DRAFT BASIC ASSESSMENT REPORT FOR A PROPOSED CONSTRUCTION OF A 765KV TRANSMISSION POWER LINE, A NEW SUBSTATION (MBEWU/THETA SUBSTATION) AND LOOP IN (765kV) AND LOOP OUT (400KV) POWERLINES IN THE ZULULAND AND KING CETSHWAYO DISTRICT MUNICIPALITIES, KWAZULU-NATAL PROVINCE,

KWAZULU-NATAL PROVINCE

MAY 2023

KIM-ENV-2022-023

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MAY 2023

Conducted on behalf of:

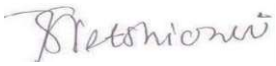
Eskom

Compiled by:

_____

Lufuno Nengwani (EAPASA: 2019/1080)

Reviewed by:



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Document History and Distribution List

Project Number	Date	Revision Number
KIM-ENV-2022-023	May 2023	00

Name	Institution
Vuledzani Thanyani	Eskom Holdings SOC Ltd
Tobile Bokwe	Eskom Holdings SOC Ltd
Kimopax Library	Kimopax (Pty) Ltd

STRICTLY CONFIDENTIAL

List of Abbreviations

BAR	: Basic Assessment Report
CARA	: Conservation of Agricultural Resources Act
DEA	: Department of Environmental Affairs
DENC	: Department of Environment Nature and Conservation
DFFE	: Department of Forestry, Fisheries and the Environment
DMR	: Department of Mineral Resources
EA	: Environmental Authorisation
EAP	: Environmental Assessment Practitioner
EIA	: Environmental Impact Assessment
ECO	: Environmental Control Officer
EMP	: Environmental Management Plan
EMPr	: Environmental Management Programme
GPS	: Geographic Positioning System
I&AP	: Interested and Affected Party
IDP	: Integrated Development Plan
KCD	: King Cetshwayo District
KZN	: KwaZulu-Natal
LM	: Local Municipality
NEMA	: National Environmental Management Act (Act 107 of 1998)
NEMBA	: National Environmental Management Biodiversity Act

NEMPAA : National Environmental Management: Protected Areas Act

NFEPA : National Freshwater Ecosystems Priority Areas

NHRA : National Heritage Resources Act (Act 25 of 1999)

NWA : National Water Act (Act 36 of 1998)

PPP : Public Participation Process

SAHRA : South African Heritage Resources Agency

SAHRIS : South African Heritage Resources Information System

SDF : Spatial Development Framework

SSC : Species of Special Concern

WMA : Water Management Area

EXECUTIVE SUMMARY

Eskom Holdings SOC Ltd ("Applicant") appointed Kimopax (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to facilitate the environmental authorisation process – the Basic Assessment (BA) process[1] for a proposed construction of 765kV transmission line between the new Mbewu substation near Empangeni to the existing Umfolozi sub-station near Ulundi and the Mbewu Loop in (765kV) and out are 400kV in the Zululand and King Cetshwayo District Municipalities, KwaZulu-Natal Province.

Eskom's transmission network supplying electricity into the Eastern Region requires strengthening to meet the growing demand in KwaZulu Natal in order to avoid load shedding because of limited Transmission capacity, as well as to improve service quality and reliability. The strengthening of the power corridor will entail phased construction of 765kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that in order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 765kV line between the proposed new Mbewu (Theta) Substation near Empangeni and a 90m servitude (45m on either side of the centre line) is required to accommodate the towers on which the overhead line will be strung.

a) The construction of 765kV lines from the Umfolozi to Mbewu (90m servitude).
b) The construction of new Mbewu (Theta) Substation with 60m x 60m footprint near Empangeni. The 400kV Umfolozi Substation is situated just northwest of Ulundi in KwaZulu-Natal (28º12' 52" S, 31°11'13" E).
c) Construction of associated 400 kV turn in lines (loop in (765kV) & loop out Athene-Umfolozi and Inmvubu-Umfolozi 400 kV lines).

The National Environmental Management Act (NEMA) requires that certain activities, such as the construction of a substation and powerlines, be subject to an environmental impact assessment (EIA) before they can be authorized by the Department of Forestry, Fisheries and the Environment (DFFE). The purpose of the EIA process is to identify and assess the potential

[1] The project will following the Basic Assessment (BA) process since it is to be executed inside the Electricity Grid Infrastructure (EGI) corridor- the Expanded East Corridor corridor.

environmental impacts of the proposed project, and to ensure that appropriate mitigation measures are put in place to minimize any negative effects.

Before the Environmental Authorisation is granted, Kimopax (Pty) Ltd must undertake an environmental Authorisation process, together with the associated Public Participation Process (PPP) in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). The Competent Authority for the Environmental Authorisation process is the Department of Forestry, Fisheries and the Environment (DFFE). Kimopax (Pty) Ltd will be responsible for the compilation of the Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) as well as to undertake the associated Public Participation Process (PPP).

The public participation process is part of the Environmental Authorisation process and is conducted in terms of NEMA (as amended) which provides clear guidelines for stakeholder engagement during an EIA. One of the general objectives of integrated environmental management set out in Section 23(2) of NEMA is to ensure the "adequate and appropriate opportunity for public participation in decisions that may affect the environment".

The public participation process is primarily aimed at affording Stakeholders and Interested and Affected Parties (I&APs) the opportunity to gain an understanding of the project. Furthermore, the proposed project can be fully explained to landowners, the affected parties, and communities in order to enable them to make informed decisions about its impact on them and their communities. In addition, the purpose of consultation with the Stakeholders and I&APs is to provide the Competent Authority with the necessary information in order for them to make informed decisions.

Before an EAP submits a final report, they must have given registered I&APs access to, and an opportunity to comment on the report prior to the submission of the final report to the Competent Authority for approval. Stakeholders (registered I&APs and commenting authorities for review) are therefore invited to participate in the public review period of the Draft BAR from **24th of May to 23rd of June 2023** to ensure that the assessment of impacts and proposed management of impacts have addressed their concerns. After the public review period, the report will be updated with comments received from stakeholders on the Draft BAR and EMPr. The updated Final BAR/ EMPr will be submitted to the Competent Authority (DFFE) for decision making.

In order to protect the environment and ensure that the development is undertaken in an environmentally responsible manner, there are a number of significant environmental legislation that were taken into consideration during this study and are elaborated on in this report. The Department of Forestry, Fisheries and the Environment (DFFE) is the lead/ Competent Authority for this BA study, and the project needs to be authorised by this DFFE.

A. KEY FINDINGS BASED ON STUDIES FROM THE DFFE SCREENING TOOL

a) Soils and Agricultural Potential

The impact on agriculture or agronomy is negligible from the standpoint of power line and stay cable foundations, as well as new substations, which will occupy less than 10 hectares of non-arable land. The design, building, and maintenance of service roads are the only issues that are significant. This is not within the purview of the specialist's responsibilities. It was further noted that there was no evidence of the existing power line having had any negative impact whatsoever on the soil and vegetation along the entire route. However, existing service roads were in part undrivable due to erosion of the road surface itself. It was apparent that this was due to lack of maintenance and drainage of storm water from the road onto the surrounding veld.

b) Aquatic Ecology

Based on the aquatic ecological assessment it is the opinion of the specialist that the proposed powerline construction project be approved. It should also be ensured that recommendations as outlined in the Section 5 of the report are adhered to in order to minimise any potential impacts on the riverine systems to be crossed by the infrastructure. Some essential mitigation measures and recommendations for the project are outlined below:

- No support structures should be constructed within the riverine systems areas. If at all possible, all support structures should be developed above the 1: 50-year flood line and above the 1:10 year flood line as a minimum;
- Limit the footprint area of the construction activities to what is essential in order to minimize environmental damage, especially where towers will encroach upon the riverine systems boundary. Construction vehicles must use existing roads where possible;
- Tower footprints and rehabilitated construction areas must be inspected for erosion and measures must be implemented to curb erosion;

- Management of alien and invasive species within the disturbed areas should be conducted on an ongoing basis to minimize spread and loss of indigenous vegetation.

c) Ecology

The proposed site has suffered general veld transformation because of the forestry and sugarcane plantation and associated activities. The proposed site has a number of protected trees, namely *Sclerocarya birrea* (Marula), in addition to this the study site has a number of watercourses which are considered as sensitive habitats.

If any of the plant Species of Special Concern such as the Marula tree are identified during clearing of vegetation for the construction area, they should be recorded with a GPS and reported so that a relocation strategy can be employed by a suitably qualified botanical specialist. Given that plant Species of Special Concern (SSC) are present in large numbers on site, it is highly likely that some of these species will be encountered. Limited plant SSC should be destroyed as a result of the proposed activity.

Fauna and Flora monitoring is recommended.

The following should be adhered to for the monitoring programme:

- Monitoring must take place on a monthly basis during the construction phase, and once after construction;
- Monitoring must be completed by qualified specialists;
- Adaptive management must be applied;
- Monitoring during the wet season is essential; and
- Findings must be compared to previous years.

d) Fauna

The site is being used for communal grazing. Additionally, hunting by the community with packs of dogs does occur, which leads to significantly reduction in the fauna on site. Therefore, permits for the removal and relocation of protected species and endangered animals must be in

place before any construction can commence. A search and rescue operation, undertaken by a suitably qualified person, must be undertaken before construction commences.

Community outreach regarding poaching of fauna should be undertaken. Rehabilitation of vegetation communities would improve faunal diversity across the site. Increased activity during construction phase will result in the small-scale movement of fauna away from the construction site. It must be noted that the type of construction associated with the construction of 765kV lines from the Umfolozi to Mbewu Substations, the construction of new Mbewu (Theta) Substation near Empangeni and construction of associated 400 kV turn in lines (loop in (765kV) & loop out (400kV) Athene-Umfolozi and Invubu-Umfolozi 400 kV lines) result in a minimal loss of habitat. Fauna will return to the area around the study area once construction is complete.

e) Visual Impact Assessment (VIA)

The focus of this study is specifically on the main project components such as the power lines, pylons and access roads and not on the ancillary infrastructure. Due to the linear nature of the proposed project, it is not possible to provide an adequate descriptive analysis of visibility by plotting sections to determine the line of sight from the observer towards the project components to indicate the extent to which the elements are not screened by the intervening landforms or structures.

The determination of the potential visual impacts is undertaken in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed infrastructure.

Anticipated issues related to the potential visual impact of the proposed development include the following:

- The visibility of the facility to, and potential visual impact on, observers travelling along the major local roads traversing south and west of the proposed facility.
- The visibility of the facility to, and visual impact on, the larger built-up centres or populated places (the towns of Bronville, Verginia and Meloding) as well as the homesteads (farm residences) located within close proximity of the site.

- Potential cumulative visual impacts (or alternately, consolidation of visual impacts) with specific reference to the existing power line infrastructure adjacent to the proposed development area.
- The potential visual impact of the construction of ancillary infrastructure (i.e., the substation at the facility, associated power line and access roads) on observers in close proximity of the facility.
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in proximity of the facility.
- The visual absorption capacity of natural or planted vegetation (if applicable).
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

It is envisaged that the issues listed above may constitute a visual impact at a local scale.

f) Heritage Impact Assessment (HIA)

The findings by archaeological and heritage specialist attest to the fact that the project area may have been located within a rich LIA landscape. As such there is potential for encountering subsurface LIA remains ranges from low to medium on the proposed substation site and powerline route (***See the appended Chance find procedure for handling of chance finds***). Visibility was affected during the current survey is thought to be a result of previous clearance, and blue gum plantation that may have destroyed surface remains. In addition, surface visibility was compromised by thick vegetation cover. It should be noted that significance of the site is not limited to presence or absence of physical archaeological sites.

Based on the significance assessment criterion employed for this report, the site was rated **low to medium** from an archaeological perspective, However, it should be noted that significance of the sites of Interest is not limited to presence or absence of physical archaeological sites. Significant archaeological remains may be unearthed during development (***see appended chance find procedure***). The absence of significant archaeological remains may be due to the following factors:

- That the substation site is located within a heavily degraded area and have reduced sensitivity for the presence of high significance physical cultural site remains due previous agriculture activities.
- Limited ground surface visibility on sections of the proposed substation site may have impended the detection of other physical cultural heritage site remains or archaeological signatures within the substation site. This factor is exacerbated by the fact that the study was limited to general survey without necessarily conducting any detailed inspection of specific locations that will be affected by the proposed development.

Based on the significance assessment criterion employed for this report, the electricity supply project site was rated **low** from an archaeological perspective. However, it should be noted that significance of the sites of interest is not limited to presence or absence of physical archaeological sites. Significant archaeological remains may be unearthed during construction. (***See appended chance find procedure***).

B. ENVIRONMENTAL IMPACT STATEMENT

Summary of the potential impacts after management and mitigation have been considered and are as follows:

a) Loss of habitat/biodiversity and impact on fauna and flora

It is expected that most of the current vegetation in the proposed area will be lost to construction activities. However, it has been proposed that indigenous vegetation be used for all landscaping activities. A rescue operation will be conducted to relocate the medicinal plants spotted on site.

b) Noise

Noise pollution due to the presence of heavy vehicles and machinery, as well as the associated construction activity itself will be the responsibility of the construction activities. The construction activity will be temporary in nature and standard methods can be employed to ensure that machinery and vehicular noise are kept to a minimal.

c) Property Values

Good housekeeping measures will be included during the operational phase, to ensure that the development does not contribute to area neglect, and screening of the property by indigenous plants, these mitigation measures will bring the impact down to low.

d) Air Quality

The key pollutant from the proposed site during the construction and decommissioning phases would be Particulate Matter (PM). Various PM control measures for the construction phase are presented, the key being wet suppression.

e) Traffic

Due to the linear nature of the proposed route specific viewpoints for the transmission line were not selected. However, areas with high volumes of traffic, areas with tourism potential and undeveloped rural areas with high scenic value were regarded as critical view zones against which the visual impact would be evaluated.

f) Visual

The significance of visual impact is based on the worst-case scenario. This scenario assumes that all facilities along with the associated grid infrastructure and sub-stations would be constructed at the same time. At the time of writing there was no evidence to the contrary. This assumption is also based on the nature of the visual impact and the fact that receptors would experience all facilities in the same visual envelope from their respective locations or as they travel along adjacent roads.

g) Socio-economic

The proposed project will have a positive impact as it will provide further support to the National grid therefore aiding in providing electricity security to the region and the country. The potential job creation at the construction phase of the project will be a positive for the local and regional economy as unemployment in the country is increasing.

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Appendices

1 INTRODUCTION

Kimopax (Pty) Ltd was appointed by Eskom Holdings SOC Ltd to conduct the Environmental Impact Assessment (EIA)/ Basic Assessment process for the proposed construction of 765kV lines from the Umfolozi to Mbewu Substations, the construction of new Mbewu (Theta) Substation near Empangeni and construction of associated 400 kV turn in lines (loop in (765kV) & loop out (400kV) Athene-Umfolozi and Inmvubu-Umfolozi 400 kV lines) near Ulundi in the Zululand and King Cetshwayo District Municipalities, KwaZulu-Natal province.

Eskom's transmission network supplying electricity into the Eastern Region requires strengthening to meet the growing demand in KwaZulu Natal in-order to avoid load shedding as a result of limited Transmission capacity, as well as to improve service quality and reliability. The strengthening of the power corridor will entail phased construction of 765kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that in order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 765kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

The National Environmental Management Act (NEMA) requires that certain activities, such as the construction of a substation and powerlines, be subject to an environmental impact assessment (EIA) before they can be authorized by the Department of Forestry, Fisheries and the Environment (DFFE). The purpose of the EIA process is to identify and assess the potential environmental impacts of the proposed project, and to ensure that appropriate mitigation measures are put in place to minimize any negative effects.

1.1 Location of the overall Activity

The route for the proposed powerline extended from the new Mbewu substation (which is a part of this application) near Empangeni to the existing Umfolozi sub-station near Ulundi. The properties which are affected by the proposed powerline shown on **Table 1** below.

Table 1: Information on properties affected by the project.

ITERM	PROPERTY NAME	21 DIGIT SURVEYOR-GENERAL CODE
1	LANGGEWACHT	N0GU00000000023500000
2	DUIKERFONTEIN	N0GU00000000052800000

3	UITKIJK	N0GU00000000035300000
4	EENSGEVONDEN	N0GU00000000055100000
5	LOTTERY	N0GU00000000053100000
6	RESERVE NO 20	N0GU00000001584000000
7	XIMBA	N0GU00000001650600000
8	RESERVE NO 11	N0GU00000001583100000
9	FULENI RESERVE	N0GU00000001437500000
10	LOT 321 EMPANGENI	N0GU00000001304000000
11	LOT 317 EMPANGENI	N0GU00000001440400000
12	LOT 316 EMPANGENI	N0GU00000001305100000
13	LOT 309 EMPANGENI	N0GU00000001305000000
14	LOT 285 EMPANGENI	N0GU00000001340000000
15	DUBE RIDGE	N0GU00000001522300000
16	LOT 290 EMPANGENI	N0GU00000001338800000
17	LYNWOOD	N0GU00000001142500000
18	LOT 292 EMPANGENI	N0GU00000001339900000
19	SYLVIA	N0GU00000001630500000
20	LOT 244 EMPANGENI	N0GU00000001057400000
21	EZULWINI	N0GU00000001106500000
22	NEEDMORE	N0GU00000001138600000
23	LOT 241 EMPANGENI	N0GU00000001105800000
24	BELLA VISTA	N0GU00000001840900000

25	NTOMBOTI	N0GU00000001841000000
26	NEWLANDS	N0GU00000001158800000
27	VALLEY	N0GU00000001678600000

1.2 Project Locality

The proposed project and associated infrastructure are situated between the proposed new Mbewu substation near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and King Cetshwayo District Municipalities. The **Figure 1** and **Figure 2** below show the locality of the transmission line and the estimated length in kilometres of the Umfolozi-Mbewu Transmission Line.

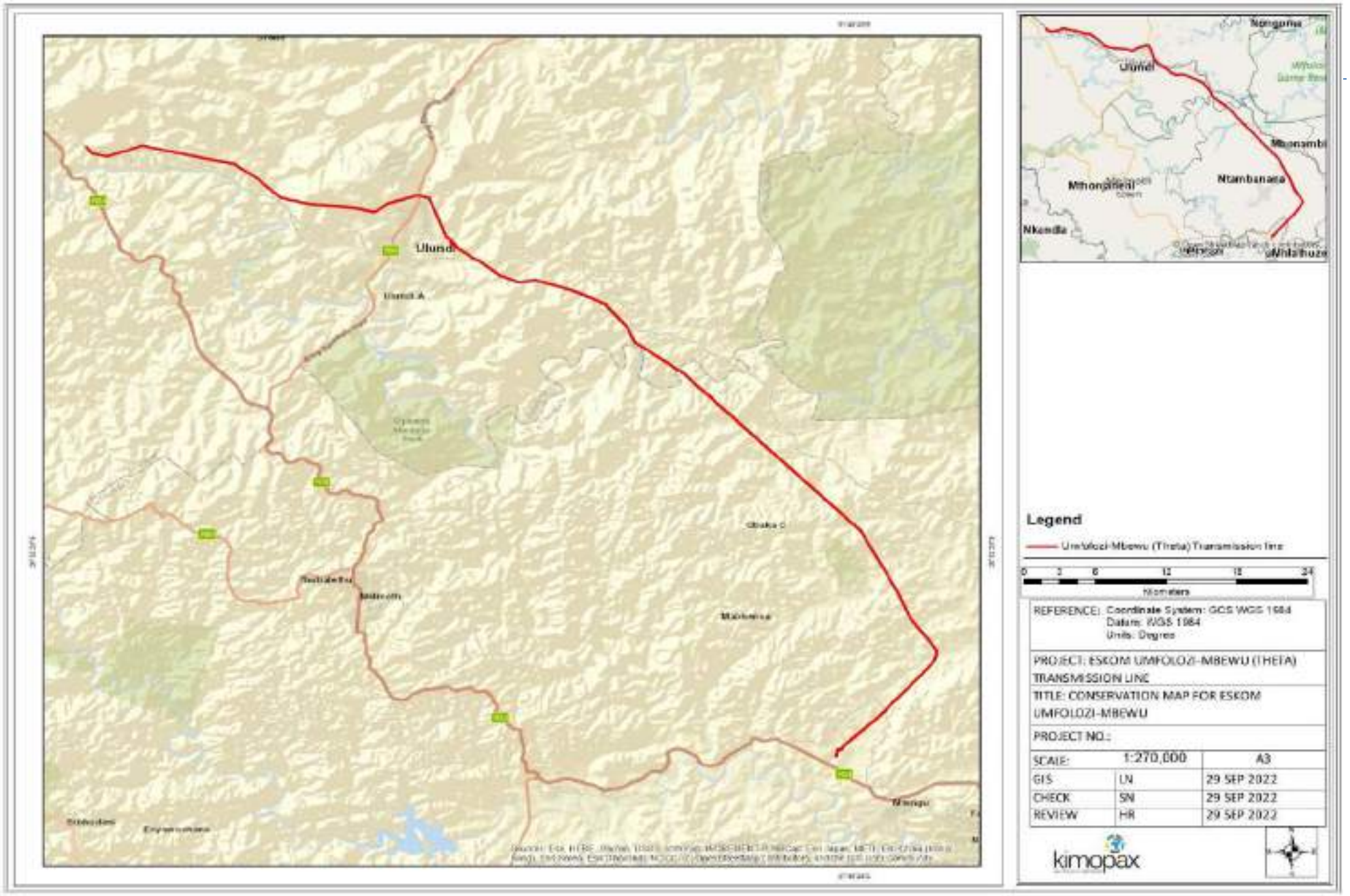

Figure 1: Locality Map for the proposed construction of the Umfolozi-Mbewu (Theta) transmission line.

