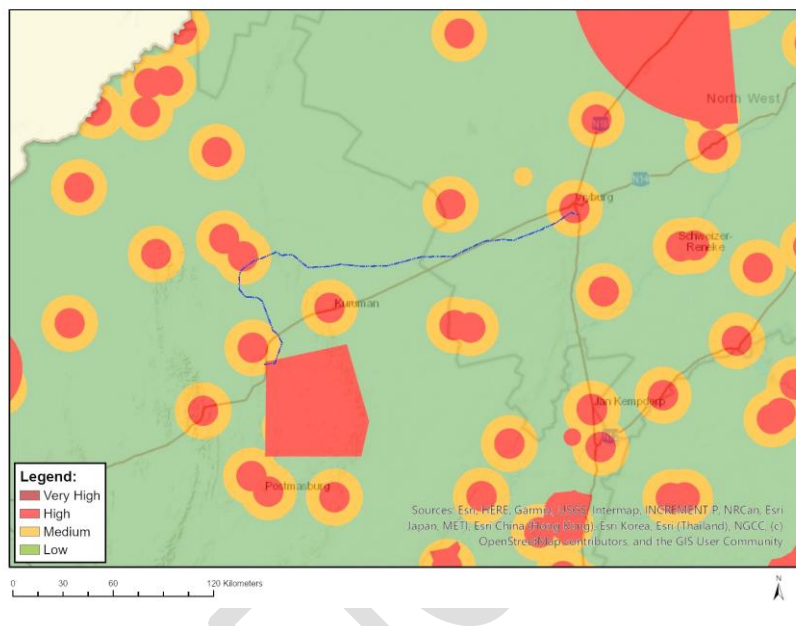
Table 8: Summary of aquatic biodiversity site sensitivity verification

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
Aquatic Biodiversity Theme	Very High	Very High	Validated – These riverine systems were verified to be present and represent systems that include or have connectivity to main river channels. Subsequently, increasing their importance in terms of biodiversity. These wetland areas were verified to be present and represent systems that include or have connectivity to main river channels. Subsequently, increasing their importance in terms of biodiversity.	Aquatic Biodiversity Assessment.

6.8 Civil Aviation

The STR has indicated a high civil aviation sensitivity of the project on account of its proximity to various aerodromes, including Kathu (FASS), Black Rock (FABP), Kuruman (FAKU) and Vryburg (FAVB), some of which lie inside the 8-15km trigger distance specified in the DFFE Protocol. The powerline route is also close to restricted airspace denoted FAR71, which is military airspace around the Lohatla SANDF facility. See the Figures 13 and 14 below.

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Within 8 km of other civil aviation aerodrome
High	Dangerous and restricted airspace as demarcated
Low	Low sensitivity
Medium	Within 5 km of an air traffic control or navigation site
Medium	Between 8 and 15 km of other civil aviation aerodrome

