



**GEOTECHNICAL DESKTOP ASSESSMENT STUDIES FOR THE PROPOSED
CONSTRUCTION OF THE IMPALA ZIRCON TEMPORARY BY-PASS 132KV POWER
LINE WITH ASSOCIATED INFRASTRUCTURE WITHIN THE UMHLATHUZE
MUNICIPALITY IN KWAZULU NATAL, SOUTH AFRICA**

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Site Coordinates: Start Point- 28°49'10.68" S 31°57'08.14" E

Middle Point- 28°47'49.89" S 31°55'59.54" E

End point- 28°46'22.34" S 31°56'27.22" E

Location: Impala Zircon Temporary By-Pass 132kv Powerline, Empangeni, Kwazulu Natal Province

Date: 28 April 2026

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1 INTRODUCTION

1.1 GENERAL

Ariys Consulting (Pty) Ltd was appointed by Selahle Consultancy and Projects (Pty) Ltd on behalf of the Eskom SOC Limited under contract '04_0226C_Impala 132 KV Lines', Selahle Consultancy and Projects (Pty) Ltd (hereafter referred to as SCP) has been appointed by Eskom SOC Limited to undertake Basic Assessment Process and Water Use License Application for the proposed for the proposed Construction of the Impala Zircon Temporary By-Pass 132kv Power Line with associated infrastructure within the Umhlathuze Municipality in Kwazulu Natal.

Ariys Consulting has been appointed to undertake the necessary geotechnical desktop assessment studies for the proposed Construction of the Impala Zircon Temporary By-Pass 132kv Line with associated infrastructure within the jurisdiction of Umhlathuze Local Municipality in Kwa-Zulu Natal Province, South Africa.

The project entails the construction of a temporary 132 kV bypass power line using wooden poles. The bypass will be 6.01 km long and installed parallel to the existing main power line, with a 15 m separation between the two, to allow for maintenance of the main power line.

The primary objective of the desktop assessment is to summarise the geology of the area, including the likely distribution of potential geotechnical challenges related to the underlying geology. The following high-level information is presented in this report:

- Reviewing geological maps, previous investigations, and historical data to identify expected soil types (e.g. clay, sand, rock) and rock weathering conditions to inform foundation design.
- Identifying potential geological hazards such as unstable ground, landslides, and compressible soils that could lead to failure of the wooden pole structures.
- Estimating bedrock depth and groundwater levels to determine the required founding depth and installation method for the wooden poles.
- Identify high-risk areas to inform and direct focused, efficient intrusive geotechnical investigations.
- Assessing slope stability, erosion potential, and environmental impacts.
- Providing preliminary geotechnical evidence to support the approval of the Environmental Basic Assessment Report (FBAR) and the Water Use Licence Application.
- Broad recommendations that may be used to guide the geotechnical design of the proposed infrastructure and installation of associated services.

The work was carried out as per instructions received from Miss Sinnah Mhlongo of Selahle Consultancy and Projects (Pty) Ltd. The information that has been provided is for planning purposes only and forms part of the environmental Basic Assessment process. Figure 1 shows the site locality plan for the study area.

1.2 TERMS OF REFERENCE

Ariys Consulting (Pty) Ltd was appointed by Selahle Consultancy and Projects (Pty) Ltd on behalf of the Eskom SOC Limited under contract '04_0226C_Impala 132 KV Lines', to undertake the necessary geotechnical desktop assessment studies for the proposed Construction of the Impala Zircon Temporary By-Pass 132kv Power Line with associated infrastructure within the jurisdiction of Umhlathuze Local Municipality in Kwa-Zulu Natal Province, South Africa.

1.3 PURPOSE AND SCOPE

The primary objectives of this investigation were to confirm the general geotechnical conditions of the site and to identify potential geotechnical impacts on the environment based on available desktop information. The desktop study comprised data obtained from published literature and existing consultancy reports compiled within the vicinity of the study area. No site visit was undertaken as part of this investigation.

The study was conducted in accordance with the level of care and skill ordinarily exercised by members of the geotechnical profession operating under similar conditions.

Geological conditions are inherently variable; therefore, the geological and geotechnical conditions along the proposed corridor will require confirmation through appropriate field investigations and testing prior to the commencement of construction. As a result, the engineering recommendations contained in this report are preliminary in nature.

1.4 SOURCES OF INFORMATION

Prior to the investigation, the following data was provided by the client: -

- Global Positioning System (GPS) co-ordinates and boundaries of the study areas.

The following sources of information were used during the investigation:

- Review of available geological records including 1:50 000 geological series maps 2831DD Felixton and 1:250 000 geological series maps 2830 Dundee published by the Council for Geoscience and 1:50 000 topographic sheets (2831DD Felixton) published by the Chief Directorate: Surveys and Mapping.

- Seismic hazard maps from Kijko et al. (2003) - Probabilistic Peak Ground Acceleration and Spectral Seismic Hazard Maps for South Africa. Report number 2003-0053, Council for Geoscience.
- 1:25000 Hydrogeological map, 2830 Dundee from the Department of Water and Sanitation;
- Geo Hydraulic and Environmental Technology (2017) Geohydrological Assessment for the proposed development of the Richards Bay Combined Cycle Power Plant (CCPP) and associated infrastructure on a site near Richards Bay, KwaZulu-Natal Province Report Reference: GET08_102016;
- Review and assessment of appropriate geotechnical/ geological references to assess the anticipated conditions of the proposed site.

SITE DESCRIPTION

1.5 STUDY LOCALITY AND SIZE

The proposed site is situated at Empangeni within the jurisdiction of the City of umhlathuze Local Municipality in Kwazulu Natal Province. The proposed site is located approximately 4km South of the Empangeni Town. The coordinates to the site are Start Point (- 28°49'10.68" S; 31°57'08.14" E) , Middle Point (- 28°47'49.89"; S 31°55'59.54" E) and End point (-28°46'22.34" S; 31°56'27.22" E). Time Zone is GMT+2 hours.

The proposed temporary 132kV line corridor is approximately 6.07km long and is running throughout the farms. The site is bounded by cultivated land in all dimensions as it progresses to the substation. The proposed temporary and existing main powerline routes can be accessed along the N2 and R34 roads. Figure 1 below shows the locality map of the proposed site.