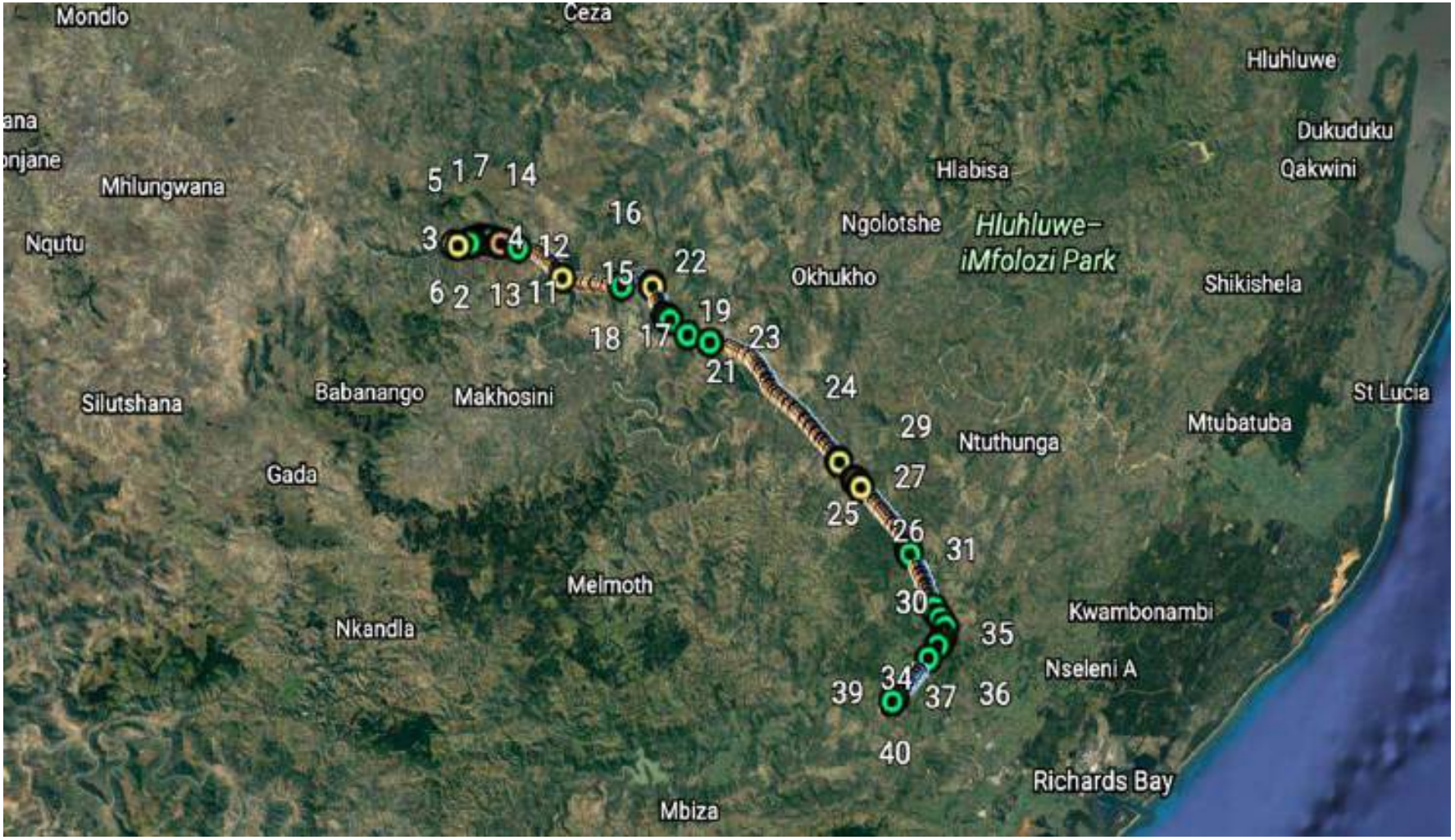

Figure 2: Umfolozi-Mbewu Transmission Line Study Map, Provided by Google Earth, kmz. (97,23km)

2 SPECIALIST STUDIES

This Draft Basic Assessment Report (DBAR) uses input from specialists **(Table 2)** to assess the key impacts, determine their significance, and recommend appropriate measures to mitigate negative impacts and enhance benefits. The specialist studies that have been undertaken are summarised below.

Table 2: List of specialists.

Specialist Study	Organisation	Appendix
Terrestrial Biodiversity Impact Assessment:	Mawenje Consulting Africa (MCA) (Pty) Ltd	Appendix B-1
Faunal Assessment	Mawenje Consulting Africa (MCA) (Pty) Ltd	Appendix B-2
Avifaunal Impact Assessment	Mawenje Consulting Africa (MCA) (Pty) Ltd	Appendix B-3
Agricultural Assessment	Mzansi Agriculture Afzelia Environmental Consultants (Pty) Ltd	Appendix B-5
Visual and Impact Assessment	Eco-Thunder Consulting (Pty) Ltd Afzelia Environmental Consultants (Pty) Ltd	Appendix B-6
Aquatic Ecological Assessment	Umongo Environmental Services	Appendix B-7
Heritage Impact Assessment	Integrated Specialist Services (Pty) Ltd	Appendix B-8

3 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

3.1 The qualifications of the EAP (with evidence)

Lufuno Kenneth Nengwani have the following qualifications:

a) Diploma in Mining Engineering.

b) BSc (Hons) Mining and Environmental Geology.

Completed the various Environmental Management modules such as Ecological Principles for Environmental Management, The Natural Environment as a System, Pollution and Environmental Quality; Environmental Geology and Mine Rehabilitation; Environmental Impact Assessment and Modelling; Resource Evaluation and Information System; GIS and Map Production; and Advanced Mining and Environmental Management.

3.2 Summary of the EAP's past experience

(In carrying out the Environmental Impact Assessment Procedure)

Mr Nengwani has over 6 years of working experience in the environmental management field obtained from Geoluken Consulting, Crysbol, and Multiview Investments which are an environmental consulting company. My expertise is ranging from conducting applications for Environmental Authorisations (mining and developmental projects), Water Use License applications, Waste Management Applications, performance assessment reports for operational mines, and water sampling. Supervisory duties within the field, Environmental reports, progress report writing and proposals, including Environmental Management Plans/Programmes, handling of the Department of Forestry, Fisheries and the Environment (DFFE) documents in general.

Please refer to Appendix A for a copy of the EAP's Curriculum Vitae and Professional Registration Certificate.

4 DRAFT BASIC ASSESSMENT REPORT - EIA REGULATIONS, 2014

Project applicant:	Eskom Holdings SOC Ltd		
Business reg. no. /ID. no.:	N/A		
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Business reg. no. /ID. no.:	2018/204629/07		
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File Reference Number:	
	(For official use only)
NEAS Reference Number:	
Date Received:	
Due date for acknowledgement:	
Due date for acceptance:	
Due date for decision	

Kindly note that:

1. The report must be compiled by an independent Environmental Assessment Practitioner.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
3. Where applicable **tick** the boxes that are applicable in the report.
4. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the Department of Economic Development, Environment and Tourism as the Competent Authority (Department) for assessing the application, it may result in the rejection of the application as provided for in the regulations.
5. An incomplete report may be returned to the applicant for revision.
6. Unless protected by law, all information in the report will become public information on receipt by the department. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
7. The Act means the National Environmental Management Act (No. 107 of 1998) as amended.
8. Regulations refer to Environmental Impact Assessment (EIA) Regulations of 2014.
9. The Department may require that for specified types of activities in defined situations only parts of this report need to be completed. No faxed or e-mailed reports will be accepted.
10. This application form must be handed in at the offices of the Department of Forestry, Fisheries and the Environment (DFFE) -

Postal Address:	**Physical Address**:
Private Bag X447 Pretoria 0001 South Africa	Environment House, Cnr. Steve Biko (previously Beatrix Street) and Soutpansberg Road, 473 Steve Biko, Arcadia, Pretoria, 0083 South Africa

4.1 SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? **YES - X** ■

If YES, please complete the form entitled "Details of specialist and declaration of interest" or appointment of a specialist for each specialist thus appointed:

Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail[2]:

1.1. BACKGROUNG INFORMATION

Eskom's transmission network supplying electricity into the Eastern Region requires strengthening to meet the growing demand in KwaZulu Natal in-order to avoid load shedding because of limited Transmission capacity, as well as to improve service quality and reliability. The strengthening of the power corridor will entail phased construction of 765kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 765kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

Eskom is mandated by the Government of the Republic of South Africa to supply sufficient and reliable electricity required for sustainable developments and the future growth of the country's economy. The project will enhance the security of the power supply to the KwaZulu Natal Province. This project will have

[2] Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.

a positive impact on the local network. With the installation of this project, over time, Eskom's ability to provide efficient and reliable service to its customers and its capability to support future developments in the area will be enhanced.

The project was authorized in August 2011, and its Environmental Authorisation (EA) was extended for four (4) years in August 2015 and once again in 2019 for a further two years, until August 2021.

1.2 DESCRIPTION OF THE BASELINE ENVIRONMENT

1.2.1 Climate

Based on the South African Weather Services, the multi-model rainfall forecast indicates above-normal rainfall for most parts of the country except for the south-western parts during late-autumn (Apr-May-Jun) and early-winter (May-Jun-Jul) which is expected to receive below-normal rainfall.

In Empangeni, the summers are warm and muggy; the winters are short, cool, and dry; and it is windy and mostly clear year-round (**Figure 3**). Over the course of the year, the temperature typically varies from 13°C to 29°C and is rarely below 10°C or above 33°C (weatherspark.com, n.d.).

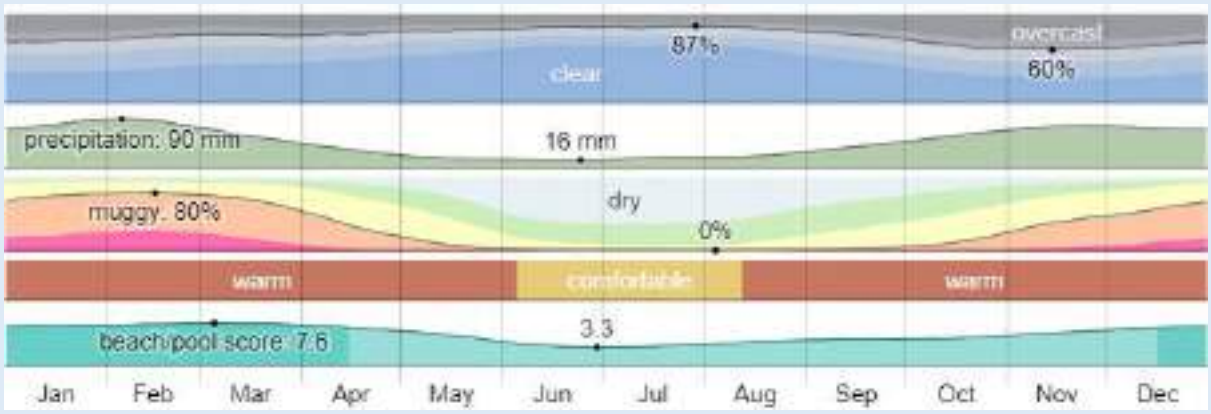

Figure 3: Average temperatures and precipitation (rainfall) for Empangeni.

1.2.2 Biophysical Environment

a) Geology and Soils

Based on the information acquired from the study done by MCA (terrestrial biodiversity impact assessment undertaken in March 2023) indicates that:

- The Svl 22 Northern Zululand Sourveld: A section of the powerline consists of Well-drained and shallow soil forms (Glenrosa and Mispah forms) derived from various lithologies; predominantly, Dwyka Group diamictites, but also shale, siltstone and sandstone from the Madzaringwe and Pietermaritzburg Formations, all of the Karoo Supergroup. Archaean granite and gneiss are also significant. Land types of mainly Fb and Fa, with some Ac.

- The Gm 15 Paulpietersburg Moist Grassland Vegetation Unit: This area is underlain by Archaean granite and gneiss partly covered by Karoo Supergroup sediments (Madzaringwe Formation) and intruded by Karoo Dolerite Suite dykes and sills. Dominant soils on the sedimentary parent material are yellow apedal, well drained, with a depth of >800 mm and a clay content of >35%, representing the soil series: Hutton, Clovelly and Griffin. Shortlands soils are dominant on dolerite. Dominant land type Ac, with Fa and Ba of subordinate importance.
- The Gs 2 Ithala Quartzite Sourveld Bushveld Vegetation Unit: Quartzite of the Mozaan Group (Pongola Supergroup) of the Randian age supporting shallow soils typical of Fb (prevalent) and Fa (marginal) land types.

b) Topography

At the Nhlazatshe substation, which is clearly visible from the R34 between Melmoth and Vryheid the route crosses over land that is mainly hilly ranges from 700m to 1040m amsl (**Appendix C-7**). From between 10 to 15 km both West and East of the town of Ulundi the habitat changes to gently sloping at a range of 200m to 600m amsl. The terrain again changes to large, steep hills from Ulundi to Heatonville.

According to the *Visual Impact Report*, the terrain of the study area cannot be too steep (angle must be less 20 degrees). Additionally, a 400kV power line can span an average distance of 500 metres between two pylons. Therefore, large valleys and channels are considered fatally flawed areas. Obstructions / deviations: The power line is required to travel in a straight path as far as possible. Should the power line route be required to change direction at an angle of more than 3 degrees a self-supporting pylon is required which is extremely costly.

c) Agricultural

Sugarcane is grown on good quality soils that occur west of the Spoornet railway line between the R34 and Heatonville. These fields are irrigated with water pumped from the Thukela River, 50 km away.

As the footprint of the proposed route, including substations, power line foundations and power line stay cables will probably be less than 10 ha along the entire 100 km route the impact will be virtually irrelevant as the entire power line, with the exception of a few kilometers at Heatonville passes over non arable land. The impact will be insignificant from an agribusiness or agronomic perspective. The concern of any consequence is the design, construction, and maintenance of service roads. This aspect is outside of realm of responsibility of the specialist (An Agricultural Impact Assessment, March 2023).

d) Vegetation

Information acquired from the study done by MCA (terrestrial biodiversity impact assessment undertaken in March 2023) indicates that the proposed transmission line also traversers the SVl **22 Northern**

Zululand Sourveld vegetation type (**Figure 4**). This vegetation type consists of dominant structural vegetation type as wooded grassland, in places pure sour grasslands and rarely also dense bushveld thickets. Terrain is mainly low, undulating mountains, sometimes highly dissected, and also some moderately undulating plains and hills.

The SVl **22 Northern Zululand Sourveld** vegetation type is naturally found in the KwaZulu-Natal Province and Swaziland: From the Lusthof area in Swaziland southwards with scattered patches in northern Zululand in the surrounds of Hlomohlomo, east of Louwsburg, Nongoma and the vicinity of Ulundi including Nkandla. In the Hluhluwe-iMfolozi Park it occurs at highest altitudes in the park. Altitude mainly 450–900 m.

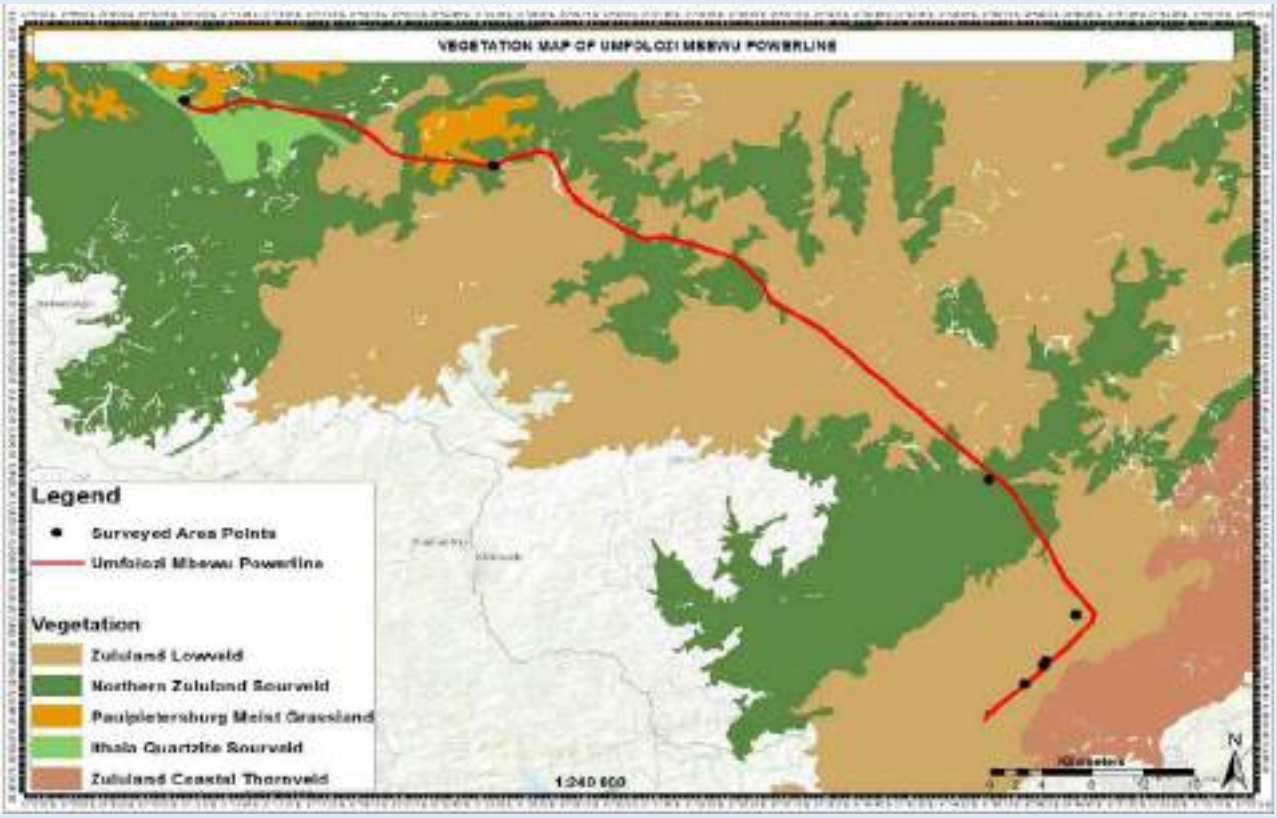

Figure 4: The vegetation type associated with the proposed transmission line (2012 Vegetation Map).

e) Biodiversity

According to the special report of terrestrial biodiversity impact assessment undertaken in March 2023 and the 2014 KwaZulu Natal Biodiversity Conservation Plan, the Umfolozi-Mbewu (Theta) Transmission line is located within a Critical Biodiversity Area (CBA). Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. A small section of the transmission line passes through an Ecological Support Area (ESA)

(**Figure 5 and Appendix C-2**). Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services.