Figure 13: Civil Aviation Theme Sensitivity for the project area

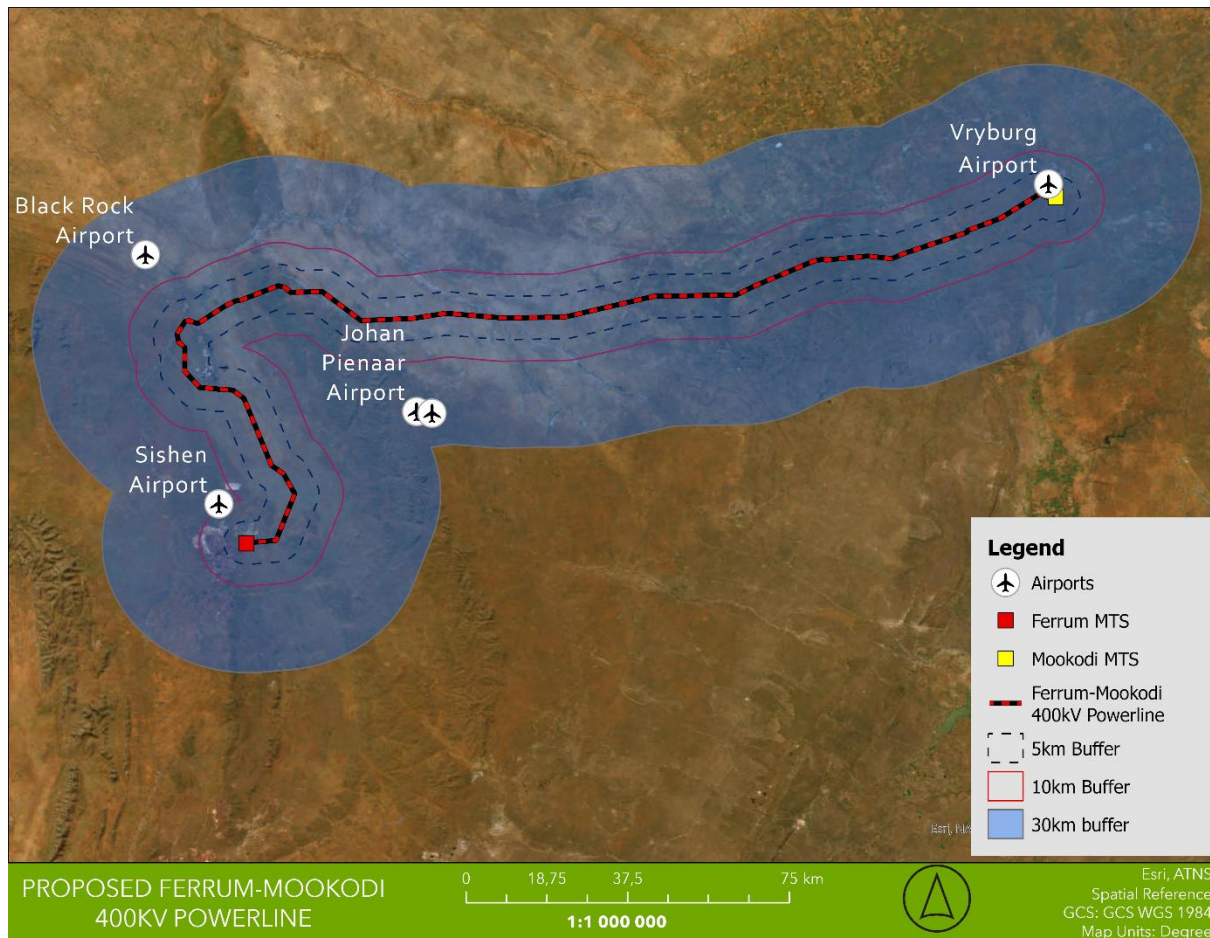


Figure 14: Airports within a 30km radius

GWI was appointed to undertake a site sensitivity verification assessment and the outcomes are briefly discussed below. The detailed Civil Aviation Site Sensitivity Verification Report is attached in Appendix D-11.

Obstacles: The assessment concluded that there is no penetration of the powerline into either the ICAO or SACAA 45m obstacle limitation surfaces (OLS's) close to any of the affected aerodromes, nor into the approach and departure surface of the aerodromes although the Mookodi substation is relatively close to the Vryburg Approach Surface and may require operational mitigation. The aviation sensitivity in terms of DFFE Protocol 320 is however low.

Radar and Navigational Infrastructure: The proposed sub-project will not materially impact civil aviation radar, navigational, or communications infrastructure in the environs, nor present any material additional risks to operations at the affected aerodrome or within adjacent airspace. While there is existing navigational infrastructure at Kathu Aerodrome (FASS), about 10km from the Ferrum substation, there is no evidence of other ground-based civil radar installations closer than 35km from

the site. This is well outside the 500 ft guideline recommended by the US FAA within which potential RF interference could occur. The civil aviation environmental sensitivity has been assessed as low.