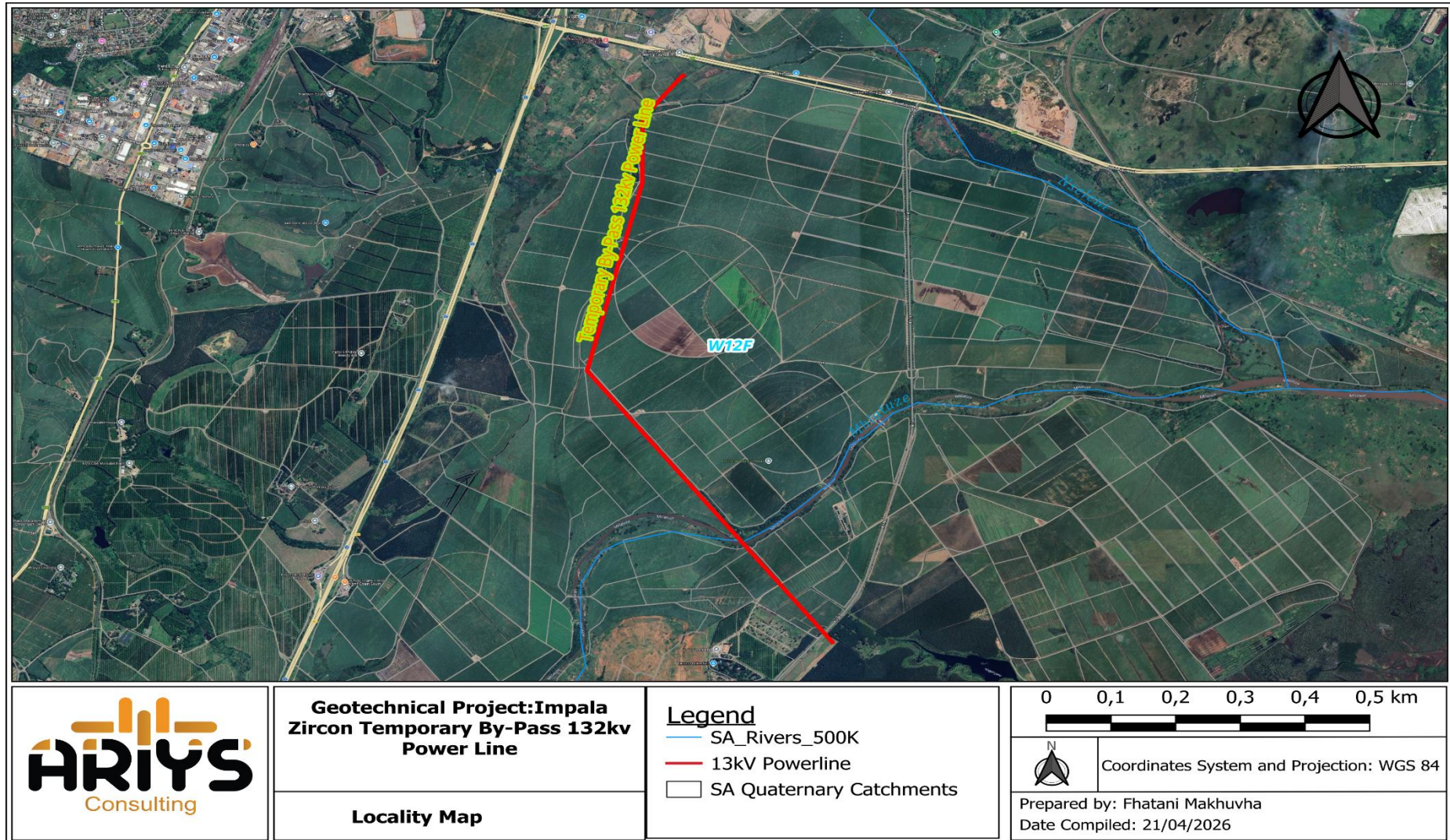


Figure 1: Locality Map showing location of site (courtesy: Google earth).

1.6 CLIMATE

In Richards Bay the climate is tropical. In Richards Bay, the quantity of rainfall during summers surpasses that of winters. This climate is considered to be Aw according to the Köppen-Geiger climate classification. The temperature in this location is approximately 21.9 °C, as determined by statistical analysis. Approximately 944 mm of rainfall occurs on a yearly basis.

In June, the precipitation level plummets to a mere 42 mm. This month holds the title for being exceptionally arid. On average, the highest amount of rainfall occurs during January with a mean value of 113 mm. The precipitation variance between the months with the lowest and highest levels of rainfall is 71 mm. The fluctuation of temperatures across the seasons is referred to as 6.5 °C.

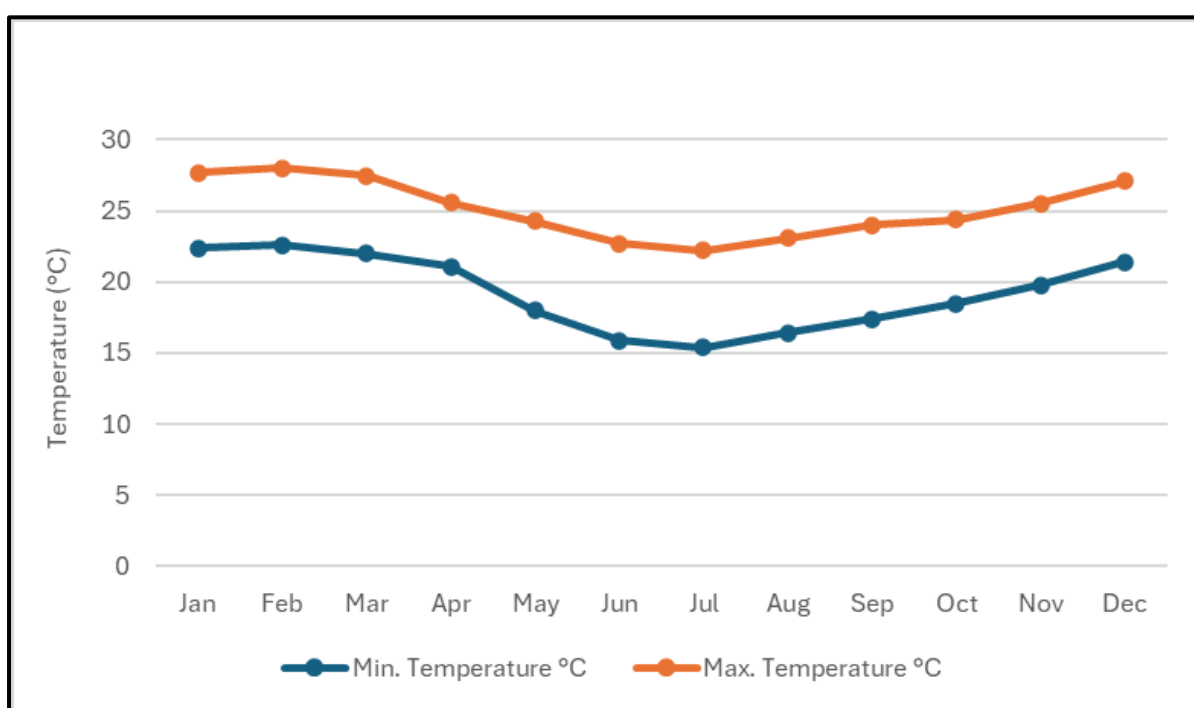


Figure 2: Monthly Average Temperature in Richards Bay (According to the Köppen-Geiger climate classification).