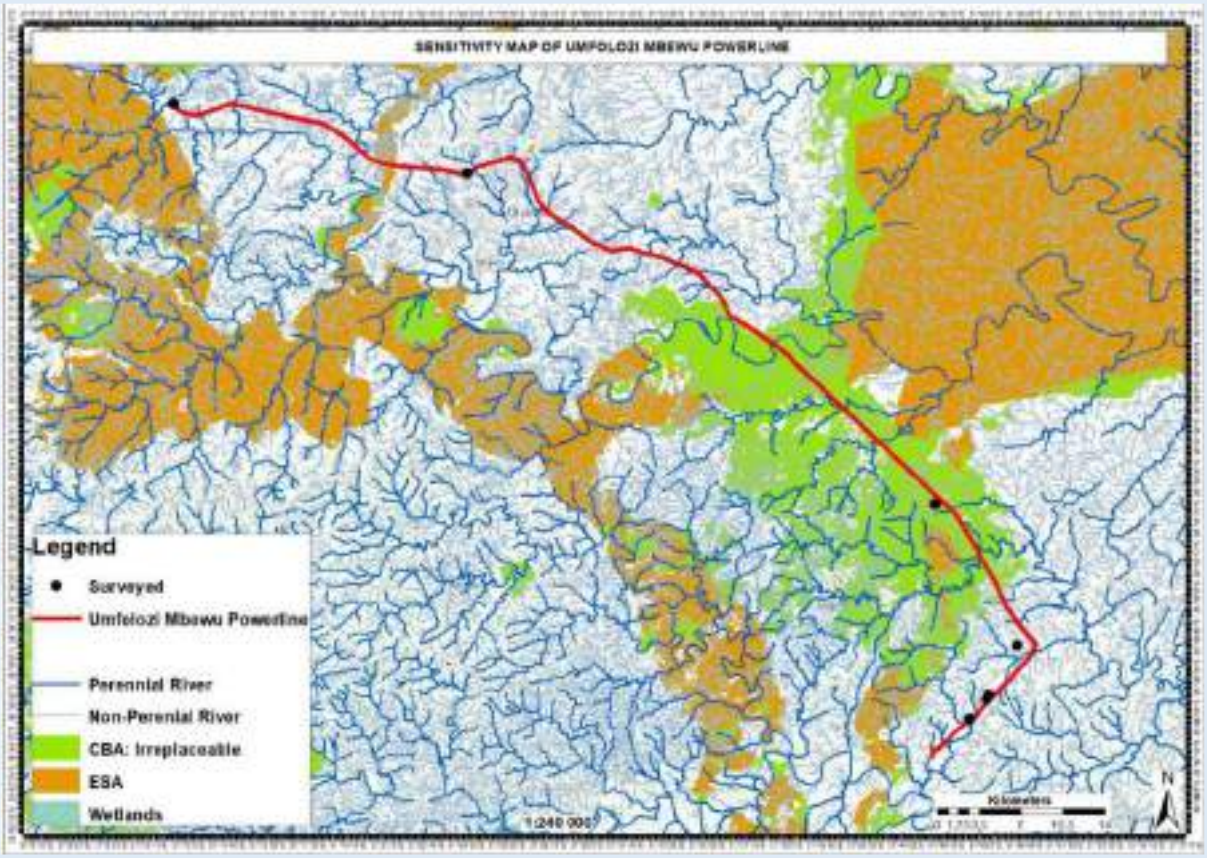

Figure 5: Sensitivity Map

1.2.2 Watercourse on site

The aquatic sensitivity of the proposed site is classified as **VERY HIGH** in the Screening Report. The National Freshwater Ecosystems Priority Areas (NFEPA) identifies important wetlands in South Africa (**Appendix C-8** and **Figure 6**), The study site falls under the Usuthu to Mhlathuze Water Management Area (WMA=10). **Appendix C-8** is a specific representation of the watercourses/wetlands that are found along the proposed Umfolozi-Mbewu Transmission Line. The proposed transmission line will be located within 500m of a number of watercourses (Terrestrial Biodiversity Impact Assessment-Report, March 2023).

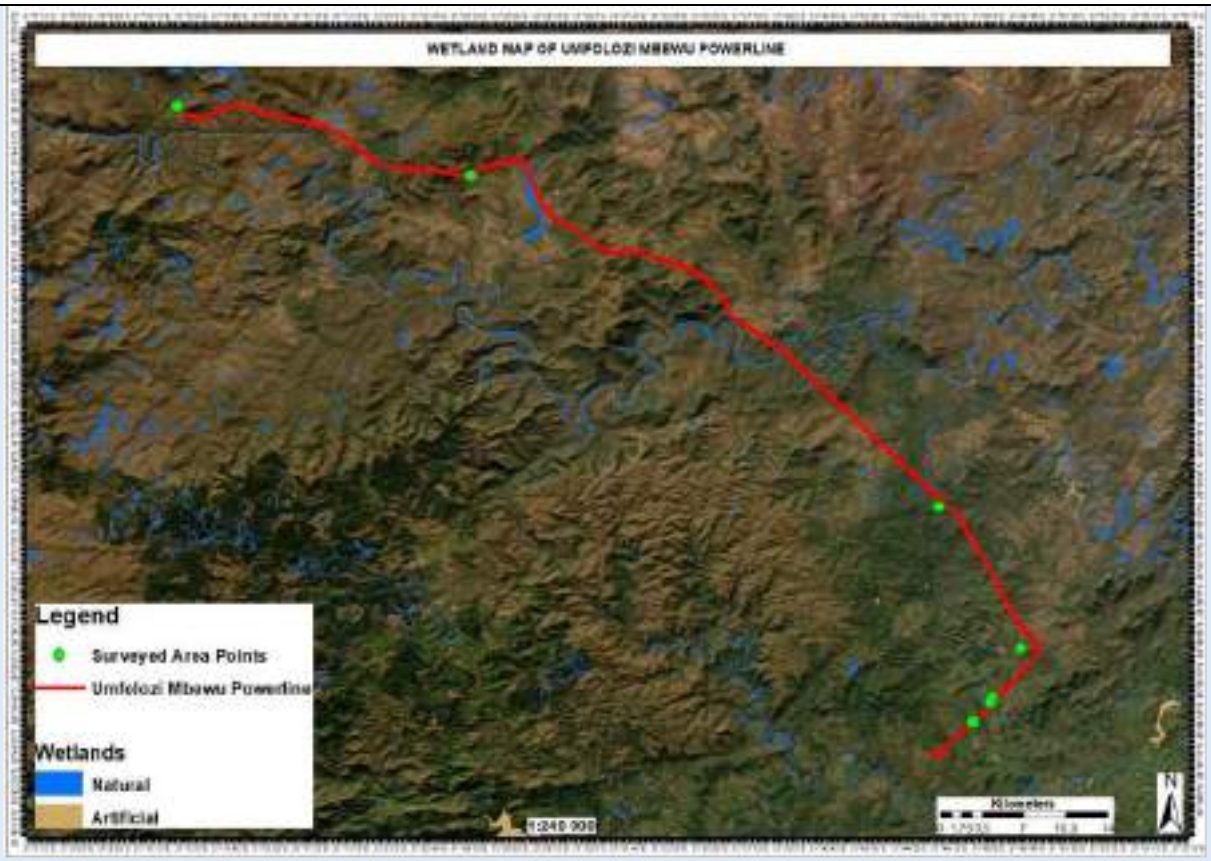

Figure 6: Wetland/Watercourses along the Marieskop Access Road.

The Aquatic Ecological Assessment Report (March 2023) states that the potential aquatic biodiversity impacts of the proposed construction and operation of the powerline and associated infrastructure are medium without suitable mitigation measures and low with the implementation of suitable mitigation measures provided in terms of any potential impact to aquatic habitat, biota, water quality, or flow for all phases of the proposed development. Impacts significance is likely to be slightly higher during the construction phase due to breaking ground activities which may result in sedimentation of the system, however this will be temporary and will be significantly reduced during the operational phase where only maintenance of the infrastructure will be necessary.

1.2.3 Populations of Sensitive and/ or Threatened Floral and Faunal Species

Based on the aquatic ecological assessment it is the opinion of the specialist that the proposed powerline construction project be considered favourably.

1.2.3.1 Avifauna

Fauna Assessment report stated that the Birds are regarded as one of the most useful bioindicators, and they have been used extensively as models to determine ecosystem function (see review Koskimies 1989;

Potts et al. 2014; Bregman et al. 2016). More than 340 bird species are known to occur in the along the study area (**Figure 7** and **Appendix B**). Generally, the areas are of Low Sensitivity due to homogenous vegetation and disturbed habitats. Furthermore, no Species of Conservation Concern were observed during the survey. Below is the table containing species recorded on site during the survey.

Figure 7: Bird that are commonly observed with the proximity of the proposed transmission line.

Butterflies and other invertebrates: A total of 121 butterfly species are predicted to be occur on site, with only three seen during the site visit. No butterflies of conservation concern were seen on site. Some species seen can be found below from **Figure 8**. The other invertebrates are depicted on **Figure 9** ,**Figure 10** and **Figure** 10**.**

Figure 8: Biblia ilithya.

Figure 9: Eurydema oleracea observed onsite.

Figure 10: Snail observed onsite.

Amphibians: A total of 17 species are predicted to occur on site with none seen on site. Potential for them to occur on site are very high due to the watercourses that are located within 500m of the transmission line. Additionally, amphibians will occur within drainage lines within the project area.

Mammals: The following list of potential animal SCC were derived from current literature for vegetation found in the area as well as the international IUCN Red Data list, the South African Red Data List, and CITES. The results are summarised in **Table 3** below.

Table 3: List of potential mammals that maybe found onsite.

Scientific name	Common name	IUCN Threat status
Nycteris macrotis	Large eared slit faced bat	LC
Orycteropus afer	Aardvark	LC
Canis mesomelas	Black-backed Jackal	LC
Equus quagga	Plains Zebra	NT
Tragelaphus strepsiceros	Greater Kudu	LC
Giraffa camelopardalis	The South African Giraffe	VU
Connochaetes taurinus	Blue wildebeest	LC
Paraxerus cepapi	Smith's Bush Squirrel	LC
Syncerus caffer	Cape Buffalo	LC
Pedetes capensis	South African Spring Hare	LC
Damaliscus lunatus	Common Tsessebe	LC
Mellivora capensis	Honey Badger	LC
Aepyceros melampus	Impala	LC
Genetta maculata	Common Large-spotted Genet	LC
Sylvicapra grimmia	Bush Duiker	LC

Reptiles: A total of 26 species are predicted to occur on site, with only two reptile species seen – Variable skink (*Trachylepis varia*; **Figure 11**) and Rainbow Skink (*Trachylepis margaritifer*), with none of them being species of conservation concern. The area provides ample habitat for reptiles.

Figure 11: Examples of the Rainbow Skink

1.2.3.2 Floral Species

A study done by MCA identified only one nationally protected plant species that was recorded on site, namely *Sclerocarya birrea* (Marula) within the study site. The Marula Plant is a medium-sized to large deciduous tree with an erect trunk and rounded crown. It is one of the plants that played a role in feeding people in ancient times. The study site was found to be rich in endemic species. Endemism is the ecological state where species are confined to a specific region or habitat. Some endemic species were recorded on site such as the *Acacia species,* which was abundant throughout the habitats on site (**Figure 12**).

Figure 12*: Sclerocarya birrea* (Marula) observed within the study site (Terrestrial Biodiversity Impact Assessment, March 2023).

The study site is also characterized by an abundance of Aloe species onsite (**Figure 13**). Aloe species have economic and cultural value. Aloes have a very long history of medicinal, cosmetic and cultural uses. Many early civilizations were familiar with the healing properties of *Aloe vera* in particular.

Figure 13: Aloe species observed along the servitude of the proposed transmission line.

1.2.5 Heritage

The Heritage Impact Assessment report done by Integrated Specialist Services (Pty) Ltd who was tasked by Kimopax (Pvt) Ltd on behalf of Eskom Holdings SOC Ltd, sets out the following results of the field study:

a. Archaeology

Based on the field study results and field observations no new archaeological sites were recorded along the powerline route. Visibility was compromised by overgrown vegetation cover which impeded detection archaeological remains along the powerline route. As such the receiving environment for the proposed development is low to medium potential to yield previously unidentified archaeological remains during construction

b. Burial grounds and Graves

The field survey did not identify any burial sites within the corridor that may require mitigation. They have both historical and social significance and are considered sacred. Graves must not be tempered with without a permit from Amafa aKwaZulu Natali and Research institute. Although graves that were directly located within the footprint of the proposed powerline corridor were relocated in 2016, the possibility of encountering human remains during excavation for tower foundations, clearance for access roads, clearance for camp sites and subsurface earth moving activities at the substation is ever present.

c. Public Monuments and Memorials

The study did not record any public memorials and monuments along the proposed powerline route and substation site that require protection during construction. As such the proposed powerline development may be approved without any further investigation and mitigation in terms of Section 27 of the NHRA.

d. Buildings and Structures

The study did not record any buildings or structures within the proposed substation and powerline route. As such, the proposed powerline development may be approved without any further investigation and mitigation in terms of Section 34 of the NHRA and its Amafa aKwaZulu Natal equivalent.

e. Impact Statement

The main cause of impacts to archaeological sites is direct, physical disturbance of the archaeological

remains themselves and their contexts. It is important to note that the heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from their original position. The primary impacts are likely to occur during clearance and digging of tower foundations, indirect impacts may occur during movement of heavy construction vehicles and machinery during installation of powerline towers and stringing. Any additional clearance of access roads will result in the relocation or destruction of all existing surface heritage material (***if any are present***).

Since heritage sites, including archaeological sites, are non-renewable, it is important that they are identified, and their significance assessed prior to construction. It is important to note that due to the localised nature of archaeological resources, that individual archaeological sites could be missed during the survey, although the probability of this is very low along the proposed powerline route. Further, archaeological sites and unmarked graves may be buried beneath the surface and may only be exposed during surface clearance. The purpose of the AIA is to assess the sensitivity of the area in terms of archaeology and to avoid or reduce the potential impacts of the proposed powerline development by means of mitigation measures (***see appended Chance Find Procedure***). It is the considered opinion of the author that the chances of recovering significant archaeological materials is very low along the proposed powerline route.

Cumulative impacts that need attention are related to the impacts of clearances, digging tower foundations, access roads and impacts to buried heritage resources. Allowing the impact of the proposed powerline development to go beyond the surveyed area would result in a significant negative cumulative impact on sites outside the surveyed area. A significant cumulative impact that needs attention is related to stamping by especially construction vehicles at the site. Movement of heavy construction machinery must be monitored to ensure they do not drive beyond the approved sites. No significant cumulative impacts, over and above those already considered in the impact assessment, are foreseen at this stage of the assessment process.

Based on the significance assessment criterion employed for this report, the electricity supply project site was rated **low** from an archaeological perspective. However, it should be noted that significance of the sites of interest is not limited to presence or absence of physical archaeological sites.

1.2.6 Visual

The sensitivity of the landscape character is an indication of "the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character" (GLVIA, 2002). The uncluttered openness of the landscape is greatly responsible for the simplistic and

essentially secluded landscape character. Vast uninterrupted landscapes and vistas are dominated by low growing and low stunted vegetation. The unspoilt, panoramic landscape is an amenity that greatly contributes to the pristine and remote character of the landscape.

Previous human induced activities and interventions have minimally impacted the original landscape character. In this case, mining and existing infrastructure, including power lines, roads, amongst others, can be classified as landscape disturbances and elements that cause a reduction in the condition of the affected landscape type and negatively affect the quality of the visual resource.

The focus of this study is specifically on the main project components such as the substation, power lines, pylons and access roads. Due to the linear nature of the proposed project, it is not possible to provide an adequate descriptive analysis of visibility by plotting sections to determine the line of sight from the observer towards the project components to indicate the extent to which the elements are not screened by the intervening landforms or structures.

The servitude, if cleared of vegetation, and the construction access road will be visible, especially where the vegetation is diverse, for an extended distance beyond the 500 m zone, if viewed from an elevated position. This scar will be visible until rehabilitation is complete. Fortunately, much of the vegetation is grassland and will not need to be cleared.

Due to the linear nature of the proposed route specific viewpoints for the transmission line were not selected. However, areas with high volumes of traffic, areas with tourism potential and undeveloped rural areas with high scenic value were regarded as critical view zones against which the visual impact would be evaluated.

The significance of visual impact is based on the worst-case scenario. This scenario assumes that all facilities along with the associated grid infrastructure and sub-stations would be constructed at the same time. At the time of writing there was no evidence to the contrary. This assumption is also based on the nature of the visual impact and the fact that receptors would experience all facilities in the same visual envelope from their respective locations or as they travel along adjacent roads.

1.3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

The construction process would consist of the following phases:

a) Contractor site establishment,

b) Survey and pegging of tower positions,

c) Access road negotiation and construction,

d) Gate installation and vegetation clearing,

e) Foundation excavation and installation,

f) Tower assembly,

g) Conductor stringing and tensioning,

h) Servitude clean-up and rehabilitation,

i) Substation construction

1.4. AUTHORISATIONS

List of Listed Activities in Terms of the EIA Regulations

On the 22 March 2019 the Minister published GN R435 in Government Gazette No. 42323 requiring applications for EA "for substation and overhead electricity transmission and distribution infrastructure to utilize the generic Environmental Management Programme (EMPr), contemplated in Regulations 19(4), 23(4) and Appendix 4 to the EIA Regulations, 2014, as amended". The DEA's generic EMPr applicable to the development of overhead powerlines requiring EA in terms of NEMA was utilized to compile the EMPr (Appendix B), and tower specific mitigation is provided.

The NEMA EIA Regulations 2014, provide for the control of certain Listed Activities. These activities are listed in Government Notice No. R327 (Listing Notice 1 - Basic Assessment), R325 (Listing Notice 2 - Scoping & EIA Process) and R324 (Listing Notice 3 - Basic Assessment) of 7 April 2017 and are prohibited to commence until environmental authorisation has been obtained from the Competent Authority, in this case, the Department of Forestry, Fisheries and the Environment (DFFE).

The Listed Activities applicable to this proposed project are presented in **Table 4** below. All potential impacts associated with these Listed Activities will be considered and adequately assessed in this BA process.

Table 4 :**EIA listed activities.**

Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1** of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
GN R. 327 (19)	xii) The development of infrastructure or structures with a physical footprint of 100m^2 or more: Where such development occurs: (a) Within a watercourse; and (c) Within 32m of a watercourse, measured	The footprint working area for each of the tower structures to be constructed would exceed the threshold of 50m^2. Some of the tower structures will be

	from the edge of the watercourse.	constructed within a watercourse and within 32m of a watercourse. The watercourses will be impacted during the construction phase of the project and rehabilitation will be undertaken prior to the operational phase.
GN R. 327 (14)	The development 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.	Oil collection dams will be built to collect and store transformer oils in cases of spillages at the substations.
GNR 327 Listing Notice 1, 7 April 2017 Activity **28**	Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 ha.	The construction of the power lines will require the use of some land that is currently being used for agriculture, game farming and/or afforestation.
GNR 325 Listing Notice 2, 7 April 2017 Activity **9**	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	The power lines as well as the substation are infrastructures that are part of the system for the transmission of 765 kV of electricity outside of urban areas and industrial complexes.
GNR 324 Listing Notice 3,	Clearance of an area of 300 m^2 or more of indigenous vegetation except where such clearance of indigenous vegetation is required	The tower footprints will be cleared of vegetation. Some of these areas are in KwaZulu-Natal and in community

7 April 2017 Activity **12**	for maintenance purposes undertaken in accordance with a maintenance plan. In (b) KwaZulu-Natal: (ii) community conservation areas; (iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (v) Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; (vii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; (viii) A protected area identified in terms of NEMPAA, excluding conservancies; (xi) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; (xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.	conservation areas; within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; A protected area identified in terms of NEMPAA, excluding conservancies; Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; or Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.