Civil Aviation Routes: Radio and Communications Interference: The proposed project does not affect any conventional or satellite-based route under air traffic control (ATC) of ATNS centres at OR Tambo International Airport (FAOR) SACAA. The guideline minimum distances prescribed by the FAA for the siting of facilities away from radar, navigational, and other communications devices they could potentially impact range from 250ft to 500ft (Appendix 6.9). These are well below the distance of the proposed development from any ground-based communications infrastructure and radio equipment, the closest of which is beyond 15km, or overflying aircraft. The risk of such interference is thus low.

The CASSV findings are that sensitivity is low, and no Civil Aviation Compliance Statement will, therefore, be required for the purposes of environmental authorization.

The summary of verification is indicated below:

Table 9: Site Sensitivity Verification for Civil Aviation

Theme	Screening tool sensitivity	Verified sensitivity	Outcome statement	Report submitted
Civil Aviation	High	Low	Disputed- There is no penetration of the powerline into either the ICAO or SACAA 45m obstacle limitation surfaces (OLS's) close to any of the affected aerodromes. The proposed powerline will not materially impact civil aviation radar, navigational, or communications infrastructure in the environs, nor present any material additional risks to operations at the affected aerodrome or within adjacent airspace. In addition, the proposed project does not affect any conventional or satellite-based route under air traffic control.	No further assessment.

6.9 Radio Frequency Interference

The Astronomy Geographic Advantage (AGA) Act of 2007 and its regulations protect areas suitable for astronomy studies by, among others, regulating radio and electrical interference. As such, the proximity of infrastructure that may be affected by the powerline corridor is shown in Figure 15. The proposed development area is not located within any Astronomy Advantage Area as it is approximately 206km from the Karoo Central Astronomy Advantage Areas, however there is an SKA receptor 30km north of the servitude. A Sentech High Power Terrestrial Broadcasting Facility is 10 km of the corridor, and no weather radar installations have been indicated within the 60km distance limit. Department of Environmental Affairs, 2015 indicates that solar PV development is generally considered not to impact weather surveillance radar as they do not have moving parts. As such, the energy returned from such facilities can be isolated or removed.

Similarly, a powerline has no moving parts; hence, it will not impact weather surveillance radar. See Figures 15-16, which shows the location of the RFI-related infrastructure in relation to the corridor. Based on these locations, the risk of interference is therefore low. The South African Radio Astronomy Observatory (SARAO) and Sentech are registered stakeholders.