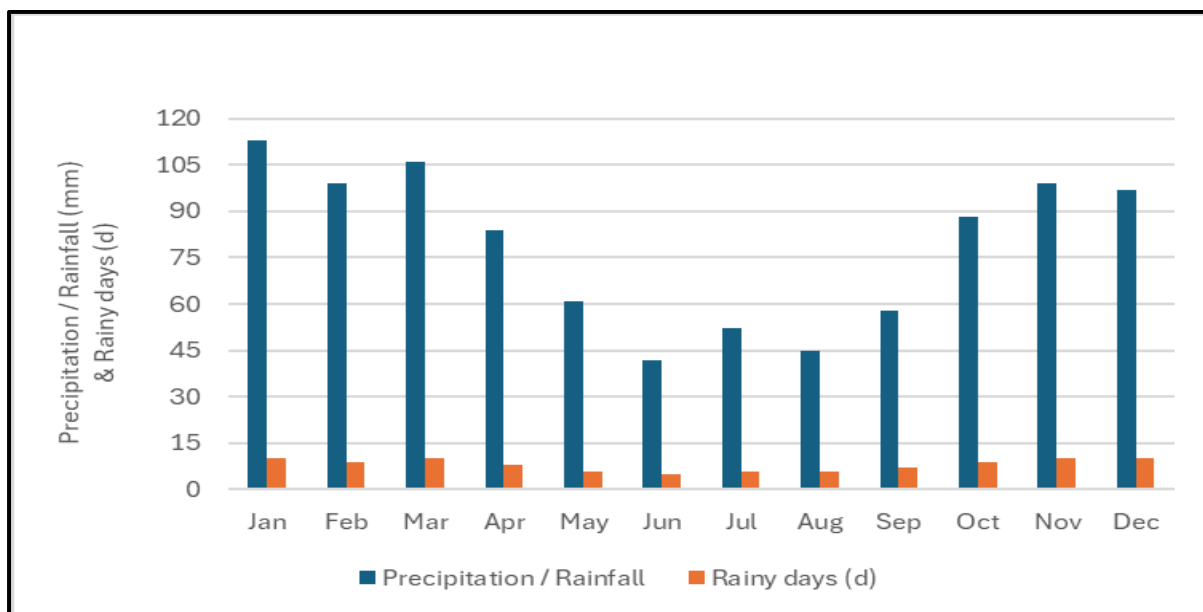


Figure 3: Monthly Average Precipitation/Rainfall in Richards Bay (According to the Köppen-Geiger climate classification).

Weinert developed an N-value which is the ratio of the annual evaporation versus annual precipitation of a region and has been defined for Southern Africa region (Weinert, 1980). Climatic regime of the present and recent past plays an important role in the soil profile below the earth's surface (A.B.A Brink). The N-values are therefore used to characterise mode of weathering of the rocks within the subcontinent. Weinert demonstrated that chemical decomposition is the predominant mode of rock weathering in areas where climatic "N-value" is less than <2 . In areas where climatic N-value is between 2 and 5, disintegration is the predominant form of weathering, although some chemical decomposition of the primary rock minerals still takes place. Where the climatic N-value is greater than 5, secondary minerals do not develop to an appreciable extent, and all weathering takes place by mechanical disintegration of the rock.

Weinert's climatic N-value for the site is less than 2 (**$N < 2$**) as indicated in Figure 4 overleaf, refer to the legend. This implies that the site is located in a wet/humid region where chemical weathering is highly active, specifically focusing on the decomposition of rock materials.

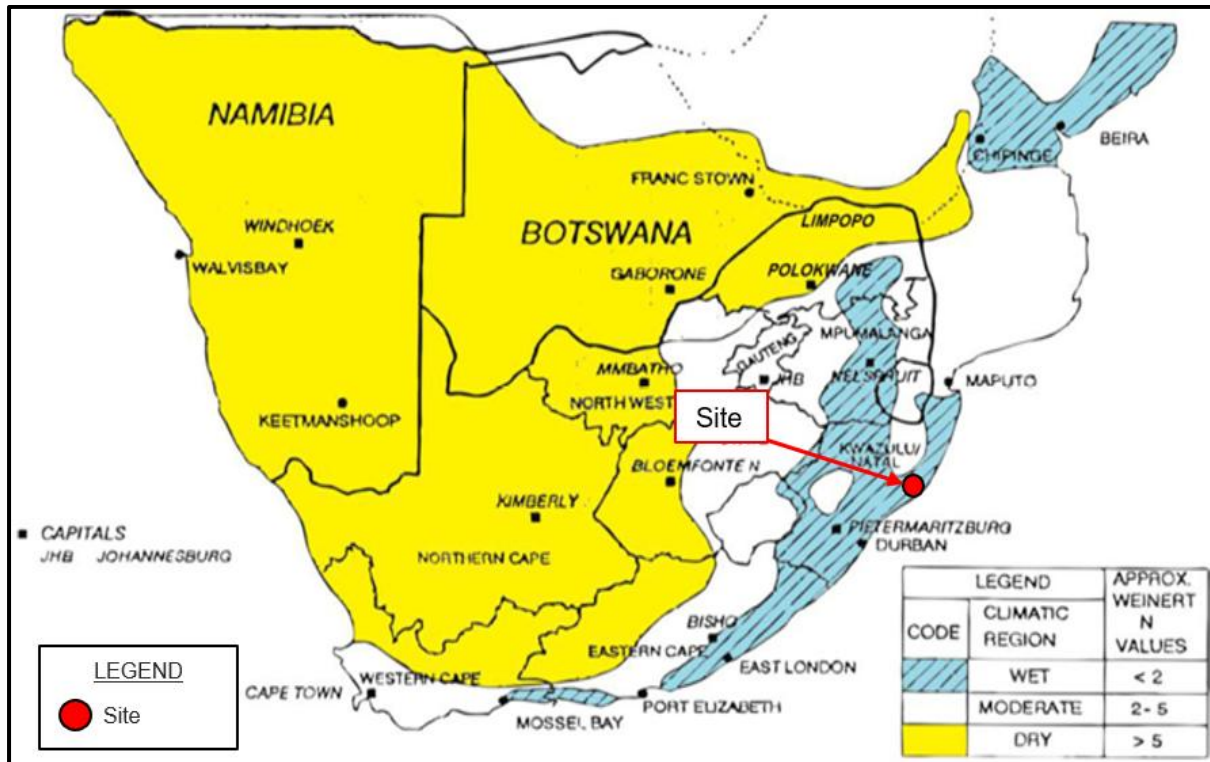


Figure 4: Macro Climatic Regions of Southern Africa (Adapted from Weinert, 1980).