1.5. 765 kV TOWERS

An overhead powerline consists of one or more conductors that are strung on in-line (intermediate) structures and bend (strain) structures. The structures proposed for this 765kV sub-transmission line.

Apart from the physical structure of the towers and the cables are the ancillary requirements to ensure maintenance of uninterrupted electricity transmission. These include access roads, cleared servitudes and

substations. These have greater visual intrusions in the landscape the more vegetated and hillier the terrain. This route will traverse a flat landform and therefore the extent of servitude clearance of tall vegetation is not a significant visual impact element and therefore is not addressed in detail.

Tower Parameters

- Tower spacing: 450 m (Average)
- Tower height: 45 m (Average)
- Conductor attachment height: 36 m (Average);
- Minimum ground clearance: 10.4 m

Tower Design

The following types of towers proposed to be used on this project:

- Cross rope suspension tower (preference).
- Compact cross rope suspension tower.
- Self-Supporting Towers

Cross rope suspension towers (**Figure 14**) will be used for most of the route. The tower is approximately 45 m high. The average span between towers will be 450 m.

Self-supporting strain towers (**Figure 15**) will only be used at bend points of greater than 3° along the line, and where the ground is unstable or the terrain is too steep to accommodate the cross-rope suspension structure, or where space.

The following refers to the types of towers considered for the development:

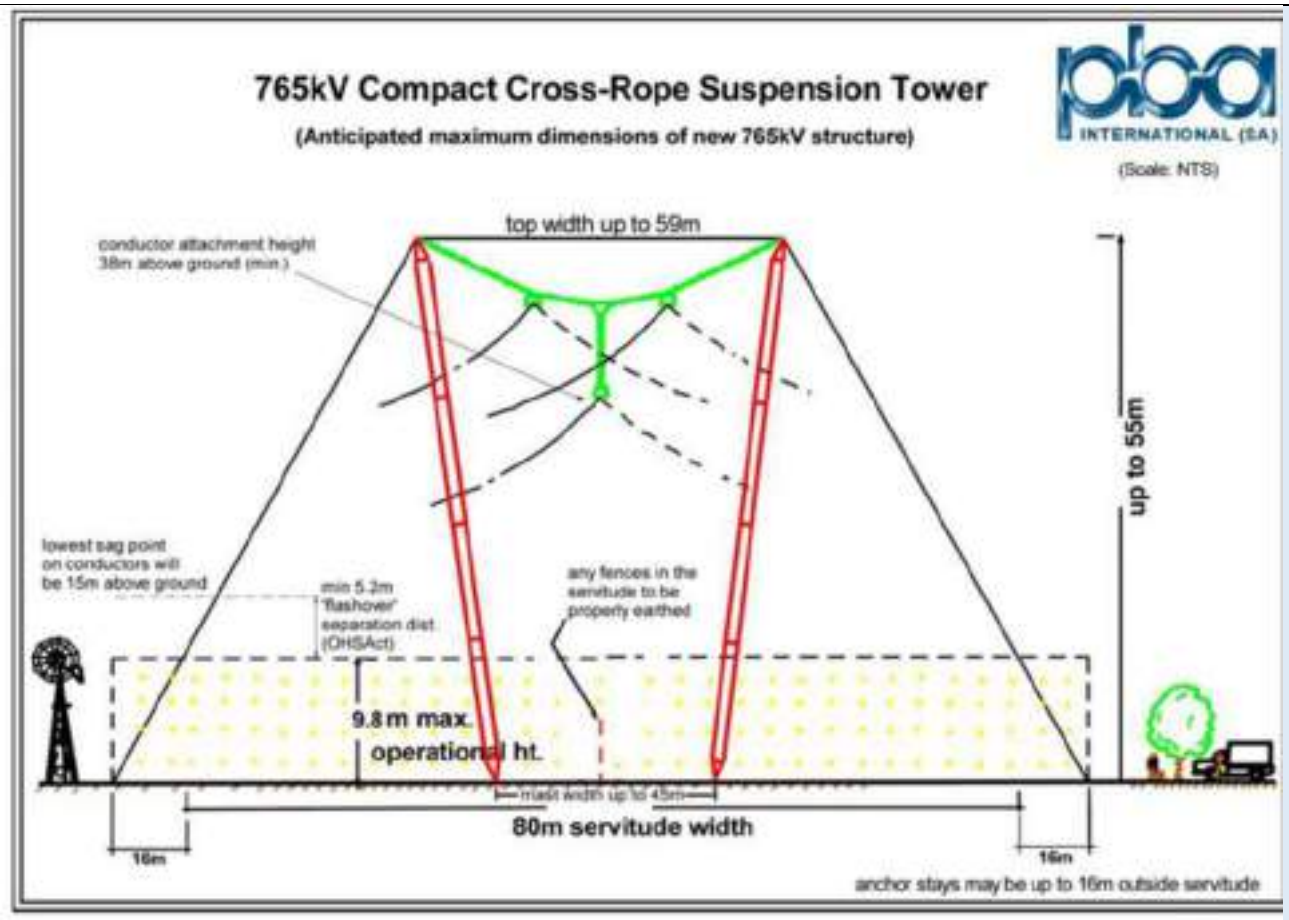

Figure 14 Compact Cross suspension tower.

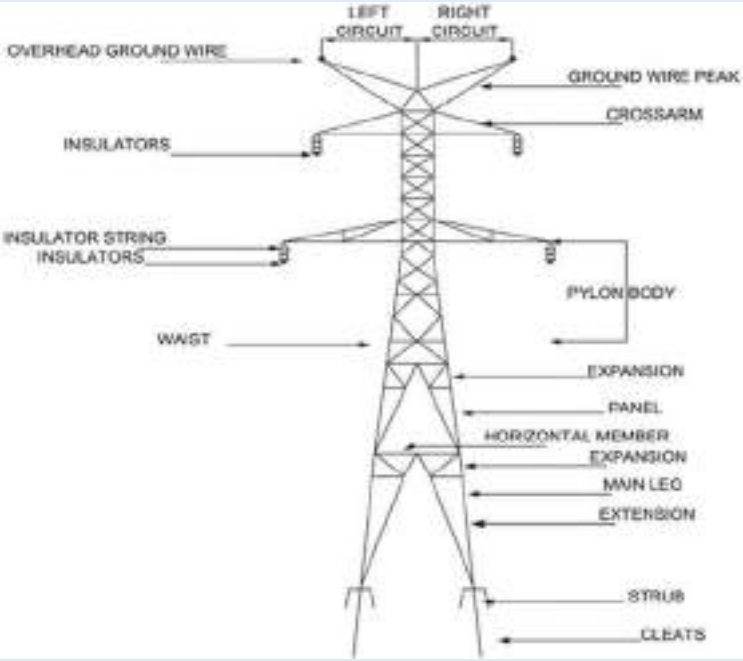

Figure 15 Strain tower design.

The Umfolozi Substation

The 400kV Umfolozi Substation is situated just northwest of Ulundi in KwaZulu-Natal (28°12' 52" S, 31°11'13" E). (**Figure 16**). When the line is energised to 400kV, another sub- station closer to Richards Bay will be identified for 400kV integration and will be extended to accommodate the 400kV integration.

Figure 16: Overview of the substation.

a) Servitude Requirements and Clearances

All trees and shrubs that cause clearance issues or may interfere with the operation and/or reliability of the transmission line, will be trimmed or completely cleared; with complete clearance only being undertaken as a last option.

Based on the 2019 EGI SEA Report (**Table 5**), Proposed powerline falls within the 220 – 765 kV where the servitude building restriction widths is 22m to 40m and the maximum vegetation clearance require clear from the centre of the power line up to the outer conductor, plus an additional 10 meters on either.

Table 5: Maximum servitude clearance distances (2019 EGI SEA Report).

Nominal Voltage	**Servitude building restriction widths3**	**Maximum Vegetation Clearance**
11 kV	9 m	4m on either side of the centre line
22 kV	11 m	4m on either side of the centre line
88 kV	11 m	5m on either side of the centre line

132 kV	15.5 m	8m on either side of the centre line
220 to 765 kV	22 m to 40 m	Clear from the centre of the power line up to the outer conductor, plus an additional 10 metres on either side.
533 kV DC	15 m	8m on either side of the centre line

A 90 m servitude (45 m on either side of the centre line) is required to accommodate the towers on which the overhead line will be strung. The servitude is required to ensure safe construction, maintenance and operation of the line, and Eskom will be entitled to unrestricted access. Where 765kV Transmission lines are constructed in parallel, a minimum separation distance of 80 m between centre points is required. The minimum vertical clearance between the line and the ground after construction is 10.4 m. The land beneath the overhead lines can continue to be used for some activities by the landowners. No dwellings or crops higher than 4 m will, however, generally be allowed in the servitude.

With the cross-rope suspension structures, anchor stays may, in some instances, be outside of the 90 m servitude.

b) Access

Access is required during both the construction and operational phases of the proposed project. The site proposed for development has largely been transformed through agricultural practices and already has gravel roads in place for these purposes. Where possible, existing access roads/tracks will be used to gain access to construction sites and the servitude. Where no access roads/tracks exist, the access points and roads will be negotiated with the relevant landowner and will be limited to single tracks as close to the servitude/within the servitude as possible. These will be established during the construction phase. Access roads will enable the transportation of construction material as well as construction teams to the site and facilitate maintenance activities during the operational phase. Where possible access routes will be rehabilitated when no longer required.

At the project area, there is an extensive network of provincial surfaced roads that form the access backbone to the study area. Secondary district gravel roads provide access to farms through which the proposed Transmission Power Lines will pass. Access roads to the proposed line may therefore only need to be constructed for short distances on private and tribal land in the south of the study area where there are no existing roads.

c) Road Crossing

Where the Transmission power line crosses a road, it will be at as close to 90° as possible. This has been taken into consideration in identifying a recommended corridor.

d) Foundations

Foundations will be mechanically excavated. Following this, a layer of concrete is cast at the bottom of the foundation. It will then be backfilled with soil / cement mixture and then compacted in layers for the setting of the foundations. In areas where access to the structure position prohibits the use of concrete mixing trucks, uphill pumping or gravity feeding of concrete up to distances of 200 m will be implemented.

Prior to erecting the structures and infilling of the foundations, the excavated foundations will be covered/fenced-off to safeguard unsuspecting animals (including livestock) and people from injury. All foundations are backfilled, stabilised through compaction, and capped with concrete at ground level.

e) Tower Earthing

Loose and corroded earth straps should be fixed to ensure the electrical integrity of the connection to the tower.

f) Insulators

Glass and porcelain have been used to insulate the conductors for many years. However, these products are heavy and susceptible to damage by vandals, as well as contamination by pollution. Composite insulators are lightweight and resistant to both vandalism and pollution.

As such, composite (Long rod type) insulators with silicone based weathershed material will be used to connect the conductors to the towers.

g) Construction Process for Transmission Lines

1. Determination of technically feasible sub-transmission line alternatives;
2. EIA input into route selection and obtaining of relevant environmental permits;
3. Selection of best-suited structures and foundations;
4. Final design of sub-transmission line and placement of towers;
5. Issuing of tenders and award of contract to construction companies;
6. Vegetation clearance and construction of access roads (if required);
7. Pegging of structures;
8. Construction of foundations;
9. Assembly and erection of structures;
10. Stringing of conductors;
11. Rehabilitation of disturbed areas and protection of erosion sensitive areas;

12. Testing and commissioning; and

13. Continued maintenance.

h) <u>Stringing Of Conductors</u>

Tension stringing gear is used to string the conductors between towers. The line is strung in sections (from bend to bend). Cable drums are placed at the beginning of the sections of the line during this stringing process. In order to minimise any potential negative impacts on the surrounding area, these cable drums will be placed within the servitude.

i) <u>On-Going Maintenance</u>

During the life span of the sub-transmission line, ongoing maintenance will be required to be performed from time to time. This maintenance work will be conducted by Eskom maintenance staff and contractors employed by Eskom, and will comply with the EMPr and EA.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;

The proposed project falls within two districts, namely the King Cetshwayo District (KCD) located in the north-eastern region of the KwaZulu-Natal province (KZN) on the eastern seaboard of South Africa and Zululand District Municipality.

The approved route falls within three local municipalities: uMhlatuze Local Municipality, Mthonjaneni Local Municipality, and Ulundi Local Municipality in the KwaZulu Natal Province. The urban areas consist of the town of City of uMhlathuze, Empangeni, Melmoth and Ulundi. Farming areas include farms (Tongaat Hullett sugar plantations in the northeastern KZN).

(b) the type of activity to be undertaken;

The construction process would consist of the following phases:

- ***Contractor site establishment:***

  The establishment of two construction camps along the route. The exact position of the construction camps will be negotiated with the relevant landowners. Strict conditions, including the approval of the location of the construction camp by the Environmental Control Officer

(ECO), as well as for the use and management of resources are set out in the Construction Environmental Management Plan Construction (EMP) and will have to be adhered to.

- ***Survey and pegging of tower positions:***

  A wide strip directly under the position of the power lines will be cleared of all vegetation for construction purposes. Any plants that could interfere with the construction, maintenance or operation of the power line, will be removed or trimmed. Once the centre line has been cleared, the tower positions will be pegged.

- ***Access road negotiation and construction:***

  Vehicle access is usually required along the entire route for construction, maintenance, and operation purposes. Existing roads will be used as far as possible, and any roads within the servitude are included in this authorisation.

- ***Gate installation and vegetation clearing***

  Gates will be installed on all fences that the line crosses. Any existing infrastructure will be maintained in its existing condition. Access points and roads will be negotiated with the relevant landowners.

  Standards to be adhered to for vegetation clearing and protected species management have been specified in the EMPr.

- ***Foundation excavation and installation***

  The type of foundation required for each tower depends on the geotechnical conditions. The minimum working area required for the erection of a self-supporting strain tower is 40 m by 40 m, and for a cross-rope suspension tower is 50 m by 50 m. bushy areas will be cleared, but grasslands will just be trampled by activities.

- ***Tower assembly***

  Foundations may be drilled, mechanically excavated, or dug by hand. No blasting will take place. Concrete is then placed.

- ***Conductor stringing and tensioning***

  The conductor is then strung between towers by first passing a guide wire through the desired position. Cable drums (containing 2.5km of cable, can be steel or wooded approximately 2.5 to 3m in size) are placed at 5km intervals in the cleared section of the servitude, and passed 2.5km in each direction (depending on the length of the conductor) during this stringing process. In

order to minimise any potential negative impacts on the surrounding area, these cable drums are placed within the servitude.

- ***Servitude clean-up and rehabilitation.***

  Any incomplete excavations will be protected to protect animals and people from injury. All foundations are backfilled and stabilized through compaction and capped with concrete at ground level. Towers are lifted into position by cranes or helicopters.

(c) the design or layout of the activity;

No site layout alternatives were considered. The proposed site layout is the most efficient and appropriate one. The design and layout of the proposed activities will be most acceptable.

(d) the technology to be used in the activity;

No alternative in terms of the technology to be used was considered

(e) the operational aspects of the activity; and

There are no alternate development types or technologies under consideration. There are no alternate operational aspects available for consideration.

Describe alternatives that are considered in this application.

Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the Department may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if realistic alternatives have not been considered to a reasonable extent.

Paragraphs 3 – 13 below should be completed for each alternative.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the Hartebeeshoek 94 WGS84 spheroid in a national or local projection.

List alternative sites, if applicable.

	Latitude (S):			Longitude (E):		
Alternative:						
Alternative S1[3] (preferred or only site alternative)	28°	12'	52"	31°	11'	13"
Alternative S2 (if any)	°	'	"	°	'	"
Alternative S3 (if any)	°	'	"	°	'	"

In the case of linear activities:

Alternative:	**Latitude (S):**			**Longitude (E):**		
Alternative S1 (preferred or only route alternative)						
• Starting point of the activity	28°	12'	52"	31°	11'	13"
• Middle/Additional point of the activity	28°	26’	43”	31°	41‘	48,12“
• End point of the activity	28°	42’	12,07"	31°	45'	33,41"
Alternative S2 (if any)						
• Starting point of the activity	°	'	"	°	'	"
• Middle/Additional point of the activity	°	'	"	°	'	"
• End point of the activity	°	'	"	°	'	"
Alternative S3 (if any)						
• Starting point of the activity	°	'	"	°	'	"
• Middle/Additional point of the activity	°	'	"	°	'	"
• End point of the activity	°	'	"	°	'	"

For route alternatives that are longer than 500m, please provide an **addendum** with co-ordinates taken every 250 meters along the route for each alternative alignment.

[3] “Alternative S..” refer to site alternatives.

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

See **Appendix D** attached.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative A1[4] (preferred activity alternative)	3 600m^2
Alternative A2 (if any)	
Alternative A3 (if any)	

or,

<u>for linear activities:</u>

	Length of the activity:
The length of the route	
Alternative:	
Alternative A1 (preferred activity alternative)	96000m
Alternative A2 (if any)	
Alternative A3 (if any)	

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

	Size of the site/servitude:
Alternative:	
Alternative A1 (preferred activity	90m

[4] "Alternative A.." refer to activity, process, technology or other alternatives.

alternative)	
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

5. SITE ACCESS

Does ready access to the site exist?	**YES - X** ■
If NO, what is the distance over which a new access road will be built	m

Describe the type of access road planned:

Existing roads will be used as far as possible and any roads within the servitude are considered to be included in this authorisation. If an access road falls outside of the servitude, authorisation from the provincial authorities will be necessary. Any additional authorisations from DWS are a condition of the EMPr and must be obtained during the implementation phase of the project. Gates will be installed on all fences that the line crosses. Any existing infrastructure will be maintained in its existing condition. Access points and roads will be negotiated with the relevant landowners.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as ***Appendix C-1*** *to this document.*

The site or route plans must indicate the following:

6.1 the scale of the plan which must be at least a scale of 1:500;

6.2 the property boundaries and numbers of all the properties within 50 meters of the site;

6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;

6.4 the exact position of each element of the application as well as any other structures on the site;

6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, streetlights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;

6.6 all trees and shrubs taller than 1.8 meters;

6.7 walls and fencing including details of the height and construction material;

6.8 servitudes indicating the purpose of the servitude;

6.9 sensitive environmental elements within 100 meters of the site or sites including (but not limited thereto):

- rivers;
- the 1:100-year flood line (where available or where it is required by Department of Water Affairs);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or invested with alien species);

6.10 for gentle slopes the 1-meter contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and

6.11 the positions from where photographs of the site were taken.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under **Appendix E** to this form**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as **Appendix F** for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

District and Local Municipalities

The proposed project falls within two districts, namely the King Cetshwayo District (KCD) located in the north-eastern region of the KwaZulu-Natal province (KZN) on the eastern seaboard of South Africa and Zululand district municipality. KCD covers an area of 8 213 square kilometres, from the agricultural town of Gingindlovu in the south, to the Umfolozi River in the north and inland to the mountainous beauty of rural Nkandla while the Zululand district municipality is approximately 14 810 km^2.

The approved route fall within four (4) Local Municipalities:

(i) uMhlatuze Local Municipality (31, 32 and 33),

(ii) Mthonjaneni Local Municipality (12 and 13),

(iii) Ulundi Local Municipality (9, 11, 13, 14, 15, 17, 20 and 24), and

(iv) Mfolozi Local Municipality (17).

. The urban areas consist of the town of City of uMhlathuze, Empangeni, Melmoth and Ulundi. Farming areas include farms (Tongaat Hullett sugar plantations in the northeastern KZN).

The proposed project and associated infrastructure are situated between the proposed new Mbewu substation near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and King Cetshwayo District Municipalities.

a) Population and Household

- Ulundi Local Municipality.

The Ulundi LM is one of five local municipalities within the administrative boundaries of Zululand District Municipality. According to the IDP (2022-2023), Ulundi LM is approximately 3,250 km^2 in extent (

Table 6). It consists of eight (8) Traditional Authority areas, which are characterised by underdevelopment and are rural in nature. The Ulundi Town is the main urban area, which services the surrounding rural settlements. Approximately 50% of the municipality consists of commercial farms and is supportive of a substantial agricultural community.