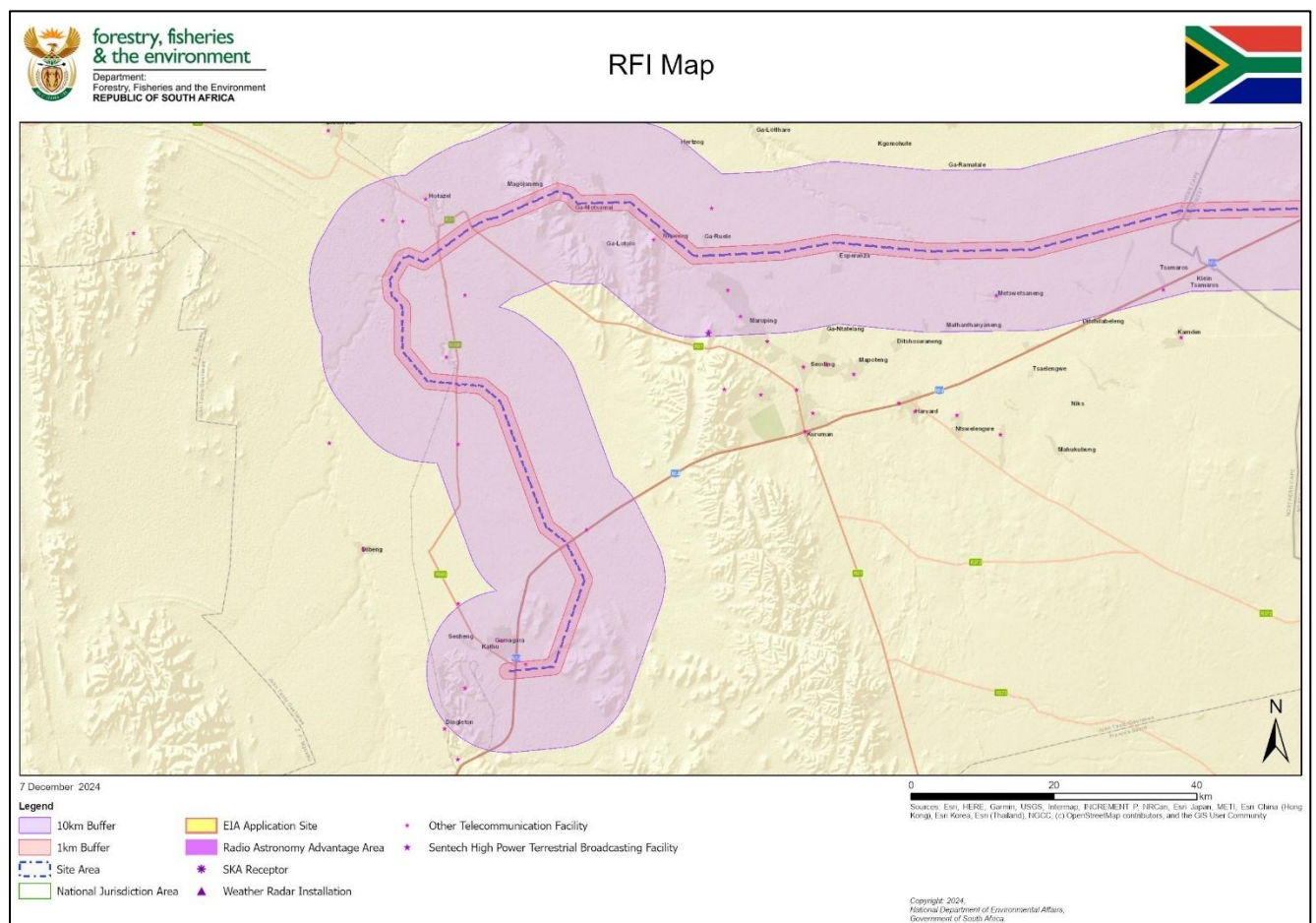


Figure 15: RFI related infrastructure from Ferrum substation to the provincial boundary