1.7 TOPOGRAPHY AND DRAINAGE

The topography is relatively gentle and steep terrain, with the minimum elevation at 9m, a maximum of 25m and an average of 13m. The steep terrain increases towards the southern side. The site occurs at heights varying between 8m in the north to 25m above mean sea level (amsl) in the southeast. Surface runoff, particularly during periods of heavy or prolonged rainfall is expected to be in the form of sheetwash towards north following the Mhlathuze River. Figure 5 shows the elevation profiles for the entire proposed temporary 132kV line site.



Figure 5: Elevation profile for the entire proposed temporary 132kV power line site.

Proposed site is comprised of a cultivated land which is currently active in terms of agricultural activities. Figure 6 shows the extract of the topographical map (2831DD Felixton) with the proposed site in red.

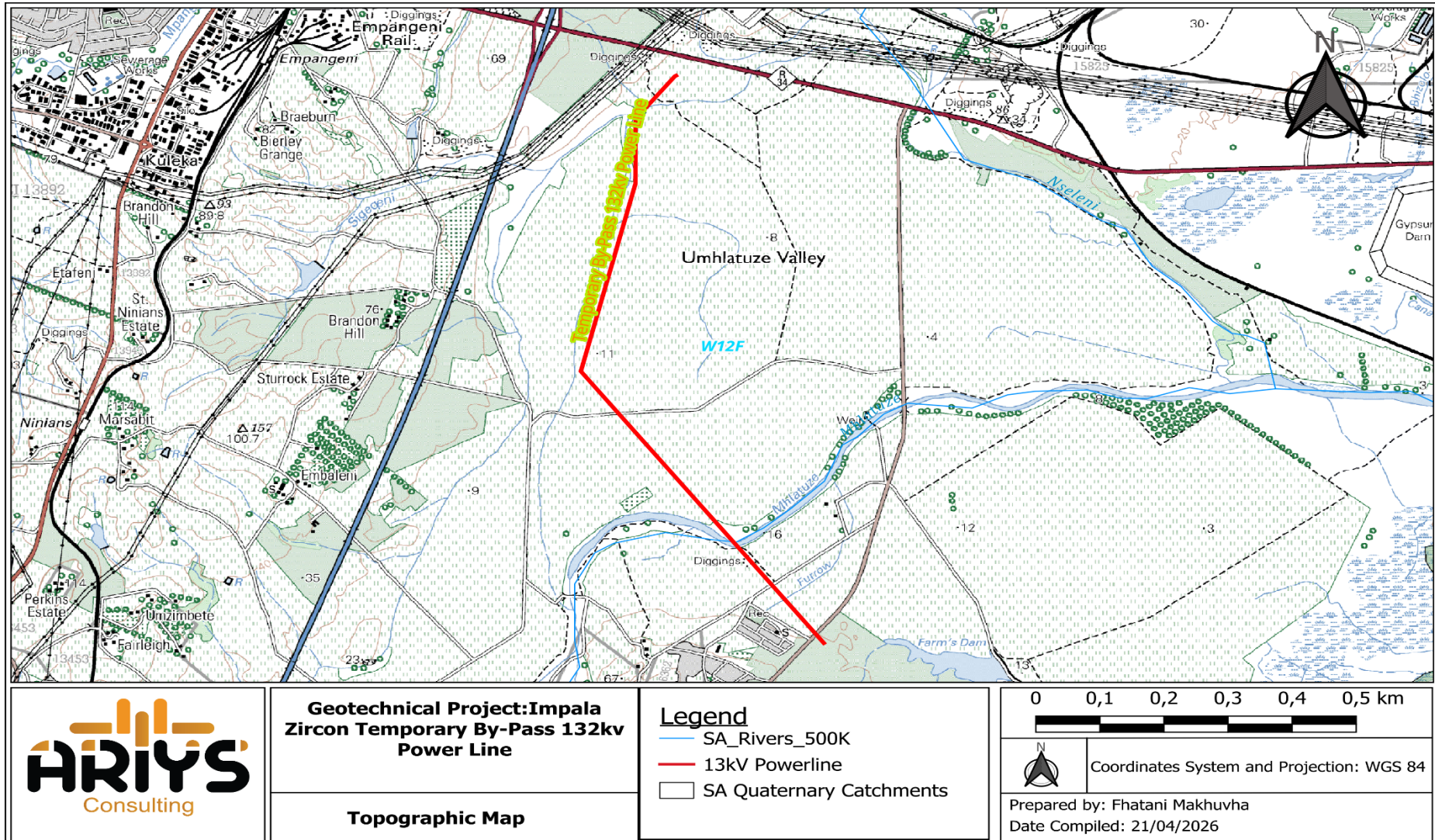


Figure 6 Extract of the Topographical Map (2831DD Felixton).

2 GEOHARZARDS

2.1 SEISMICITY

Seismic-hazard can be described as being the physical effects of an earthquake or earth tremor. Examples of such phenomenon include surface faulting, ground shaking and ground liquefaction (Kijko A et al, 2004). The peak ground acceleration (PGA) is the maximum acceleration of the ground shaking during an earthquake. The seismic hazard map of South Africa (Council for Geoscience, 2003) indicates that the proposed site lies within an area where there is a 10% probability that Peak Ground Acceleration (PGA) is 0.125g will be exceeded in 50years. Based on this information, the risk of seismic events for the study area is low. Figure 7 indicates the seismic hazard map of South Africa with t the location of proposed study area in red.