Table 6. Ulundi Demographic Profile IDP (2022-2023).

INDICATOR	ULUNDI MUNICIPAL AREA
Area	3 250 km^2
Population (2016)	205 762 people
Households	38 553
People per Household	5.1
Gender breakdown	Males 45.17 % & Females 54.83 %
Age breakdown	0 – 14 40.15 %

	15 – 64 55.21 % 65 + 4.63 %

- uMhlathuze Local Municipality.

The uMhlathuze LM is one of local municipalities within the King Cetshwayo District Municipalities. It covers 123 359 ha and incorporates Richards Bay, Empangeni, eSikhaleni, Ngwelezane, eNseleni, Felixton, Vulindlela, Bhucanana and Heatonville as well as the rural areas under Traditional Councils (Draft Fifth Generation IDP 2022/2027). The city of uMhlathuze (KZ 282) is situated on the north-east coast of the province of KwaZulu-Natal, about 180 kilometers north-east of Durban.

The 2016 Community Survey indicates that the population of uMhlathuze Municipality has increased by just over 22% between 2011 and 2016. This increase is indicated in relation to the King Cetshwayo District Family of Municipalities, as per **Table 7** and **Figure 17** below.

Table 7 Population Numbers

	KCDM	IMFOLOZI	UMHLATHUZE	UMLALAZI	MTHONJANENI	NKANDLA
2011	907519	122889	334459	213601	47818	114416
2016	971135	144363	410465	233140	78883	114284
% Growth	7,01%	17,47%	22,73%	9,15%	64,97%	-0,12%

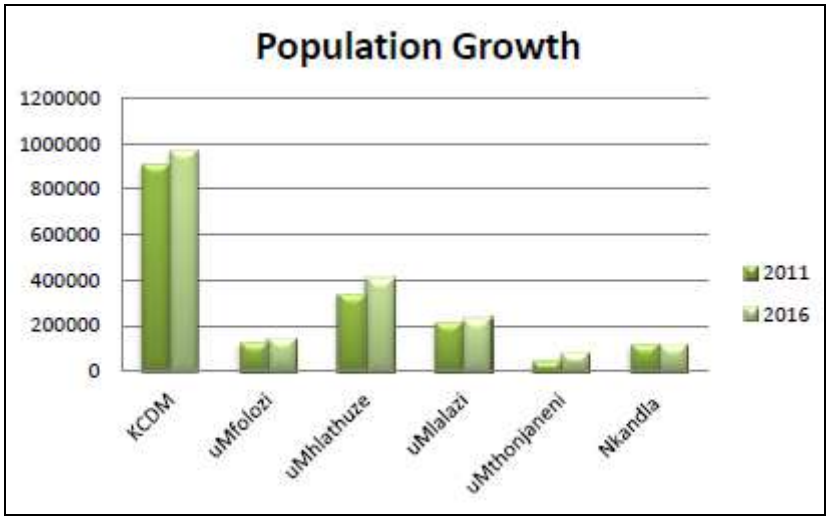

Figure 17 Population Growth ***(Source: Statistics SA, Census 2011 and Community Survey 2016).***

- **Mthonjaneni Local Municipality**

According to the latest census that was conducted in 2016 there was a total population of 83 563 people residing in municipal area of jurisdiction. According to the 2016 census there is an

increase in the total population which is a result of the wards that were inherited from Ntambanana municipality. Males constitute 45.8% with 54.2 females. This reflects that the percentage of the females is 8.4% greater than that of the males (.

Table 8: Population by gender.

	Male	Female	Total
KZN285 : Mthonjaneni	**38257**	**45306**	**83563**
52805001 : Ward 1	**3496**	**4427**	**7923**
52805002 : Ward 2	**3254**	**3607**	**6861**
52805003 : Ward 3	**2898**	**3414**	**6312**
52805004 : Ward 4	**2822**	**2948**	**5770**
52805005 : Ward 5	**2878**	**3263**	**6142**
52805006 : Ward 6	**2908**	**3483**	**6392**
52805007 : Ward 7	**3481**	**4041**	**7522**
52805008 : Ward 8	**1609**	**1963**	**3573**
52805009 : Ward 9	**3244**	**3758**	**7003**
52805010 : Ward 10	**3815**	**4693**	**8509**
52805011 : Ward 11	**2375**	**2778**	**5152**
52805012 : Ward 12	**3407**	**4439**	**7846**
52805013 : Ward 13	**2069**	**2489**	**4558**

StatSA: 2016

- **Mfolozi Local Municipality.**

According to the Community Survey, 2016, the total projected population of the municipality is 144 363. This shows an increase of 17,5% from the 2011 statistics. UMfolozi municipality is highly black dominated since out of 144 363, 143 871 are Black Africans. There are 30 470 households in the municipality. Out of these households, 5 617 of them are municipal subsidized through RDP Housing. Educationally, 51 686 of the population is educated. This shows an increase of 1.8% from the 2011 statistics.

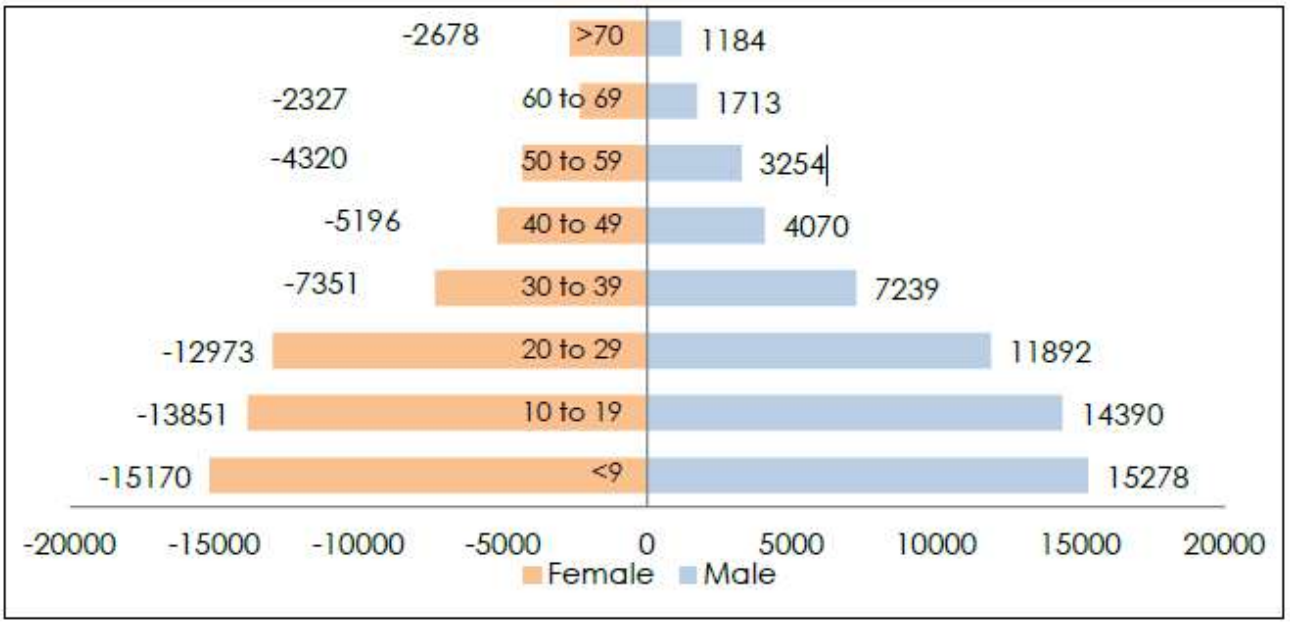

Figure 18: Population Distribution by Age (2011), Source (Community Survey, 2016).

The results of CS 2016 (**Figure 18** above) show that the population of KwaZulu-Natal is largely concentrated between the age group 15–19 years and 25–29 years, as opposed to those of Census 2011, which results showed a large proportion of the population falling within the 0–4-year and 10–14-year age groups. Both Census 2011 and CS 2016 recorded a relatively large proportion of females aged 70 years and above residing in KwaZulu-Natal.

b) Economic Profile

According to the Zululand District Municipality profile, the economy of Zululand district is driven by the tertiary sector, with community services having the highest contribution at 31%. This is attributed to the poor and rural nature of the district, and the need for social interventions. Zululand contributes of about 3% to KwaZulu Natal's Gross Value Added and has the slowest growing GVA of all district municipalities. Ulundi local municipality is the second largest economy, which can be attributed to the presence of government departments and the fact that Ulundi is the administrative seat of the Zululand district.

The King Cetshwayo District (KCD) is among the key economic role players in KZN in terms of GDP contribution. The second highest average annual growth rate is the agriculture sector averaging at 2.53% per year. The construction sector had an average annual growth rate of 0.73%, while the electricity sector had the lowest average annual growth of -0.91% (Profile: King Cetshwayo District). The agricultural sector is of a dual nature, i.e., commercial and subsistence/ traditional agriculture. The commercial agriculture is based on two main monocrops, namely sugar cane and forestry. The cane and forestry sectors have been at the forefront of assisting emerging farmers.

The 2011 statistics reflect that a large amount of people in Mthonjaneni area of jurisdiction are either unemployed or discouraged work seekers. The majority of those who are employed are low-income earners. A high percentage of the households depend on government social grants as means of poverty alleviation. There is a large labour force employed by farms around Mthonjaneni and earn very low salaries. The rate of unemployment within the municipality remains being high. In order to find employment opportunities, the economically active population has to travel to areas such as Richards Bay and Empangeni.

UMfolozi Municipality is strategically located within the N2 Corridor. It is within a close proximity to Richards Bay Port and town. The area has been identified as a growth point for the Richards Bay Industrial Development Zone (RBIDZ). This is due to availability of development and investment land within the jurisdiction of uMfolozi municipality, which is one of the key economic opportunities for this municipality. It has rich coastal forests which are rehabilitated mine areas for Richards Bay Minerals. It links into ISimangaliso Wetland Park through Nhlabane reserve.

c) Education

- Ulundi Local Municipality.

The 2016 Community Survey findings illustrate that approximately 21% of the population in Ulundi have no form of schooling, this includes persons aged 20 years above. A further 33% of the population have received primary school education. Adaptable from the findings is 16% (32 635 people) of the population that have completed secondary education that qualifies them for enrolment at technical education institutions such as FET and TVET College to receive technical education training in trading sectors such as Electrical, mechanical engineering, woodwork, plumbing and welding. The education levels in Ulundi Municipality are symptomatic of a primarily rural area and provides a serious challenge when it comes to securing employment opportunities (source, Profile: Zululand District - Final Integrated Development Plan 2022).

- uMhlathuze Local Municipality.

Education levels are provided for the 2001 and 2011 census years. A slight increase in the primary enrolment levels at national and district level, nearly 10% of children of school going age, are not attending school. Reasons being relate to access, affordability and other poverty related factors such as HIV/Aids for this (uMhlathuze Local Municipality: Draft Fifth Generation IDP 2022/2027).

- Mthonjaneni Local Municipality.

Education serves as the means to bring about the desired change in society and contribute to the development of responsible citizen of our country. Education empowers individuals to take better care of themselves and their children. It is a key to higher economic growth through higher level of skilled

society. This is why the provision of good education and educational resources remains a high priority for Mthonjaneni municipality and KCDM. The department of education in King Cetshwayo is playing a vital role in ensuring that the education is given the priority by providing necessary resources and support to enhance the culture of teaching and learning.

A small percentage of the population in the has post-matric qualifications. The rate of illiteracy still remains being very high and our schooling system has not yet effectively addressed the problem of dropouts especially at high school level. This means that there is a limited pool of skilled labour in the municipality and that basic education needs to be addressed in order to improve skills levels in the future. Basic education is considered fundamental to the future success of the local economy.

- uMfolozi Local Municipality.

UMfolozi Municipality is strategically located within the N2 Corridor. It is within a close proximity to Richards Bay Port and town. The area has been identified as a growth point for the Richards Bay Industrial Development Zone (RBIDZ). This is due to availability of development and investment land within the jurisdiction of uMfolozi municipality, which is one of the key economic opportunities for this municipality. It has rich coastal forests which are rehabilitated mine areas for Richards Bay Minerals. It links into ISimangaliso Wetland Park through Nhlabane reserve.

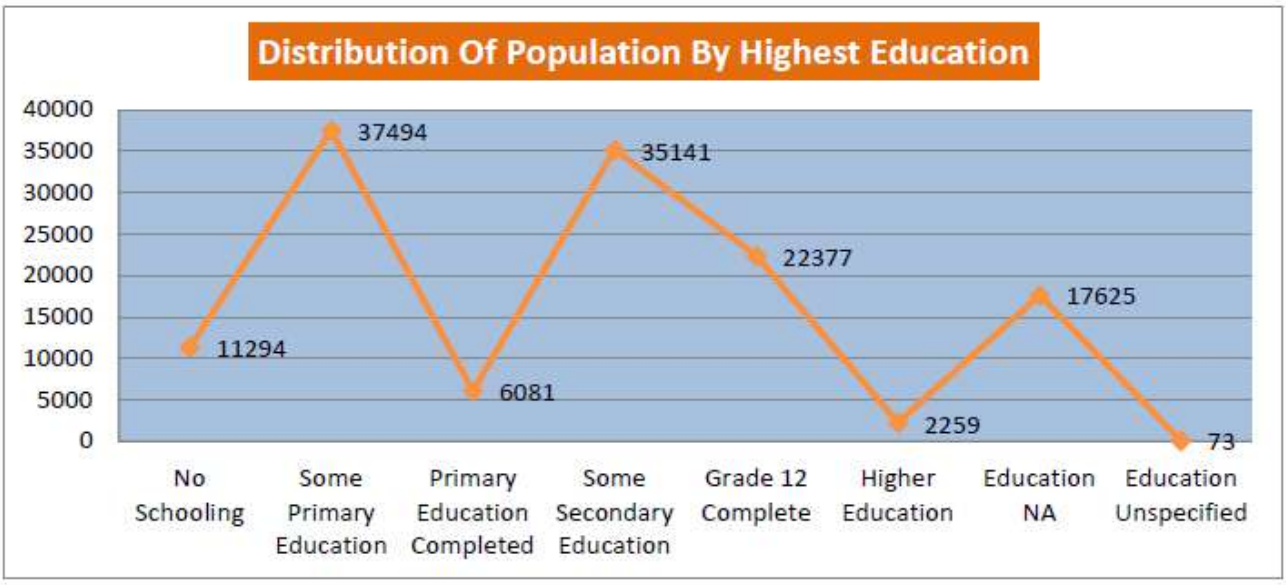

Figure 19: Education Profile

According to the UMfolozi Final 2022_23 – 2026_ 27 IDP, the above **Figure 19: Distribution of Population by Highest Education** indicates that the youth make great attempts in attending some primary education and some secondary education. However, the percentage of children who are

enrolled in some primary education is far higher than the percentage of children who complete primary education (see Graph 6: Distribution of the Population Percentage by Highest Education). This relationship seems to be common throughout graph 5 which indicates a great depreciation whenever it represents the number of people who have either completed some primary or secondary education.

d) Employment

In 2019, there were a total number of 87 400 people unemployed in KCD, which is an increase of 27 900 from 59 500 in 2009. The total number of unemployed people within the district constitutes 9.71% of the total number of unemployed people in KwaZulu-Natal Province. The district experienced an average annual increase of 3.91% in the number of unemployed people, which is worse than that of the KwaZulu-Natal Province which had an average annual increase in unemployment of 2.59% (source, Profile: King Cetshwayo District).

The municipality has the second smallest unemployment rate at 26.4% after uPhongolo at 26.1%. Nongoma (38.6%) and Ulundi (38.7%) have the highest unemployment rate, higher than the district average (31.4%) (source, Profile: Zululand District).

- Ulundi Local Municipality.

There is limited formal employment within economic sectors and general high unemployment. The Municipality has a high rate of unemployment & high dependency ratios coupled with low skill levels. This leads to poverty and underdevelopment. In terms of average household income, most of the population either has no form of income or earns less than R38 500 annually highlighting the significant importance of growing employment in the municipality (Ulundi Local Municipality, Final IDP 2022-2023). In terms of skills in the locality, the skills breakdown of the total employed individuals in Ulundi is as follows: 32 percent were considered skilled, whilst 45 percent were considered semi-skilled, and 23 percent considered low skilled in 2019 (Ulundi Municipality, 2020).

- uMhlathuze Local Municipality.

The below **Figure 20** and **Figure 21** shows the percentage of persons in the respective municipal wards that are employed and unemployed. The highest percentage employment is in Ward 1, 2, 3, 9, 23 and 29. These wards largely correlate with the developed urban areas of Richards Bay and Empangeni. Unemployment levels seem to be highest (as a percentage) in Wards 6, 19 and 22.

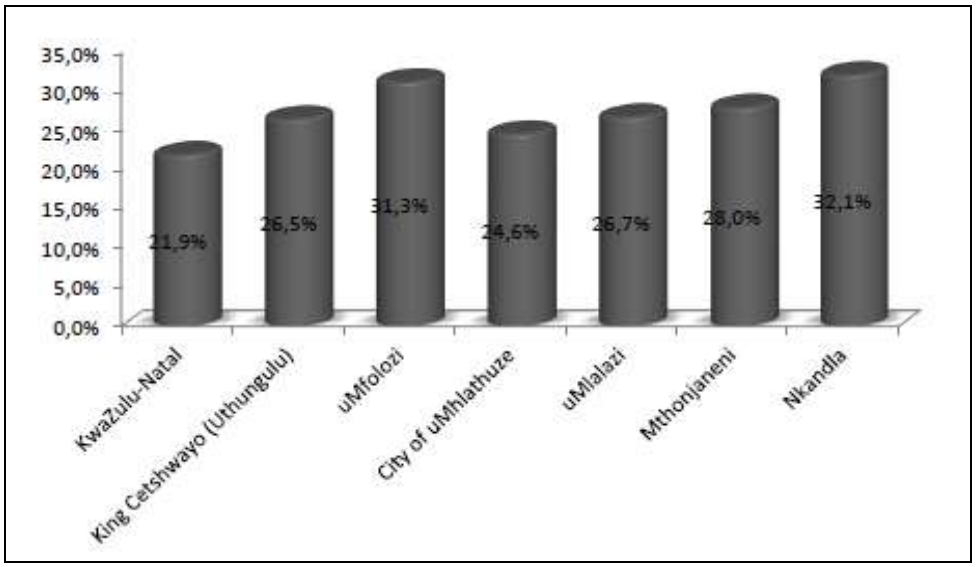

Figure 20: Total Employment within KwaZulu Natal *(Source: Global Insights 2017).*

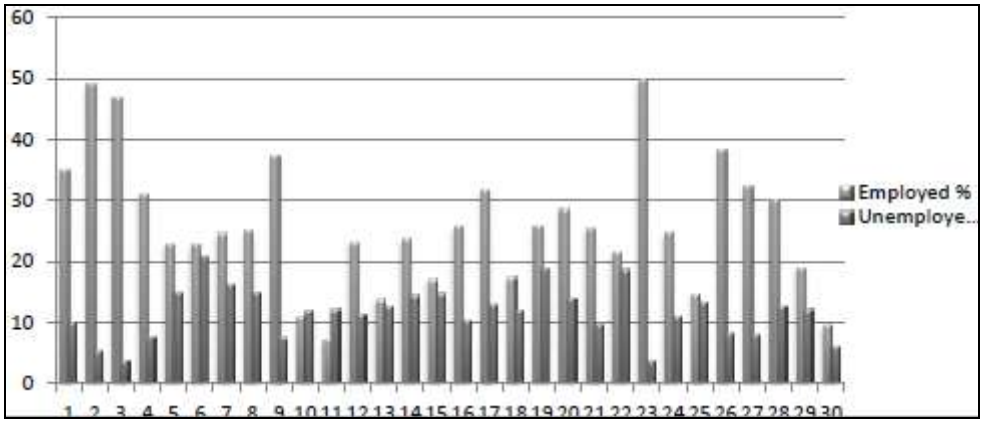

Figure 21: Percentage Employment per Ward *(Source: Statistics SA, (Census 2011)).*

- Mthonjaneni Local Municipality.