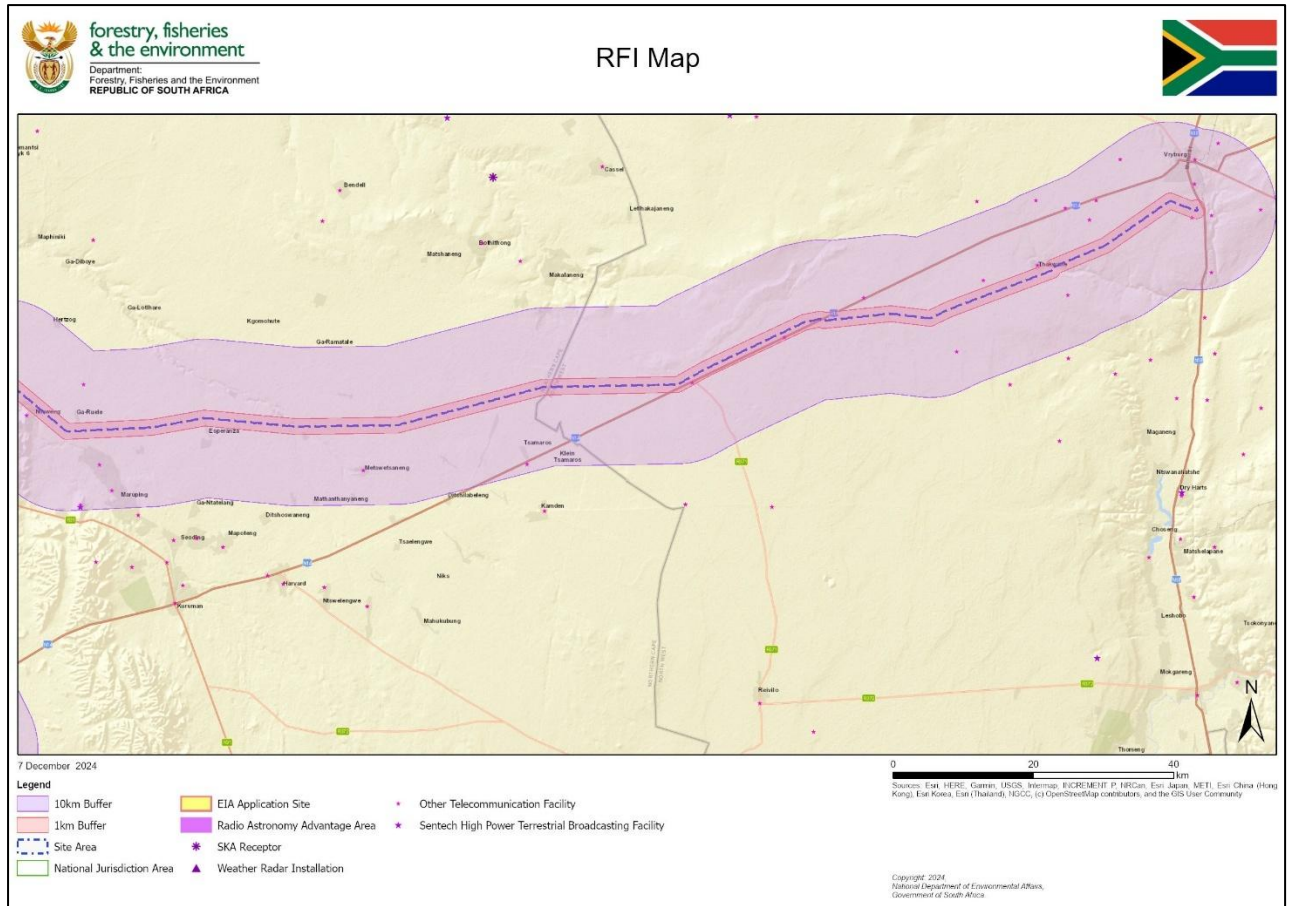


Figure 16: RFI related infrastructure from provincial boundary to Moodi substation

As a norm, NTCSA has adopted a maximum L50 wet audible noise limit of 53.1 audible decibels (dBA) at the edge of the servitudes; however, this is subjective, dependent on the area classification and time of the day and week. The following parameters are used in the specification of radio limits:

- The minimum signal to be protected.
- The minimum acceptable signal-to-noise ratio.
- The reference noise level, 20 m from the nearest conductor, during prescribed weather conditions; and,
- The protected distance, the minimum distance from the line at which the signal can be satisfactorily received.

6.10 Geotechnical

The screening tool does not indicate the sensitivity of the geological features; hence, no site sensitivity verification was completed for this project. The servitude underlain by the following: dune sand and aeolian sand in the west and east, surface limestone, dolomite, limestone and chert of the Ghaap Group of the Griqualand West Supergroup. A section of the line that crosses over the hills west of Hotazel, in the Ga-Motsemai region, is underlain by the rocks of the Daniëlskuil Member of the Asbesberge

Formation of the Asbestos Hills Subgroup and a small section, southwest of Vryburg, is underlain by calcrete and south of Vryburg there are rocks of the Dwyka Group of the Karoo Supergroup. See Figure 17.

Based on the geology onsite, no subsidence is expected within the area. However, before the contractor constructs towers, they do soil nomination at tower positions to determine the foundation required for the load. The load encompasses the cable and support structure. In addition, load calculation is done to determine the correct foundation, considering wind, icing and bird load.