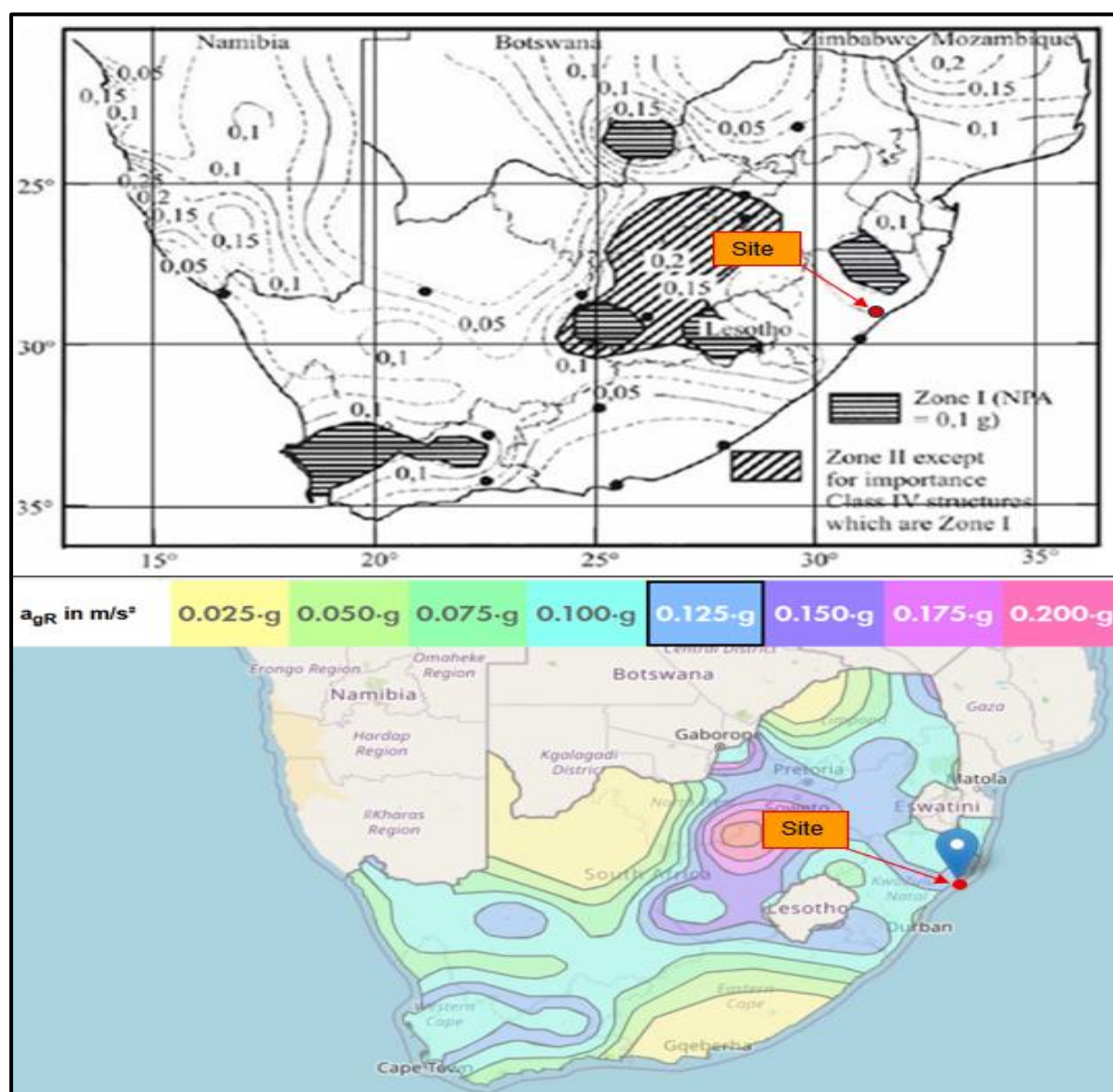


Figure 7: Seismic Hazard Map of South Africa.

2.2 DOLOMITIC LAND

Information obtained from Council for Geoscience (CGS), access to data, maps and information shows that the site is not underlain by dolomite rock at surface or at depth (<100m). The site is therefore not classified as dolomitic land and is not at risk in terms of dolomite related surface subsidence. Generally, soluble rock, such as limestone or dolomite was not found on the site and no instability associated with this rock type is anticipated (<https://maps.geoscience.org.za>).

2.3 UNDERMINING

No indication of the presence of undermined ground was found during the desk study or field investigation. It is certain that the site is not shallowly undermined and there is no risk of surface settlements/subsidence that may be caused by mining activities. However, it is advisable for the site engineer to verify this with the Department of Mineral Resources to ascertain if there is any undermined ground in the area.

2.4 STEEP SLOPES

No steep slopes occur on the site, primarily due to the low relief and relatively gentle to slightly steep sloping gradient of the area. The probability of the occurrence of rockfalls and rockslides is low due to the low relief and shallow gradient.

2.5 FLOODING

A 100-year flood is a flood event that has on average a 1 in 100 chance (1% probability) of being equaled or exceeded in any given year.

According to the 1:100-year floodline, the proposed site is located within the floodplain. The proposed temporary 132 kV power line crosses one perennial river and one non-perennial river. As a result, flooding events may be expected during periods of heavy rainfall.

2.6 VOLCANIC ACTIVITIES

South Africa has seen its last volcanic activity approximately 65 million years ago during the massive historical eruption of the Drakensberg Lava forming the Basaltic Drakensberg Mountain Ranges that we see today. Recent studies showed no signs for the possibility of volcanic eruption in the foreseeable future.

2.7 GEOLOGICAL FAULT

Our review of geologic literature/geological map and site indicates that there are no known active, potentially active or inactive faults crossing the proposed site.

3 GEOLOGICAL CONDITIONS

3.1 REGIONAL GEOLOGY

A review of the 1:250 000 geological series maps 2830 Richards Bay published by the Council for Geoscience, shows that the site is underlain by the surficial (grey and brown fine-grained sand “Qs”) deposits, of the Quaternary Era.

The regional geology of the Richards Bay area consists of siltstone and sandstone of the St Lucia formation which is the upper part of the Zululand group. The Zululand group is overlain by red sand, red calcarenite, coquina and calcareous sandstone of Uloa formation. The Uloa formation is overlain by mudstone, shale, sandstone, lignite and sand of the Port Durnford formation. The latest is finally overlain by quaternary yellowish distributed sand.

3.2 LOCAL GEOLOGY

According to 1:50 000 geological map, “No 2831DD Felixton” The site is underlain by sand (Qs) belonging to the Upper Pleistocene to Holocene Formation within the Quaternary Era. Typically, the site is anticipated to be underlain by sands of Harbour Beds. Recent cohesionless sands, which overlie the Harbour beds formation sands maybe found on site.

The local geology of Richards Bay is dominated by Quaternary-aged coastal dunes and marine sediments forming part of the Maputaland Group, which sit atop older Cretaceous siltstones and Tertiary deposits. The area is characterized by a sandy coastal plain, a high groundwater table, and heavy mineral-rich dune sands.