The 2011 statistics reflect that a large amount of people in Mthonjaneni area of jurisdiction are either unemployed or discouraged work seekers. The majority of those who are employed are low income earners. A high percentage of the households depend on government social grants as means of poverty alleviation. There is a large labour force employed by farms around Mthonjaneni and earn very low salaries.

The table below shows the number of persons in the respective municipal wards that are employed and unemployed.

Table 9: Employment statistics

	Employed	Unemployed	Discouraged work-seeker	Other not economically active	Not applicable	Total
Mthonjaneni	9639	4771	4364	27311	37477	83563
Ward 1	370	574	477	2470	4032	7923
Ward 2	2227	715	260	1464	2196	6861
Ward 3	1968	268	203	1488	2385	6312
Ward 4	1995	204	266	1239	2067	5770
Ward 5	288	247	324	2381	2902	6142
Ward 6	225	644	299	2129	3095	6392
Ward 7	432	153	378	2982	3577	7522
Ward 8	290	400	185	1038	1660	3573
Ward 9	495	180	251	2782	3295	7003
Ward 10	534	296	698	2949	4032	8509
Ward 11	277	425	113	2015	2323	5152
Ward 12	291	370	604	2873	3708	7846
Ward 13	247	295	307	1502	2206	4558

According to the 2020/2021 Financial Year Final Reviewed IDP, the rate of unemployment within the municipality remains being high. In order to find employment opportunities, the economically active population has to travel to areas such as Richards Bay and Empangeni.

- uMfolozi Local Municipality.

The graph below depicts the annual household income for uMfolozi Municipality. It appears the majority of the households is earning between the R9600-R19600 bracket. The graph depreciates after R19600 to indicate that only a few households earn anything above the aforementioned price.

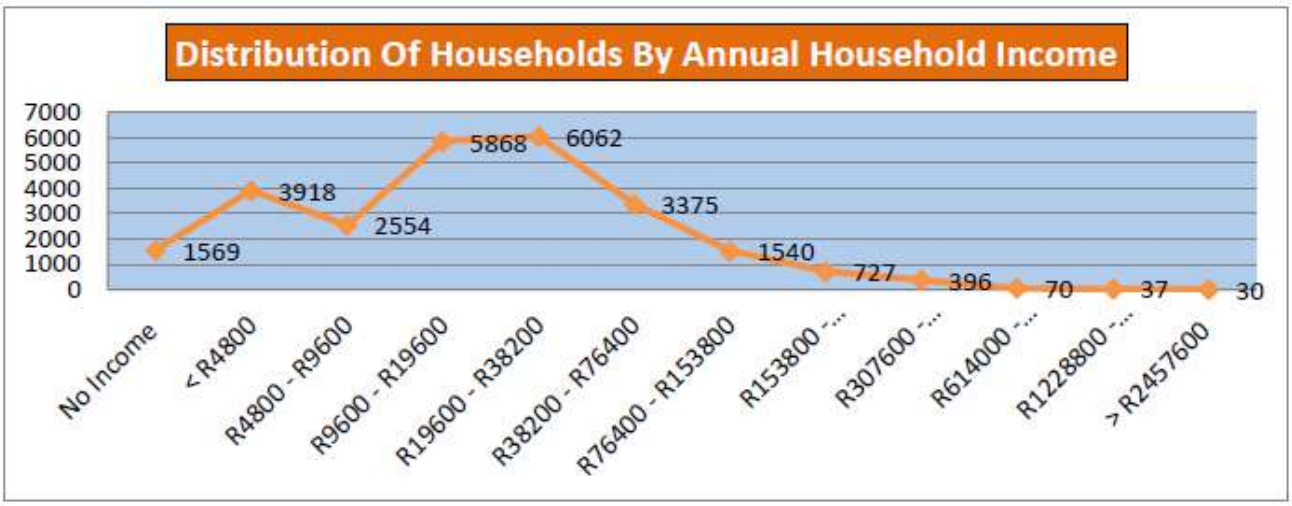

Figure 22: Income Profile uMfolozi Municipality

The above graph (Figure 22) indicates that most of uMfolozi municipal households earn between **R4 800, 00 and R9 600, 00.** Given a raise on the tax percentage, this remains a meager income level.

e) Access to Basic Services

- Ulundi Local Municipality

According to the Profile: Zululand District - Final Integrated Development Plan (June 2022), there was a significantly dramatic increase in the supply of piped water in 2016, as 25 822 households had access to piped water. The most common sanitation facility used in the municipality is the pit latrine (both ventilated and unventilated), which is used by 64,18% of the population, followed by the chemical toilet (15,93%) and the flush toilet (9,86) respectively. Between 1996 and 2001 and between 2011 and 2016 there has been a significant increase in the number of households who had their own or a communal refuse dump.

- uMhlathuze Local Municipality.

According to Community Survey, 2016 about 89% of households in uMhlathuze obtain water from the uMhlathuze Municipality.

The City of uMhlathuze has no electricity backlogs in its area of supply. The total backlogs of 6429 exist in the areas within the municipality which are directly serviced by Eskom (Draft IDP- Fifth Generation – March 2022). There has been a marginal increase in the EMpangeni areas and smaller areas such as Ngwelezane and Nseleni. The total length of the paved network is 560.4km (553.8km tar, 0.4km block paving and 6.2km concrete pavements) with an estimated replacement value of R1.85 billion. The average condition of the network can be rated as fair to poor, with 16% of the surfacing and 12% of the structure in the poor to very poor category.

- Mthonjaneni Local Municipality.

The table 10 below accounts for backlogs that have been recorded by Statistic South Africa (Stats SA) in 2011, when the census survey was conducted.

Table 10: Showing service delivery status (Source: Census 2011).

Municipality	No. of HHs	Piped (tap) water inside dwelling unit or yard or on community standpipe			HHs unserved	Pit latrine or higher LoS (pit, flush or chemical)			HHs unserved	Electricty (household connection)			HHs unserved
		HHs served	% served	% unserved		HHs served	% served	% unserved		HHs served	% served	% unserved	
Mfolozi	25 584	21 242	83.0	17.0%	4 342	21 228	83.0	17.0%	4 356	21 788	85.2	14.8%	3 796
uMhlathuze	86 609	83 974	97.0	3.0%	2 635	83 507	96.4	3.6%	3 102	85 195	98.4	1.6%	1 414
Ntambanana	12 826	8 682	67.7	32.3%	4 144	9 030	70.4	29.6%	3 796	8 105	63.2	36.8%	4 721
Umlalazi	45 062	33 044	73.3	26.7%	12 018	31 949	70.9	29.1%	13 113	28 025	62.2	37.8%	17 037
Mthonjaneni	10 433	7 358	70.5	29.5%	3 075	9 475	90.8	9.2%	958	8 185	78.5	21.5%	2 248
Nkandla	22 463	14 811	65.9	34.1%	7 652	18 308	81.5	18.5%	4 155	10 302	45.9	54.1%	12 161
Uthungulu District	202 977	169 111	83.3	16.7%	33 866	173 497	85.5	14.5%	29 480	161 600	79.6	20.4%	41 377

- Mfolozi Local Municipality.

UMfolozi local municipality is not a Water Service Authority. Water and sanitation provision are part of the competencies of the King Cetshwayo District Municipality (KCDM) and uMfolozi local municipality forms part of its family municipalities. According to the 2011 census, there has been an increase in the number of households with water inside their yards and well as access to communal stands.

There are 400 Household to benefit from electrification (Ward 1,4,5,7,9,14,16,17) in the current financial year 2020/21. uMfolozi Municipality receives funding form the Department of Energy so that it becomes able to provide electricity. The department signed a memorandum of agreement with the Municipality, which is for a duration of 3 years to connect an average of 250 houses per annum (Figure 23).

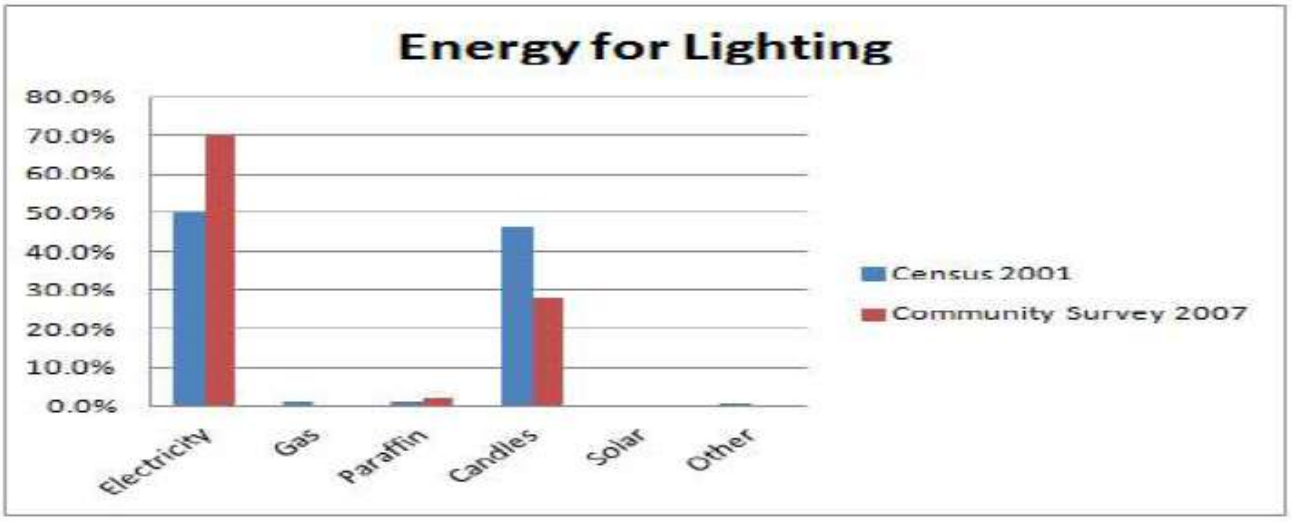

Figure 23: Energy usage for Lighting

9(b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	~R1.3 billion	
What is the expected yearly income that will be generated by or as a result of the activity?	~R190 million	
Will the activity contribute to service infrastructure?	YES - X	[redacted]
Is the activity a public amenity?	YES - X	[redacted]
How many new employment opportunities will be created in the development phase of the activity?	To be confirmed	
What is the expected value of the employment opportunities during the development phase?	To be confirmed	
What percentage of this will accrue to previously disadvantaged individuals?	80%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	None	
What is the expected current value of the employment opportunities during the first 10 years?	R0	
What percentage of this will accrue to previously disadvantaged individuals?	00%	

9(b) Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

NEED:			
i.	Was the relevant municipality involved in the application?	YES - X	[redacted]
ii.	Does the proposed land use fall within the municipal Integrated Development Plan?	YES - X	[redacted]
iii.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:		
	[redacted]		

DESIRABILITY:			
i.	Does the proposed land use / development fit the surrounding area?	YES - X	[redacted]
ii.	Does the proposed land use / development conform to the relevant structure plans, Spatial development Framework, Land Use Management Scheme, and planning visions for the area?	YES - X	[redacted]
iii.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES - X	[redacted]
iv.	If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:		
	[redacted]		
v.	Will the proposed land use / development impact on the sense of place?	YES - X	[redacted]
vi.	Will the proposed land use / development set a precedent?	YES - X	[redacted]
vii.	Will any person's rights be affected by the proposed land use / development?	YES - X	[redacted]
viii.	Will the proposed land use / development compromise the "urban edge"?	[redacted]	NO
ix.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.		
	Eskom is mandated by the Government of the Republic of South Africa to supply sufficient and reliable electricity required for sustainable developments and the future growth of the country's economy. The project will enhance the security of the power supply to the KwaZulu Natal Province. This project will have a positive impact on the local network. With the installation of this project, over time, Eskom's ability to provide efficient and reliable service to its customers and its capability to support future developments in the area will be enhanced. The project was authorised in August 2011, and its Environmental Authorisation (EA) was extended for four (4) years in August 2015 and once again in 2019 for a further two years, until August 2021.		

BENEFITS:			
i.	Will the land use / development have any benefits for society in general?	YES - X	
ii.	Explain:		
	The project will result in employment opportunities, including temporary opportunities for unskilled individuals from local communities. There will also likely be an injection into the local and regional economies, benefitting businesses and SMMEs. Due to Eskom safety standards and servitude requirements, relocation of houses and other assets may be necessary. Employment opportunities, electricity for a growing KZN economy and a monetary injection into the area (as a result of the construction and purchasing of the servitude areas) by Eskom will result in positive economic impacts in the region. However, negative economic impacts may include limited loss of productive farmland and a potential loss in yield as result of the power lines and servitude zones.		
iii.	Will the land use / development have any benefits for the local communities where it will be located?	YES - X	
iv.	Explain:		
	Numerous socio-economic benefits would apply such as the creation of employment opportunities for local people during construction and operational phases. The contractors are likely to utilise existing, skilled staff. However, should the need for unskilled, short-term labour arise, these workers would, most likely, be sourced from the local community. The construction phase will provide job security for the existing employees of the appointed contracting company. The informal vendors will benefit as this development. The large number of project staff required provides ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the construction site. The project will result in employment opportunities, including temporary opportunities for unskilled individuals from local communities. There will also likely be an injection into the local		

	and regional economies, benefitting businesses and SMMEs.

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

The following legislation will guide this assessment process:

a) The South African Constitution (Act 108 of 1996);

This is the supreme law of the land. As a result, all laws, including those pertaining to the proposed development, must conform to the Constitution. The Bill of Rights - Chapter 2 of the Constitution, includes an environmental right (Section 24) according to which, "*everyone has the right* –

(a) To an environment that is not harmful to their health or well-being; and

(b) To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that–

(i) Prevent pollution and ecological degradation.

(ii) Promote conservation; and

(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.".

b) National Environmental Management Act (Act 107 of 1998);

The National Environmental Management Act (No.107 of 1998) (NEMA) provides for the basis for environmental governance in South Africa by establishing principles and institutions for decision-making on matters affecting the environment.

A key aspect of NEMA is that it provides a set of environmental management principles that apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. Section 2 of NEMA contains principles (see Table 4-2) relevant to the proposed project, and likely to be utilised in the process of decision making by DEA.

As these principles are utilised as a guideline by the Competent Authority in ensuring the protection of the environment, the proposed development should, where possible, be in accordance with these principles. Where this is not possible, deviation from these principles would have to be very strongly motivated.

NEMA introduces the duty of care concept, which is based on the policy of strict liability. This duty of care extends to the prevention, control and rehabilitation of significant pollution and environmental degradation. It also dictates a duty of care to address emergency incidents of pollution. A failure to

perform this duty of care may lead to criminal prosecution and may lead to the prosecution of managers or directors of companies for the conduct of the legal persons. Employees who refuse to perform environmentally hazardous work, or whistle blowers, are protected in terms of NEMA.

In addition, NEMA introduces a new framework for environmental impact assessments, the EIA Regulations (2014 and subsequent 2017 amendments), which aims to avoid detrimental environmental impacts through the regulation of specific activities that cannot commence without prior environmental authorisation (discussed in Section 4.1).

c) Subdivision of Agricultural Land Act (No. 70 of 1970)

The Subdivision of Agricultural Land Act (No. 70 of 1970) controls the subdivision of all agricultural land in South Africa and prohibits certain actions relating to agricultural land. In terms of the Act, the owner of agricultural land is required to obtain consent from the Minister of Agriculture, Forestry and Fisheries in order to subdivide agricultural land.

d) National Environmental Management: Biodiversity Act (Act No. 10 of 2004);

The National Environment Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) provides for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection.

The objectives of NEM:BA are:

(a) *Within the framework of the National Environmental Management Act, to provide for—*
    (i) *The management and conservation of biological diversity within the Republic and of the components of such biological diversity;*
    (ii) *The use of indigenous biological resources in a sustainable manner; and*
    (iii) *The fair and equitable sharing among stakeholders of benefits arising from bioprospecting involving indigenous biological resources;*
(b) *To give effect to' ratified international agreements relating to biodiversity which are binding on the Republic;*
(c) *To provide for co-operative governance in biodiversity management and conservation; and*
(d) *To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.*

The Act provides for the management and conservation of South Africa's biodiversity within the framework of the NEM:BA. In terms of the Biodiversity Act, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (including The Endangered and Threatened Ecosystem Regulations, Government Notice R. 1002 dated 9th December 2011).
- Application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

e) National Water Act (Act 36 of 1998);

The National Water Act (NWA) provides for fundamental reform of the law relating to water resources in South Africa.

The purpose of the Act is "*to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors*–

(a) Meeting the basic human needs of present and future generations;
(b) Promoting equitable access to water;
(c) Redressing the results of past racial and gender discrimination;
(d) Promoting the efficient, sustainable and beneficial use of water in the public interest;
(e) Facilitating social and economic development;
(f) Providing for growing demand for water use;
(g) Protecting aquatic and associated ecosystems and their biological diversity;
(h) Reducing and preventing pollution and degradation of water resources;
(i) Meeting international obligations;
(j) Promoting dam safety;
(k) Managing floods and droughts."

Section 21 of the NWA describes activities defined as a water use under the Act. These activities may only be undertaken subject to the application for, and issue of, a Water Use License (WUL) or General Authorisation (GA). Water use activities include—

(a) Taking water from a water resource;
(b) Storing water;
(c) Impeding or diverting the flow of water in a watercourse;
(d) Engaging in a stream flow reduction activity contemplated in section 36;
(e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

(f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;

(g) Disposing of waste in a manner which may detrimentally impact on a water resource;

(h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

(i) Altering the bed, banks, course or characteristics of a watercourse;

(j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

(k) Using water for recreational purposes."

f) The National Heritage Resources Act (Act No. 25 of 1999);

The National Heritage Resources Act protects archaeological and palaeontological sites and materials, as well as graves/cemeteries, battlefield sites and buildings, structures and features over 60 years old. The South African Heritage Resources Agency (SAHRA) administers this legislation nationally, with Heritage Resources Agencies acting at provincial level.

According to the Act (Section 35), it is an offence to destroy, damage, excavate, alter or remove from its original place, or collect, any archaeological, palaeontological and historical material or object, without a permit issued by the South African Heritage Resources Agency (SAHRA) or applicable Provincial Heritage Resources Agency, viz. Heritage Western Cape (HWC). Notification of SAHRA or the applicable Provincial Heritage Resources Agency is required for proposed developments exceeding certain dimensions (Section 38(1)).

g) Conservation of Agricultural Resources Act (Act No. 43 of 1983);

The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) is the main statute that deals with agricultural resource conservation.

The objectives of the Act are to provide for the conservation of the natural agricultural resources of South Africa by the maintenance of the production potential of land. In order to maintain production potential of land, CARA provides for the following mechanisms; namely:

- Combating and prevention of erosion and weakening and destruction of water sources.
- Protection of vegetation.

Combating of weeds and invader plants

CARA Regulations

In order to give meaning to mechanisms aimed at maintaining production potential of land provided for in CARA, the Minister of Agriculture published regulations under CARA (CARA Regulations) which

prescribes control measures which all land users have to comply with, in respect of a number of matters, including the:

- Cultivation of virgin soil.
- Protection of cultivated land.
- Utilisation and protection of the veld.
- Control of weed and invader plants.
- Prevention and control of veld fires and the restoration and reclamation of eroded land.

Regulations 15 and 16 under this Act, which relate problem plants, were amended in March 2001. The Act provides a list of declared weeds and invader plants as well as indicators of bush encroachment. In terms of weeds and invader plants:

- A land user shall control any category 1 plants that occur on any land or inland water surface;
- No person shall, except for the purposes of a biological control reserve:
  - Establish, plant, maintain, multiply or propagate weeds and invader plants;
  - Import or sell propagating material of category weeds and invader plants; and
  - Acquire propagating material of weeds and invader plants.