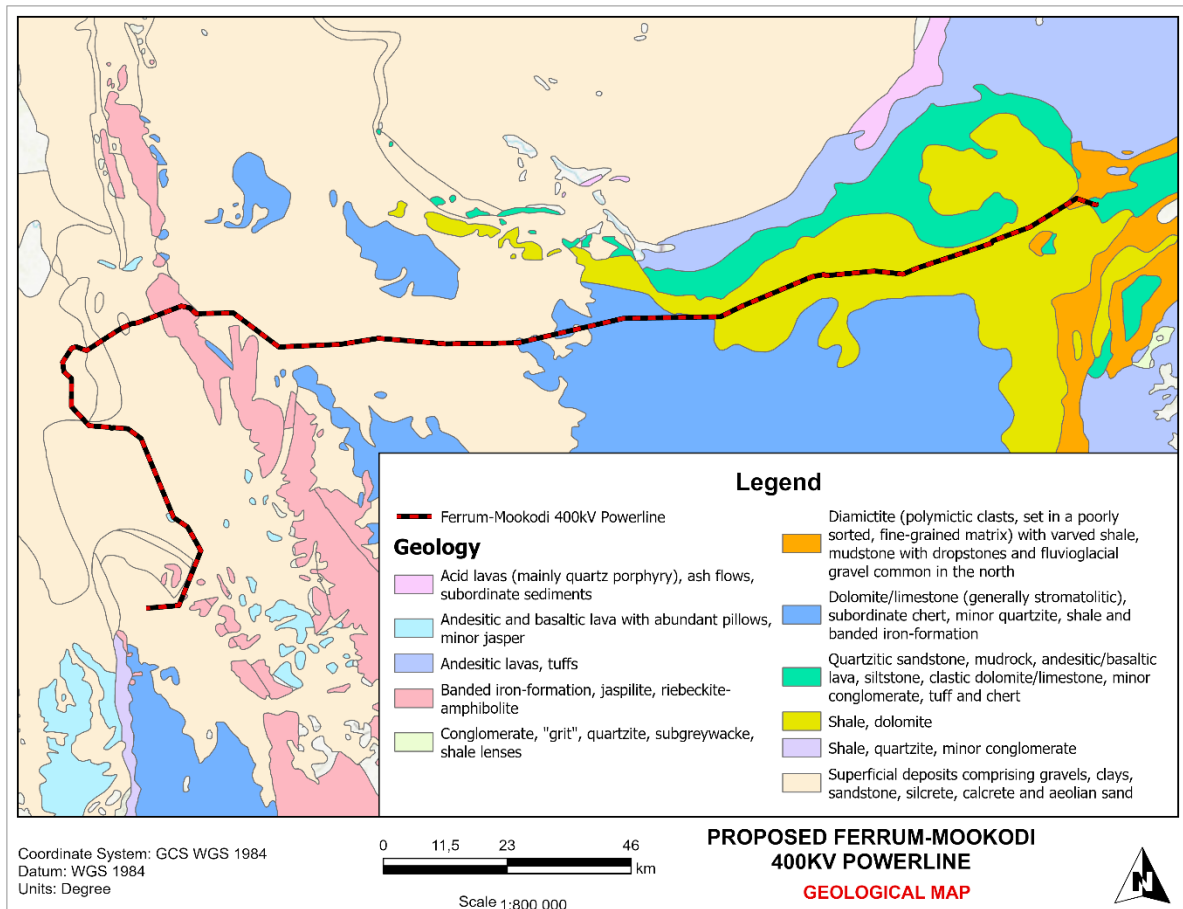


Figure 17: Geological Map

7 CONCLUSION

Based on the outcome of the site sensitivity verification, the following specialist studies have been commissioned for the proposed project:

- Avifauna Assessment Impact Assessment.
- Archaeology and Cultural Heritage Assessment.
- Aquatic Biodiversity Compliance Statement
- Civil Aviation Site Sensitivity Verification
- Palaeontological Impact Assessment



- Social Impact Assessment
- Soil Potential and Land Capability Compliance Statement
- Terrestrial Plant Species Compliance Statement
- Terrestrial Animal Species Compliance Statement.
- Visual Impact Assessment