Figure 8 below shows the geological setting and position of the site on the geological map.

3.3 GEOHYDROLOGY

According to the 1:500 000 scale hydrogeological map series (Vryheid, Map sheet 2730) and from available hydrogeological information, Richards Bay groundwater occurs within the inter granular primary aquifer in the semi consolidated and unconsolidated materials deposited during the Tertiary and Quaternary periods.

According to Geo Hydraulic and Environmental Technology, (2017) Richards Bay's hydrogeology is defined by a shallow, high-yielding unconfined aquifer within the coastal sand dunes (Kwambonambi Formation), with a high-water table ranging from (<2 to 45 m) below ground level. The system is characterized by high rainfall (994—1500 mm/year) and high recharge rates, creating a fresh groundwater lens that is sensitive to seawater intrusion, particularly around coastal lakes. Based on the aquifer classification map (Parsons and Conrad, 1998) the aquifer underlying the study is regarded a “major aquifer”.

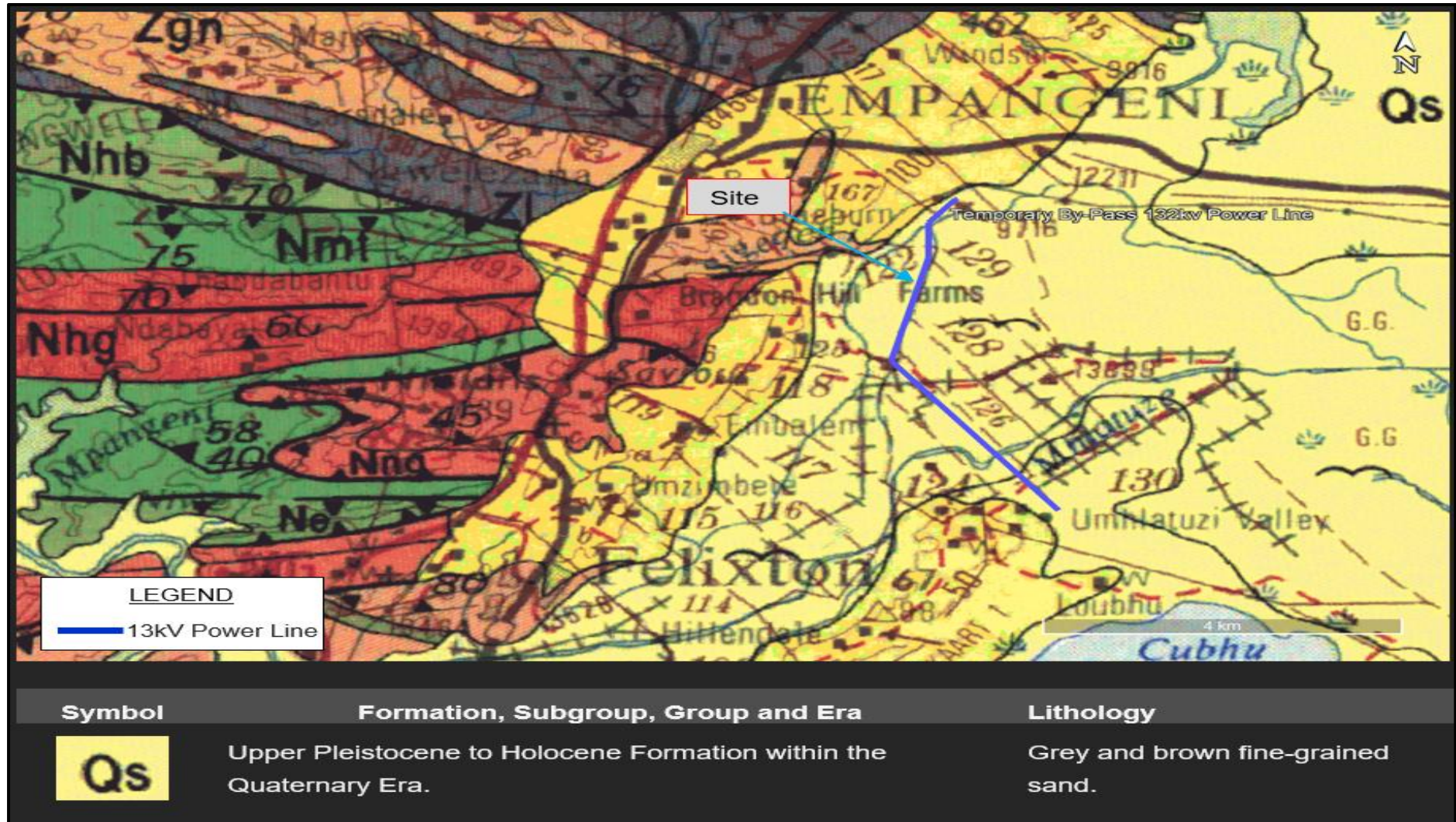


Figure 8: 1:250 000 Geological Map (2830) Dundee showing proposed site.

4 METHOD OF ASSESSMENT

A desktop study review of all available information pertaining to the site including the review of published geological maps, geohydrological maps, topographical and the seismic hazard, to identifying geotechnical constraints to the project. This information was sourced from publicly available sources such as the Council for Geoscience and previous geotechnical study. No site visit or site walkover was conducted. No test pits were excavated or inspected during this assessment.

The findings will be compiled into a report presenting preliminary recommendations on foundation types, potential excavation methods, and the need for additional follow-up field studies.

5 GEOTECHNICAL EVALUATION & RECOMMENDATIONS

5.1 The anticipated typical soil type

Each typical soil type anticipated on site will be discussed below, considering the potential problems which can be generally expected, as well as possible geotechnical consideration.

5.1.1 Sands soil

Unconsolidated aeolian (wind-blown) coastal sands are anticipated, typically occurring over short distances and derived from coastal dune sands and beach deposits. These materials generally form non-cohesive soils with negligible to low plasticity and are typically of low to medium density. With depth, the sandy soils may be underlain by Quaternary clays, resulting in clayey sand profiles.

A further characteristic of these soils is the tendency for weak secondary cementation to develop over time within the transported sands, resulting in a high susceptibility to collapse settlement upon wetting or disturbance. This collapse potential presents a significant geotechnical risk for shallow founding. The preferred geotechnical mitigation measure for founding in such soils is the removal and replacement of the collapsible material and the construction of foundations on engineered soil, compacted to specified density and moisture criteria to achieve adequate bearing capacity and reduce settlement risk.