These lists include:

- Combating of category 1 plants (Section 15A) according to CARA (Act No 43 of 1983); and
- Combating of category 2 plants (Section 15B) according to CARA (Act No 43 of 1983)

h) Occupational Health and Safety Act (Act No. 85 of 1993);

The objective of this Act is to provide for the health and safety of persons at work. In addition, the Act requires that, "as far as reasonably practicable, employers must ensure that their activities do not expose non-employees to health hazards". The importance of the Act lies in its numerous regulations, many of which will be relevant to the proposed project. These cover, among other issues, noise and lighting.

i) Electricity Regulation Act (Act 4 of 2006);

The Electricity Regulation Act (Act No. 4 of 2006) came into effect on 1 August 2006 and the objectives of this Act are to:

- Facilitate universal access to electricity.
- Promote the use of diverse energy sources and energy efficiencies.
- Promote competitiveness and customer and end user choice.

OTHERS

Water Services Act 7 (Act 108 of 1997);

National Road Traffic Act (Act No. 83 of 1996);

National Environmental Management: Waste Act (Act No. 59 of 2008).

National Forest Act (Act 84 of 1998).

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES - X ■
If yes, what estimated quantity will be produced per month?	10 m^3

How will the construction solid waste be disposed of (describe)?

All solid waste produced during the construction phases will be transported by means of truck and will be stored temporarily in scavenger and weatherproof containers until removed to an appropriately registered landfill site in close proximity to the construction site.

Where will the construction solid waste be disposed of (describe)?

The rubble that is generated by means of building activities must be crushed and re-utilised as aggregate and binding material during soil rehabilitation. General wastes will be directed to the nearest landfill near the construction site. Hazardous wastes will be directed to the licensed Landfill site.

Will the activity produce solid waste during its operational phase?	YES - X ■
If yes, what estimated quantity will be produced per month?	This amount would fluctuate.

How will the solid waste be disposed of (describe)?

All solid waste will be removed by truck to landfill sites that has been approved within the close proximity construction site. Waste generated on site will feed into the Municipal waste stream.

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

If solid waste generated during the activities done not enter the municipality waste streams, it will typically be disposed of at a construction and demolition (C&D) waste management facility. All the construction companies will be enforced to follow proper waste management practices and ensure that all waste is disposed of in a responsible manner; to help in minimizing environmental impacts and ensure compliance with local regulations.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the department to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	NO - X

If yes, inform the department and request a change to an application for scoping and EIA.

N/A

Is the activity that is being applied for a solid waste handling or treatment facility?	NO - X

If yes, then the applicant should consult with the Department to determine whether it is necessary to change to an application for scoping and EIA.

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	NO - X
If yes, what estimated quantity will be produced per month?	m^3
Will the activity produce any effluent that will be treated and/or disposed of on site?	NO - X

If yes, the applicant should consult with the Department to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	NO - X

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of wastewater, if any:

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?		NO - X
If yes, is it controlled by any legislation of any sphere of government?		NO - X

If yes, the applicant should consult with the Competent Authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

Dust and vehicle emissions will be released into the atmosphere during the construction phase. Construction activities such as excavation and grading carried out by construction vehicles and machinery will result in the production of dust. Although dust produced during these processes settles quickly, dust suppressants such as watering will be used. Dust amelioration measures, such as temporary halting of dust generating construction activities during periods of high wind will be implemented.

Ultimately, given the relatively small scale of the proposed development, the dust emissions will be of low concentration and predicted to be insignificant should appropriate mitigation measures be employed in the implementation of the Environmental Management Programme (EMPr), (**Appendix F**).

11(d) Generation of noise

Will the activity generate noise?	YES - X [redacted]
If yes, is it controlled by any legislation of any sphere of government?	YES - X [redacted]

If yes, the applicant should consult with the Competent Authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

Limited noise will be generated by construction vehicles and machinery during construction. There will be noise generated from vehicles utilizing the facility during the operational phase. The amount of noise generated at the site during the construction and operational phases is considered to be negligible and is not expected to exceed the existing ambient noise levels in the area.

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

Municipal The preferred option. - X	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate

the volume that will be extracted per month (**for construction**):	±10 000.00 Kℓ
Does the activity require a water use permit from the Department of Water Affairs?	YES - X [redacted]

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

As part of the KZN 400 kV Strengthening - Empangeni Integration Eskom have proposed to undertake the construct of a 765 kV transmission line between the proposed new sub-station (the so-called Mbewu substation) near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and uThungulu District Municipality.

This development aims at strengthening of the power corridor entail phased construction of 765kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that, in-order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 765kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Eskom is mandated by the Government of the Republic of South Africa to supply sufficient and reliable electricity required for sustainable developments and the future growth of the country's economy. The project will enhance the security of the power supply to the KwaZulu Natal Province. This project will have a positive impact on the local network. With the installation of this project, over time, Eskom's ability to provide efficient and reliable service to its customers and its capability to support future developments in the area will be enhanced.

4.2 SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g., A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section?

YES - X	

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:

All specialist reports must be contained in Appendix D.

Property description/physical address:

The transmission line, the substation and LILO are going to be located in the Umfolozi Local Municipality, Ulundi Local Municipality and uMhlathuze Local Municipality within the King Cetshwayo District Municipality, and Zululand District Municipality of KwaZulu Natal, South Africa.

(Farm name, portion etc.) Where many properties are involved (e.g., linear activities), please attach a full list to this application.

Province	KwaZulu Natal
District Municipality	the King Cetshwayo District Municipality Zululand District Municipality
Local Municipality	Umfolozi Local Municipality Ulundi Local Municipality uMhlathuze Local Municipality Mthonjaneni Local Municipality
Farm name and number	Refer to **Table 1**
Portion number	Refer to **Table 1**
SG Code	Refer to **Table 1**

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use zoning:

Forest, agriculture and settlements

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

	NO - X

Must a building plan be submitted to the local authority?	YES - X	■

Locality map: An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:300 000. For linear activities of more than 25 kilometres, a smaller scale e.g., 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline		2.6 Plain	X
2.2 Plateau		2.7 Undulating plain / low hills	**X**
2.3 Side slope of hill/mountain	X	2.8 Dune	
2.4 Closed valley		2.9 Seafront	
2.5 Open valley			

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		**Alternative S2 (if any):**		**Alternative S3 (if any):**	
Shallow water table (less than 1.5m deep)	[redacted]	NO -X	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	[redacted]	NO - X	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	[redacted]	NO - X	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	[redacted]	NO - X	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	[redacted]	NO - X	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	[redacted]	NO - X	YES	NO	YES	NO
Any other unstable soil or geological feature	[redacted]	NO - X	YES	NO	YES	NO
An area sensitive to erosion	YES - X	[redacted]	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcovers present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area	X	5.22 School	
5.2 Low density residential	X	5.23 Tertiary education facility	
5.3 Medium density residential		5.24 Church	
5.4 High density residential		5.25 Old age home	
5.5 Medium industrial [AN]		5.26 Museum	
5.6 Office/consulting room		5.27 Historical building	
5.7 Military or police base/station/compound		5.28 Protected Area	X
5.8 Spoil heap or slimes dam [A]		5.29 Sewage treatment plant [A]	
5.9 Light industrial		5.30 Train station or shunting yard [N]	
5.10 Heavy industrial [AN]		5.31 Railway line [N]	
5.11 Power station		5.32 Major Road (4 lanes or more)	

5.12 Sport facilities		5.33 Airport [N]	
5.13 Golf course		5.34 Harbour	
5.14 Polo fields		5.35 Quarry, sand or borrow pit	
5.15 Filling station [H]		5.36 Hospital/medical centre	
5.16 Landfill or waste treatment site		5.37 River, stream or wetland	X
5.17 Plantation	X	5.38 Nature conservation area	X
5.18 Agriculture	X	5.39 Mountain, koppie or ridge	
5.19 Archaeological site		5.40 Graveyard	
5.20 Quarry, sand or borrow pit		5.41 River, stream or wetland	
5.21 Dam or Reservoir		5.42 Other land uses (describe)	

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity?

N/A

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity?

If YES, specify and explain:	
If NO, specify:	

If any of the boxes marked with an "[H]" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	
If NO, specify:	

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including	[redacted]	NO - X
Archaeological or palaeontological sites, on or close (within 20m) to the site?	No - X	

If YES, explain:	

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:	[redacted]
Will any building or structure older than 60 years be affected in any way?	YES - X
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES - X

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

4.3 SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

Publication name	Zululand Observer, The Star & Pretoria News and Ilanga newspaper	
Date published	24/03/2023 &27/03/2023	
Site notice position	**Latitude**	**Longitude**
	28°18'1''S	31° 25'40''E
	28°17'53''S	31° 24'59''E
	28°17'56''S	31°25'22''E
	28° 42'36''S	31° 45'13''E
	28° 41'40''S	31° 50'52''E
	28°36''18''S	31° 44'36''E
	28°40'15'' S	31° 47' 16''E
	28° 43' 51''S	31° 49'35'' E
	28° 44' 40'' S	31° 53' 26'' E
	28° 52'' 6'' S	31° 54' 33''E
	28°39' 12'' S	31° 52' 49'' E
	28° 39' 12''S	31° 52' 49''E
	28° 27' 49'' S	31° 42' 27'' E

	28° 18' 49'' S 28° 35' 17'' S 28° 20' 18'' S 28° 33' 45'' S 28° 12'55''S 28° 12' 35" S	31° 31' 20'' E 31° 23'55'' E 31° 36' 15'' E 31° 39'17'' E 31° 11' 20" E 31° 09' 55'' E
Date placed	27/03/2023	

Include proof of the placement of the relevant advertisements and notices in **Appendix I**.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Title, Name and Surname	**Affiliation/ key stakeholder status**	**Contact details (Tel number or e-mail address)**
Becker Elize	Amafa AkwaZulu Natal	amafa.pmb2@mweb.co.za
Baytopp Philip	Dept. of Health	Phillip.Baytopp@kznhealth.gov.za
Blackmore Andy	Ezemvelo KZN Wildlife	andyb@kznwildlife.com
Burchmore Chris	Mondi Bp	Chris.Burchmore@mondibp.com
Bengani Thokozani	Eskom Distribution	amafa.pmb2@mweb.co.za
Bezuidenhout Koos	Ulundi Municipality	jabezuidenhout@ulundi.co.za
Biyela M N	Mthonjaneni Local Municipality	076 9128668
	Umflozi local Municipality	
Madden R C	UMhlathuze Local Municipality	madden@richemp.org.za
Na Boejie Willie	National Electricity Regulator	johanbodenstein@absamail.co.za
Brenchley Pat G	SA Sugarcane Research Institute	pat.brenchley@sugar.org.za
Denton Andrew	R.B.M	andrew.denton@rbm.co.za

Dixon-PaverHugh	DWAF	hughdp@dwaf.gov.za
Fortman Tom	SASRI	tom.fortmann@ugar.org.za
Grobbelaar Lené	Department of Environmental Affairs	LGrobbelaar@deat.gov.za
Nel C	Zululand District Municipality	cnel@zululand.org.za
Lynsky Rory	SA Sugar	rory_lynsky@sasa.org.za
Mahadeo Pool	Eskom	Pool.Mahadeo@eskom.co.za
Dr Wurz Sarah Dr	SAHRA	swurz@sahra.org.za
Mrs Wloschowsky Elsa	BHP Billiton	Elsa.Wloschowsky@bhpbilliton.com
Mr Willis-Smith Gerald	KZN Dept. of Agriculture & Environmental Affairs	smithg@uld.kzntl.gov.za
Walters D	WWF: Mondi Wetlands	walters@wetlands.org.za
Tinus Nomaswazi	MTN -Innovation Centre	tinus_n@mtn.co.za
Mrs Thompson Averyll	City of uMhlathuze	Athomson@richemp.org.za
Thambu Dinesree	Ezemvelo KZN Wildlife	thambud@kznwildlife.com
Ms Swart Elize	Department of Minerals and Energy	012 3178000
Steytler Tom	Ticor South Africa	tom.steytler@gmail.com
City of uMhlathuze	Smit Hennie	hsmit@richemp.org.za
Mr Purdon Neil	Eskom Transmission	Neil.Purdon@eskom.co.za
Punchum Nirdosh	DWS HYDRO	punchumn@dwaf.gov.za
Mr Portokalis Andrew	MTN – Innovation Centre	portok_a@mtn.co.za
Ms Plomp Hantie	Bohlweki Environmental	hantiep@bohlweki.co.za
Mr Opperman Nic	Agri SA	nic@agriinfo.co.za
Ms Plomp Hantie	Bohlweki Environmental	hantiep@bohlweki.co.za
Adv. Ramashia Rams	Department of Labour	zanele.ledwaba@labour.gov.za
Mr Oelofse Leon	Petronet SA	leon.oelofse@petronet.co.za

Nzuza F P	Dept. of Land Affairs	FPNzuza@dla.gov.za
Ms. Nxumalo Zodwa G	Dept. of Local Government	zodwa.nxumalo@kznlgta.gov.za
Mr Ngwenya Jabu	Department of Works	035 8743963
Mr Ngubane Steven	Forestry South Africa	steven@forestrysouthafrica.co.za
Mr Ngoasheng Peter	Dept. of Environmental Affairs &Tourism	pngoasheng@deat.gov.za
Ngcobo ME	Environmental Affairs	035 8473296
Nel L G	Umfuli Irrigation Board	mtnel1@telkomsa.net
Mr Nash Brett	Vodacom	nashbr@Vodacom.co.za
Naidoo I J	uThungulu District Municipality	zandilem@uthungulu.co.za
Mr Naik Mervyn	Dept. of Local Govt. & Traditional Affairs (Inland	mervyn.naik@kznlgta.gov.za
Inkosi Mthembu S J	Somopho Traditional council	0722568114
Induna Qulu	Obuka Traditional Council	076 757 9036
Ms Moodley Nivi	Exxaro	nivi.moodley@exxaro.com
Ms Moonsamy Coleen	DWS	moonsamyc@dwaf.gov.za
Mr Mnisi Philix	Spoornet Environmental Management	philixmn@spoornet.co.za
Mr Mkhize T P	Mpungose Traditional Authority	Silondilemkhize1@gmail.com

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or

- or any other proof as agreed upon by the Competent Authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
N/A. This section will be updated after the 1st public participation period.	N/A

The comments and response report will be attached under appendix as soon as it is available.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as **Appendix G**.

5. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report or scoping report, whichever is applicable.

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input.

Name of Authority informed:	Comments received (Yes or No)
uMfolozi Local Municipality Ulundi Local Municipality uMhlathuze Local Municipality Mthonjaneni Local Municipality	No
Cetshwayo District Municipality Zululand District	No
Department of Water and Sanitation	No
Department of Agriculture	No

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub regulation to the extent and in the manner as may be agreed to by the Competent Authority.

Proof of any such agreement must be provided, where applicable.

Has any comment been received from stakeholders?	■	**NO**

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

N/A

4.4 SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

There are no issues of concerns raised from the interested and affected parties thus far. Consultation is still in process and follow up will be made in order remind all stakeholders to submit their issues.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as **Annexure E**):

N/A

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including

impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

Alternative (preferred alternative)

2.1. PLANNING AND DESIGN PHASE

2.1.1 Socio-Economic impacts

Direct Impacts

Employment opportunities for design and assessment-related services, such as engineers and environmental consultants. In addition, input would be required from the regional authorities responsible for reviewing the applications made in terms of the relevant legislation.

Proposed Mitigation

There are no foreseeable negative impacts; therefore, no mitigation measures are necessary.

Indirect Impacts:

2.1.2 Location of Storm Water Drains

Storm water location unable to efficiently channel water away from site may result in ground and surface water pollution.

Proposed Mitigation

Those stormwater outfalls will be appropriately designed to minimise the likelihood of soil erosion.

Cumulative Impacts:

Cumulative loss of natural habitat

Deterioration of soil fertility and downstream water quality.

2.1.3 NO- GO

Positive

No potential impacts on ground and surface water.

No potential soil erosion.

Negative

No additional job opportunities created.

No contribution to infrastructure and development of the area.

2.2. CONSTRUCTION PHASE

2.2.1 Soils and Groundwater

Direct Impacts:

Potential disturbances on the soil include compaction, physical removal and potential pollution by hydrocarbons.

Contamination of the environment, specifically the soil and groundwater could arise during the construction phase. The potential exists for construction activities, workers and materials to transfer contaminants to the surrounding environment. This could arise as a result of, for example, inadequate ablution facilities, spillage of hazardous substances stored on the site, inappropriate responses to hazardous spills and improper waste handling, storage and disposal.

Indirect Impacts:

The clearance of vegetation and the exposure of the soil will increase the risk of erosion off the site.

Altered hydrological regime as a result of artificial hardening of the soil surface, cut and fill activities and compaction of soils on the site.

Proposed Mitigation

A stormwater and erosion control plan must be implemented across the entire development site to prevent and control erosion impacts.

Construction vehicles must make use of designated access routes and should not be permitted to drive over the entire site, to minimize compaction impacts.

All construction vehicles will be properly maintained to prevent leaks.

• Cement mixing must be confined to a designated area and must be done on an impervious surface.

• Any fuel stored on site must be kept in a bunded containment area.

• Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants.

• Drip trays are to be inspected on a weekly basis for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow.

2.2.2 Stormwater

Direct Impact:

During the construction phase, building materials such as building sand, cement, rubble and litter from

construction workers can add on site. These materials can contaminate the stormwater and then be washed into the stormwater system.

Proposed Mitigation

During construction, all material excavated must be protected, screened, or covered to prevent off site movement (primarily wind-blown soil or surface runoff) and the surplus material must be removed from site weekly to a licensed waste disposal site or re-used if appropriate.

All storm water channels around the outside of the site should be inspected regularly to ensure that they are not blocked and/or obstructed to ensure their efficient operation.

Storm water runoff must be controlled to ensure that on-site activities do not result in off-site pollution.

Soil erosion on site must be always prevented. If the storm water is of such a quality that suspended solids are present, then detention ponds for removal of suspended solids must be considered.

2.2.4 Air Quality

Direct Impacts:

Air quality impacts may arise during the construction phase because of dust generated by the exposure and disturbance of soil.

Fugitive dust may become a nuisance for surrounding land users and occupiers.

It may also create a hazard for users of the road and must therefore be tightly controlled.

Further air quality impacts will arise because of the exhaust emissions from construction vehicles.

The significance of this impact is however expected to be minimized by the proximity of the proposed development site to the road, on which traffic volumes are high, resulting in relatively poor ambient air quality due to vehicle emissions, under normal conditions. The contribution made by construction vehicles is deemed to be negligible.

Proposed Mitigation

Dust minimisation and control measures should be implemented on the construction site at regular intervals. This could include irrigation by water tankers.

The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop.

Vegetation clearing should only take place immediately prior to the commencement of construction activities in an area, in order to minimise the amount of exposed soil on the site.

Stockpiles and spoil heaps must be covered with tarpaulins or straw to prevent fugitive dust.

All construction vehicles must be appropriately maintained to minimise exhaust emissions.

2.2.5 Vegetation

Direct Impacts:

The site has no vegetation of value; only grass which is covering the site would be cleared for the new development.

Loss of vegetation will occur because of vegetation clearing to prepare the site for construction activities.

The size of the site proposed for development is small enough, however, that its clearance will not compromise the functioning of the corridor. The site is not located along a "movement corridor" such as a valley or watercourse, rather it is located next to the main transport route further minimizing the significance of the site in the functioning of the ecological corridor.

Indirect Impacts:

Spread of alien invasive plant species because of the disturbance of vegetation and soils on the site by construction activities.

Cumulative Impacts:

Fragmentation of habitat and disturbance of ecological process areas.

Proposed Mitigation

The extent of the construction footprint must be limited as much as possible.

Limit vegetation removal to the construction footprint only. Retain natural vegetation as much as possible.

Re-vegetate disturbed areas, which are not intended to be developed as soon as construction activities have been completed.

Rehabilitation must make use of indigenous grasses and should be undertaken by means of in-situ grass sods and hydro-seeding.

Indigenous, low maintenance and water-wise plants should be utilised in landscaped areas.

Alien plants must be removed by the Contractor, where these plants establish in the construction footprint during the construction period.