5.2 Groundwater and Drainage

The site hydrology is influenced by groundwater seepage and shallow subsurface flow originating from upslope areas and migrating downslope toward the ocean. Groundwater seepage is anticipated due to the presence of a shallow water table, which is influenced by saturated ground conditions associated with the proximity of the ocean.

The underlying Quaternary sands (Qs), as indicated on the geological map, are characterized by high permeability. As a result, shallow perched water tables are likely to develop, leading to continuous groundwater movement and percolation through the soil profile in a seaward direction. Fluctuations in groundwater levels and seepage conditions may have a significant influence on settlement behaviour and the overall geotechnical performance of the ground.

5.3 Foundations

It is anticipated that conventional foundation systems may be adopted all area of the site, subject to confirmation of local ground conditions. However, the foundation conditions at each pole location within the study area should be investigated in greater detail prior to construction to verify soil characteristics, groundwater conditions, and founding parameters, and to ensure that site-specific design requirements are adequately addressed.

5.4 Excavation

It is anticipated that excavation conditions across the site will be relatively uniform. A Quaternary soil cover is expected to be present throughout the site, which should generally permit excavation by conventional means and be classified as easy or soft excavation in accordance with SANS 1200.

5.5 Problem Soil

Problematic soil conditions are anticipated within the study area. A Quaternary soil cover is expected to be present, which may exhibit a potentially collapsible granular structure. However, provided that appropriate geotechnical design measures and construction practices are implemented, these conditions are not anticipated to pose a significant constraint to the proposed development.

6 FURTHER GEOTECHNICAL INVESTIGATIONS

A detailed intrusive site investigation is recommended to further characterize site conditions, to better understand the key geotechnical risks characteristics and optimise the design of the poles.

Based on the current lack of previous geotechnical investigation data, the primary objectives of the proposed intrusive investigation must include:

- Determination of the founding conditions, especially the depth, for all poles.
- The scope of the intrusive investigation should comprise the excavation of test pits with a Tractor Loader Backhoe.
- Laboratory testing to determine the behavioural characteristics of the in-situ materials.
- Investigation of subgrade conditions for service roads.
- Investigation of materials to be used during construction.
- Non-intrusive investigation techniques, such as geophysical surveys including thermal and electrical resistivity for ground earthing requirement.

7 GEOTECHNICAL IMPACT ASSESSMENT

The geotechnical impact assessment of the proposed Impala Zircon Temporary By-Pass

132kV Powerline was performed according to the methodology included in Table 1, Table 2, Table 3 and Table 4.

Geotechnical impacts need to be taken into account as part of the Impala Zircon Temporary By-Pass 132kV Powerline development. The identified risks can typically be mitigated by the implementation of an appropriate and effective plan. Mitigation measures must be implemented to avoid or reduce negative impacts during the construction, operation and decommissioning phases.

The assessment considers the entire development but the three main parts of the development namely overhead cabling, wooden poles and access roads, are the primary consideration. Based on the impact assessment matrix undertaken for this project, from a geotechnical perspective the impact of the Impala Zircon Temporary By-Pass 132kV Powerline was found to be “Negative low to moderate impact”. The anticipated impact will have negative effects and will require mitigation. With mitigation measures the impact will be Negative very low to low. The assessment impact assessment matrix is presented in Table 1, Table 2, Table 3 and Table 4.

The Impala Zircon Temporary By-Pass 132kV Powerline application site is considered suitable for the proposed development provided that the recommendations presented in this report are adhered to and which need to be verified by more detailed geotechnical investigations during detailed design.

Table 1: Impact table of soil erosion, contamination and destabilisation due to the Construction Phase.

Project Phase		Construction		
Impact	Geological Impact – soil erosion and contamination			
Description of Imapct	Stripping of vegetation during construction causing erosion; Excavation of rock; Machinery and earth moving plant causing spills contaminationg soil.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential Mitigation	• Only strip vegetation necessary for the next phase of construction. • Install temporary drainage to divert stormwater away from active construction activities, where required. • Park within designated area. • Stormwater Management Plan must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil • Suitable stormwater management systems must be installed a long roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions may be necessary (i.e, extension, energy dissipaters, spreaders, etc) • No-Go Areas (areas that shall be excluded from any construction activity or general access by the construction team) within the development sites or servitudes shall be clearly indicated on map included with the micro-siting reports or attached to the EMPr. •Implement the generic EMPr for overhead transmission infrastructure, including: a. Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is affected and erosion is controlled; b. Sloped areas stabilised using designed structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; c. The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; d. Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and e. Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows. f. During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; g. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure smallspills are contained; and h. Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used.			
	Assessment	Without Mitigation		With Mitigation
Nature	Negative		Negative	
Duration	Short Term	Impact will last between 1 and 5 years	Short Term	Impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and / or processes a	Low	Natural and/ or social functions and / or processes are somewhat altered
Probability	Likely	Impact may occur	Likely	Impact may occur
Confidence	Medium	Determination is based on common sense and gene	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resources is damaged irreparably elsewhere	Medium	The resources is damaged irreparably elsewhere
Significance	Low-Negative		Very Low-Negative	
Comment on Significance	The significance of the impact on the geological environment is considered low without mitigation and very low to neglible with appropriate mitigation measures			

Table 2: Impact table of soil erosion, contamination and destabilisation due to the Operational Phase.

Project Phase	Operation			
Impact	Geological Impact – soil erosion and contamination			
Description of Impact	Concentration of run off and/or ponding due to hard surfaces, i.e. paved areas; reinstated and compacted ground surrounding turbines; borrow areas; and support structures, Concentration of natural drainage (and increasing runoff) due to paved areas. Increased siltation within natural water courses due to increased runoff and soil erosion.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential Mitigation	•Investigate and confirm the geotechnical suitability of each pylon position prior to construction (i.e. that soil with an adequate bearing capacity is obtained beneath each footing). •Select temporary pole positions on 1:4 slopes or shallower, where possible. •Any road cuttings should be designed by an appropriately qualified professional. •Drainage in the region should be designed and managed appropriately. •Stormwater Management Plan must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions may be necessary (i.e., extension, energy dissipaters, spreaders, etc). •No regular maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks. •Implement the generic EMP for overhead transmission infrastructure, including: a. Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly.			
Assessment	Without Mitigation		With Mitigation	
Nature	Negative		Negative	
Duration	Short Term	Impact will last between 1 and 5 years	Short Term	Impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and / or processes are not significantly affected	Low	Natural and/ or social functions and / or processes are somewhat altered
Probability	Likely	Impact may occur	Likely	Impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resources is damaged irreparably elsewhere	Medium	The resources is damaged irreparably elsewhere
Significance	Low-Negative		Very Low-Negative	
Comment on Significance	The significance of the impact on the geological environment is considered low without mitigation and very low to negligible with appropriate mitigation measures			

Table 3: Impact table of soil erosion, contamination and destabilisation due to the Decommissioning Phase.

Project Phase	Decommissioning			
Impact	Geological Impact – soil erosion and contamination			
Description of Imapct	Soil/rock destabilisation and erosion due to vegetation removal. Spillage from vehicle.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential Mitigation	•Vehicles should be well maintained, parked over drip trays/hard-surfaced areas, and parked within designated areas. •Land rehabilitation to near natural state, i.e. removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. •Reinstate natural topography where cut-to-fill embankments have been constructed. •Implement generic EMPr for overhead transmission infrastructure.			
Assessment	Without Mitigation		With Mitigation	
Nature	Negative		Negative	
Duration	Short Term	Impact will last between 1 and 5 years	Short Term	Impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and / or processes a	Low	Natural and/ or social functions and / or processes are somewhat altered
Probability	Likely	Impact may occur	Likely	Impact may occur
Confidence	Medium	Determination is based on common sense and gene	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resources is damaged irreparably elsewhere	Medium	The resources is damaged irreparably elsewhere
Significance	Low-Negative		Very Low-Negative	
Comment on Significance	The significance of the impact on the geological environment is considered low without mitigation and very low to negligible with appropriate mitigation measures			

Table 4: Impact table of soil erosion, contamination and destabilisation due to Cumulative Impacts.

Project Phase	Cumulative Impacts			
Impact	Soil erosion, contamination and destabilisation			
Description of Imapct	Widespread soil destabilisation, erosion and contamination due to agricultural activities and renewable energy development, including associated transmission infrastructure. Increased siltation within natural water courses due to increased runoff and soil erosion.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential Mitigation	• Do not enter No-Go areas • Limit disturbance footprints to the area absolutely necessary for the project • Use existing access tracks where feasible • Observe limits of acceptable disturbance for areas of high, medium and low sensitivity • Implement the generic EMPr for overhead transmission infrastructure.			
Assessment	Without Mitigation		With Mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Regional	Impacts felt at a regional / provincial level	Local	Impacts felt at a regional / provincial level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain /Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Low	TThe affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium - negative		Low - negative	
Comment on Significance	The region has experienced impacts on geological/geotechnical conditions (e.g. soil erosion) due to conventional agricultural practise in the area occurring for many years rendering the cumulative impact without mitigation negative medium. With mitigation, these cumulative impacts (of construction of the mpala Zircon Temporary By-Pass 132kV Powerline and agricultural practises) the significant rating is considered negative, but low.			

7.1 Alternatives

In the event of the development not proceeding (i.e. the no-go alternative being selected) project related geotechnical impacts would be avoided; however regional cumulative impacts (such as from agriculture activities in the region would persist). As the project is located wholly within an agricultural site), cumulative impacts from this infrastructure can be anticipated.

7.2 Summary of Impacts on Geological and Geotechnical Conditions

The impacts to be considered from a geotechnical standpoint for the construction of the Impala Zircon Temporary By-Pass 132kV Powerline are contained in Table 5.

Table 5: Summary table of impacts on geological and geotechnical conditions.

Description of Impact	Overall Significance	
	No-Go Alternative	Preferred Alternative
Impact table of soil erosion, contamination and destabilisation due to the Construction Phase	Insignificant	Very Low
Impact table of soil erosion, contamination and destabilisation due to the Operational Phase	Insignificant	Very Low
Impact table of soil erosion, contamination and destabilisation due to the Decommissioning Phase.	Insignificant	Very Low
Impact table of soil erosion, contamination and destabilisation due to Cumulative Impacts	Medium	Very Low

8 CONCLUSIONS

The desktop assessment of the geotechnical conditions at the proposed construction of the Impala Zircon Temporary By-Pass 132kV Powerline has shown the site to be generally suitable for the proposed development.

A “negative low to moderate” impact was assessed, from a geotechnical perspective, for the pre-mitigation situation. Post-mitigation, the assessed impact decreases to “negative very low”.

A geotechnical site investigation must be undertaken to provide detailed and site-specific geotechnical information for the design of the proposed structures and roads.

The proposed development should, from a geotechnical impact perspective, be authorized. The most significant geotechnical condition that will affect the development is the possibility of soft excavation conditions as water table is anticipated.

8.1 Assumption and Limitations

The statements presented in this document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimize the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by Ariys Consulting, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

9 REPORT PROVISIONS

The analysis presented in this report are based upon the data obtained from the desktop studies performed at the indicated locations and from other information discussed in this report.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical impact assessment practices. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions contained in this report shall not be considered valid unless Ariys Consulting (Pty) Ltd reviews the changes and either verifies or modifies the conclusions of this report in writing.

10 REFERENCES

The following sources of reference were used during the investigation of the site and the compilation of this report.

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forestry, fisheries & the environment

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SPECIALIST DECLARATION FORM – AUGUST 2023

Specialist Declaration form for assessments undertaken for application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

REPORT TITLE

Geotechnical Desktop Assessment Studies for the Proposed Construction of the Impala Zircon Temporary By Pass 132kv Power Line with Associated Infrastructure within the Umhlathuze Municipality in Kwazulu Natal, South Africa

Kindly note the following:

1. This form must always be used for assessment that are in support of applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting, where this Department is the Competent Authority.
2. This form is current as of August 2023. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.dffe.gov.za/documents/forms>.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with '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 act, when applying for environmental authorisation - GN 320/2020', where applicable.

1. SPECIALIST INFORMATION

Title of Specialist Assessment	Engineering Geologist
Specialist Company Name	Ariys Consulting
Specialist Name	Fhatani Lenon Makhuvha
Specialist Identity Number	9211025759089
Specialist Qualifications:	Bachelor of Earth Sciences in Mining and Environmental Geology
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2. DECLARATION BY THE SPECIALIST

I, Fhatani Lenon Makhuvha declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. “the Protocols”) and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing –
 - any decision to be taken with respect to the application by the competent authority; and;
 - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.



Signature of the Specialist

Ariys Consulting

Name of Company:

04 Jun 2026

Date

SPECIALIST DECLARATION FORM – AUGUST 2023

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Fhatani Lenon Makhuvha, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

Ariys Consulting

Name of Company

04/06/26

Date

Click or tap here to enter text.

Signature of the Commissioner of Oaths

Click or tap to enter a date.

Date