2.2.6 Solid gaseous and liquid Waste Generation.

The three forms of waste will be generated at the site during construction and operation phases of the project's infrastructure. Such waste will consist of metal cuttings, rejected materials, surplus materials,

spoilt, excavated materials, waste oils and grease, pieces of tyres, paper bags, empty cartons, empty paint and solvent containers, broken glass among others. Such solid waste materials can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on human and animal health. This may be accentuated by the fact that some of the waste materials contain hazardous substances such as oils and grease, paints, cement, adhesives and cleaning solvents, while some of the waste materials including metal cuttings and plastic containers are not biodegradable and can have long-term and cumulative effects on the environment. They also pose danger to the safety of the public in case of accidental cutting or injury.

Proposed Mitigation

The waste materials should be properly segregated and separated to encourage recycling of some of them such as concrete debris which can be used as backfills with the approval of the site engineer.

On completion, the property management should adapt a waste management system to handle any waste that would be generated from various operations.

2.2.7 Noise Impacts

Direct Impacts:

Noise impacts will arise because of the use of construction vehicles and machinery on the development site.

These noise impacts may be a nuisance to surrounding land users and occupiers.

It must be noted that the significance of the nuisance is somewhat reduced by the location of the proposed development site near a busy road. These create noise impacts and affect ambient noise levels. It is not anticipated that the construction activities will contribute significantly to ambient noise levels.

Proposed Mitigation

Construction activities should be limited to normal working hours (08:00 – 17:00) and limited to weekdays. No work should occur on weekends or on public holidays. The contractor will adhere to local authority by-laws relating to noise control.

Mechanical equipment with lower sound power levels must be selected to ensure that the permissible occupation noise-rating limit of 85 dBA is not exceeded. Equipment must be fitted with silencers as far as possible to reduce noise. All equipment to be adequately maintained and kept in good working order to reduce noise.

Neighbouring landowners should be informed prior to any very noisy activities e.g., high intensity drilling. A grievance procedure will be established whereby noise complaints can be received, recorded, and responded to appropriately.

Construction workers and personnel will wear hearing protection when required.

Noise levels must comply with the SANS 100103 – 0994 (recommended noise levels).

2.2.8 Visual Impacts

Direct Impacts:

Visual impacts will be caused by construction-related activities such as the stockpiling of material, trucks, construction offices, clearance of vegetation, excavation and storage of construction materials and equipment. This impact will be temporary in nature, being limited to the construction phase.

Cumulative Impacts:

Litter (if wastes are improperly handled, stored and disposed of).

Proposed Mitigation

The construction site, material stores, stockpiles and lay-down area should be kept tidy. Measures to control wastes and litter should be included in the contract specification documents. Wind-blown dust from stockpiles and construction activities should be controlled.

2.2.9 Occupational Health and Safety

Direct Impacts:

Occupational health and safety risks will exist during the construction phase as a result of open excavations, vehicle movement and other construction activities. These may pose a health and safety hazard to construction workers.

Proposed Mitigation

The construction site must be fenced off to prohibit unauthorised access and site access must be strictly controlled.

All employees, contractors and sub- contractors to wear appropriate Personal Protective Equipment (PPE).

Open excavations must be clearly marked.

Appropriate health and safety signage must be displayed on site.

2.2.10 Fire safety

Fire safety measures should be considered in any development plan. Fire outbreaks are common occurrences in many premises mainly due to poor installation of electric devices or poor handling of fire equipment's or flammable substances. In this development proposal, proper care will be considered during and after the implementation phase so as to minimize chances of fire outbreaks.

Proposed Mitigation

Fire alarm and fighting equipment should be installed within the facility once it is complete. A "No smoking" notice should be placed strategically on site.

Ensure that all firefighting equipment installed on the site once it is complete are regularly maintained and serviced.

Dry sand buckets should be placed in strategic places in case of fire.

The facility operators should be trained on how to use various firefighting devices.

Emergency chart numbers should be placed strategically in case of any emergency.

2.2.11 Archaeology / Palaeontology

Direct Impacts:

The construction phase may potentially result in the loss of cultural heritage resources and artefacts buried beneath the surface. Archaeological and historical sites can be damaged during the construction and the maintenance of transmission lines.

Proposed Mitigation

If an artefact of potential historical significance is uncovered during construction, the KwaZulu-Natal Amafa and Research Institute (The Institute) is the provincial heritage resources authority (PHRA) for KwaZulu Natal) or South Africa Heritage Resource Authority (SAHRA) must be notified immediately.

2.2.12 Socio-Economic Impacts

The proposed development will have numerous positive impacts to the area residents and to the general area. Some of the anticipated benefits include:

Direct Impacts:

The contractors are likely to utilise existing, skilled staff. However, should the need for unskilled, short-term labour arise, these workers would, most likely, be sourced from the local community.

The construction phase will provide job security for the existing employees of the appointed contracting company.

The street vendors will be benefited as this development will extract even more customers for their market.

The large number of project staff required provides ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the construction site.

The project will result in employment opportunities, including temporary opportunities for unskilled

individuals from local communities. There will also likely be an injection into the local and regional economies, benefitting businesses and SMMEs. Due to Eskom safety standards and servitude requirements, relocation of houses and other assets may be necessary.

Indirect Impacts:

The proposed development is predicted to provide an input stimulus into the local economy. The direct impact on the economy of construction spending and labourer/employee spending, could result in growth in the local economy. The extent to which the uMfolozi Local Municipality Ulundi Local Municipality, uMhlathuze Local Municipality, and Mthonjaneni Local Municipality would benefit from construction phase spending would depend on the extent to which construction goods and labour are sourced from local suppliers and communities. The project will require supply of large quantities of building materials most of which will be sourced locally and from the surrounding areas. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

Potential increase in criminal activity in the areas surrounding the construction site, associated with the presence of transient job seekers on the site.

Employment opportunities, electricity for a growing KZN economy and a monetary injection into the area (as a result of the construction and purchasing of the servitude areas) by Eskom will result in positive economic impacts in the region. However, negative economic impacts may include the loss of productive farmland and a potential loss in yield as result of the power lines and servitude zones.

Cumulative Impacts:

Increased wealth in the community.

Skills development.

An Environmental Control Officer (ECO) must be appointed to oversee the implementation of the Environmental Management Programme (EMPr) for the duration of the construction phase.

2.3. OPERATIONAL PHASE

The activities that are going to be undertaken during the operational life of the transmission line involve, but are not limited to:

- Inspections of roads, towers, lines, insulators, bird diverters, access roads and signage.
- Maintenance and repair of roads, towers, lines, insulators, bird diverters, access roads and signage.

2.3.1 Stormwater

Direct Impacts:

Small, selected portion of the surfaces area will be affected but may not result in the promotion of erosion and flash floods.

Proposed Mitigation

The Contractor shall not in any way modify nor damage the banks or beds of streams, rivers, wetlands, other open water bodies and drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable, modification of water bodies must be kept to a minimum in terms of removal of riparian vegetation and opening of the stream channel.

Earth, stone, and rubble is to be properly disposed of so as not to obstruct natural pathways over the site. i.e., these materials must not be placed in stormwater channels, drainage lines or rivers.

Stormwater outfalls must be designed to reduce flow velocity and avoid stream bank and soil erosion. There must be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.

2.3.2 Air Quality Impacts

Direct Impacts:

Main causes of air pollution are dust particles from vehicle movements and stockpiles, vehicle emissions and fires.

Proposed Mitigation

- Vehicles travelling to and from the construction site must adhere to the speed limits to avoid producing excessive dust. A speed limit of 20 km/h must be adhered to on the construction site.
- Limiting construction operational hours from 07h00 and 17h00 would reduce congestion and disturbance in surrounding areas and minimize road deterioration and consequent dust creation.
- Access points and other cleared surfaces must be dampened whenever necessary and especially in dry and windy conditions to avoid excessive dust.
- Stockpiles may cause dust and so must be managed in accordance with the guidelines in Materials Management.

2.3.3 Traffic Impacts

Direct Impacts:

Traffic impacts will be observed during the construction phase.

Vehicles travelling to and from the construction site must adhere to the speed limits.

2.3.4 Noise Impacts

Direct Impacts

None.

2.3.5 Visual Impacts

Direct Impacts:

None.

Proposed Mitigation

- Avoid crossing over or through ridges, rivers, wetlands or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover.
- The tower types used for the powerline should be the most permeable and create an extremely low degree of visual obstruction.
- Avoid changing the alignment's direction too often in order to minimise the use of the self-supporting strain tower. This tower type is the most visually intrusive as the steel lattice structure is more dense than other tower types, hence creating more visual obstruction.

2.3.6 Socio-economic Impact

Direct Impacts:

It is expected that a few people will be employed during the construction phase, with approximately 80 percent of the employment positions being made available to previously disadvantage South Africans from the local community.

2.3.8 Pollution from sanitation system

Indirect

Improperly treated wastewater can contaminate soil and water quality, causing disease. l Infectious diseases are spread by mosquitoes and flies that breed in areas where liquid wastewater reaches the surface.

Risk to the public, especially children and animals who come into contact with surface flows.

Proposed Mitigation

The detection of leakages/malfunctioning of septic tank must be reported and repaired immediately.

It should be designed and used in such a way that the tank takes the longest possible time to fill, without causing environmental damage.

The use of water (grey water) can reduce the sludge accumulation rate in the tank, and also to reduce potential problems odours.

The septic tank should not be used as a disposal site for household waste.

By ensuring that an effective solid waste removal system is in place and educating users about the consequences of putting non-degradable refuse into the tank, the lifespan of this tank will be substantially enhanced.

The septic tank must be pumped and maintained to avoid it to have blockage and overflow in the environment. Regular maintenance is the single most important consideration in making sure the septic system works well over time. Regular pumping helps prevent solids from escaping into the drain field and clogging soil pores.

2.3.10 Socio-economic Impacts:

Indirect Impacts:

The proposed development is projected to provide an input stimulus into the local economy. The direct impact on the economy, through the associated larger development, could result in growth in the local economy.

Cumulative Impacts:

Skills development.

• Increased wealth in the community.

2.4. DECOMMISSIONING AND CLOSURE PHASE

2.4.1 Soil and Groundwater Contamination

There is potential for soil and groundwater contamination as a result of accidental spills and leaks from underground storage tanks and associated infrastructure that may have occurred during the operation phase.

Hydrocarbon contamination may persist in the subsurface for an extended period before degradation takes place.

Proposed Mitigation

Residual product must be removed from the underground storage tanks and associated infrastructure.

2.4.2 Air Quality Impacts

There is potential for the air quality to be impacted through the decommissioning activities that may generate dust through excavation activities and disturbing the ground.

Exhaust emissions produced by construction equipment will be dispersed and it is not anticipated that they will cause a nuisance to surrounding landowners.

Proposed Mitigation

Dust suppression methods, such as wetting or laying straw, should be applied where there are large tracks of exposed surfaces.

Stockpiles and soil heaps must be covered with tarpaulins or straw to prevent fugitive dust.

All construction vehicles must be appropriately maintained to minimise exhaust emissions.

2.4.3 Traffic Impacts

Vehicle traffic around the site may increase during the decommissioning phase and impact the natural traffic flow around the site.

Proposed Mitigation

Co-ordination of movement of vehicles on and off site to reduce risks and prevent congestion on roads in the vicinity of the site.

No vehicles or machinery should be serviced or refuelled onsite.

Peak traffic hours should be avoided.

Large vehicle turning must take place onsite and not in the adjacent roads.

In cases where activities may obstruct traffic, local traffic officials must be contacted.

2.4.4 Loss of Employment

The closure of the Construction activities will mean that those employed construction phases will no longer be required, and their employment may be terminated.

Proposed Mitigation

Existing employees may be transferred to another station if feasible.

Employees must be given adequate notice prior to closure, to allow them time to seek alternative employment.

Site management must supply employees with a letter of recommendation and certificate of skills to assist them with future job applications.

2.4.5 Occupational Health and Safety

During the decommissioning phase, open excavations, vehicle movement and other construction activities may pose a health and safety hazard to workers.

Proposed Mitigation

The construction site must be fenced off to prohibit unauthorised access and site access must be strictly controlled.

All employees, contractors and sub- contractors to wear appropriate PPE.

Open excavations must be clearly marked.

All employees, contractors and sub- contractors must comply with the relevant Health and Safety Policy.

Appropriate health and safety signage must be displayed on site.

2.4.6 Noise and Vibrations

Vehicles and other machinery required for decommissioning will increase the noise levels during working hours.

Proposed Mitigation

The contractor will adhere to local authority by-laws relating to noise control.

Decommissioning activities will be restricted to regular working hours, i.e. Monday to Friday (08:00 – 17:00).

Mechanical equipment with lower sound power levels will be selected to ensure that the permissible occupation noise-rating limit of 85 dBA is not exceeded.

Equipment will be fitted with silencers as far as possible to reduce noise.

All equipment to be adequately maintained and kept in good working order to reduce noise.

Neighbouring landowners should be informed prior to any very noisy activities e.g., high intensity drilling.

A grievance procedure will be established whereby noise complaints can be received, recorded and responded to appropriately.

Workers and personnel will wear hearing protection when required.

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been considered, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative A (preferred alternative)

The following table illustrates the environmental sensitivities to be considered during the operational life of the transmission line. It also includes associated preventive and mitigation measures which need to be complied with by Eskom staff or its contractors in instances where inspections, maintenance work etc. are undertaken within sensitive positions.

3.1 Methodology

Impacts identified were assessed according to the criteria outlined below. Each impact was ranked according to extent, duration, magnitude and probability. A significance rating was calculated as per the methodology outlined below. Where possible, mitigatory measures were recommended for the impacts identified.

3.1.1 Status of the Impact

The impacts were assessed as having either a:

- Negative effect (i.e., at a cost to the environment);
- Positive effect (i.e., a benefit to the environment); or
- Neutral effect on the environment.

3.1.2 Extent of the Impact

The extent of each impact was rated as being one of the following:

(1) Site - within the boundaries of the development site;

(2) Local - the area within 5 km of the site;

(3) Municipal - the uMhlatuze LM, uMfolozi LM, Mthonjaneni LM, and Ulundi LM;

(4) District – Zululand District and King Cetshwayo District

(5) Regional - The KwaZulu Natal Province;

(6) National – South Africa; or

(7) International – Southern Africa.

3.1.3 Duration of the Impact

The duration of each impact was rated as being one of the following:

(1) Immediate - > 1 year;

(2) Short term – 1 – 5 years;

(3) Medium term – 6 – 15 years;

(4) Long Term – the impact will cease when the operation stops; and

(5) Permanent – no mitigation measure will reduce the impact after construction.

3.1.4 Magnitude of the Impact

The intensity or severity of each impact was rated as being one of the following:

(0) None – where the aspect will have no impact on the environment';

(2) Minor – where the impact affects the environment in such a way that natural, cultural and social functions / processes are not affected;

(4) Low – where the impact affects the environment in such a way that the natural, cultural and social functions / processes are slightly affected;

(6) Moderate – where the affected environment is altered but natural, cultural and social functions / processes continue, albeit in a modified way;

(8) High – natural, cultural or social functions / processes are altered to the extent that they will temporarily cease; or

(10) Very high / unknown – natural, cultural or social functions / processes are altered to the extent that they will permanently cease.

3.1.5 Probability of Occurrence

The likelihood of the impact actually occurring is indicated as either:

(0) None – the impact will not occur;

(1) Improbable – the possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate corrective actions;

(2) Low – there is a probability that the impact will occur;

(3) Medium – the impact may occur;

(4) High – it is most likely that the impact will occur; or

(5) Definite / unknown – the impact will occur regardless of the implementation of any prevention or corrective actions, or it is not known what the probability will be, based on a lack of published information.

3.1.6 Significance of the Impact

Based on the information contained in the points above, the potential impacts have been assigned a significance weighting (S). This weighting is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.

S = (E+D+M) *P

The significance weightings are:

- (< 30) Low – the impact would not have a direct influence on the decision to develop in the area;
- (30 – 60) Medium – the impact could influence the decision to develop in the area unless it is effectively managed / mitigated; and
- (> 60) High - the impact must have an influence on the decision-making process for development in the area.

It must be noted that in identifying and describing the potential impacts of the development, as well as in determining the significance ratings for the impacts, a team of specialist sub- consultants were consulted and appointed to undertake individual specialist studies.

DESIGN AND CONSTRUCTION PHASE

Impacts	Impact				Significance Pre-Mitigation	Significance Post-Mitigation
	Extent	Duration	Magnitude	Probability		
Job creation	(3) Municipal	(2) Short Term	(6) Moderate	(5) Definite	Medium (+)	Medium (+)
Soil disturbance	(2) Local	(2) Short Term	(6) Moderate	(3) Medium	Low (-)	Low (-)
Ground water contamination	(2) Local	(2) Short Term	(4) Low	(2) Low	Low (-)	Low (-)
Stormwater	(1) Site	(2) Short Term	(4) Low	(3) Medium	Low (-)	Low (-)
Increased traffic volumes, congestion,	(2) Local	(1) Immediate	(4) Low	(2) Low	Low (-)	Low (-)

and damage to roads						
Dust generation and exhaust emissions	(2) Local	(1) Immediate	(4) Low	(3) Medium	Low (-)	Low (-)
Vegetation Clearing	(1) Site	(4) Long term	(4) Low	(5) Definite	Medium (-)	Low (-)
Spread of alien Vegetation	(1) Site	(2) Short Term	(4) Low	(2) Low	Low (-)	Low (-)
Noise generation	(2) Local	(1) Immediate	(2) Minor	(2) Low	Low (-)	Low (-)
Visual Impacts	(2) Local	(1) Immediate	(2) Minor	(3) Medium	Low (-)	Low (-)
Litter	(2) Local	(1) Immediate	(4) Low	(3) Medium	Low (-)	Low (-)
Occupational Health and Safety risks	(1) Site	(1) Immediate	(4) Low	(1) Improbable	Low (-)	Low (-)
Damage of sub-surface heritage	(1) Site	(1) Immediate	(0) None	(1) Improbable	Low (-)	Low (-)
Job creation and skills development	(3) Municipal	(1) Immediate	(4) Low	(5) Definite	Medium (+)	Medium (+)
Job security	(3) Municipal	(1) Immediate	(6) Moderate	(5) Definite	Medium (+)	Medium (+)
Increase criminal activity	(2) Local	(2) Short Term	(6) Moderate	(2) Low	Low (-)	Low (-)
Stimulus of Local Economy	(3) Municipal	(2) Short Term	(6) Moderate	(5) Definite	Medium (+)	Medium (+)

OPERATIONAL PHASE

DESIGN AND CONSTRUCTION PHASE

Impacts	**Impact**				**Significance Pre-Mitigation**	**Significance Post-Mitigation**
	Extent	**Duration**	**Magnitude**	**Probability**		
Soil and Ground water contamination	(2) Local	(3) Medium term	(4) Low	(1) Improbable	Low (-)	Low (-)

Air quality	(2) Local	(1) Immediate	(2) Minor	(1) Improbable	Low (-)	Low (-)
Traffic	(2) Local	(1) Immediate	(4) Low	(2) Low	Low (-)	Low (-)
Loss of Employment	(3) Municipal	(1) Immediate	(6) Moderate	(3) Medium	Low (-)	Low (-)
Occupational Health and Safety	(1) Site	(1) Immediate	(4) Low	(1) Improbable	Low (-)	Low (-)
Noise and vibration	(2) Local	(1) Immediate	(2) Minor	(2) Low	Low (-)	Low (-)

The proposed project would result in limited negative impacts on the biophysical and socio- economic environment during the construction phase. Those negative impacts that would arise on the biophysical and socio-economic environments would have a low significance if the recommended mitigation measures were implemented.

Potential construction related impacts were assessed, in general, to be of low significance, due to their local nature and short-term durations. Impacts would decrease to lower levels of significance with the implementation of the recommended mitigation measures.

During the operational phase, the impacts relating to the contamination of the surrounding area through operational activities was found to be of medium to low significance, however through the implantation of the recommended mitigation measures these could be reduced to low significance.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	PerformanceIndicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
4.1 General & Emergency operational phase inspections and maintenance work	Inspections, maintenance and repair of roads, towers, lines, insulators, bird diverters, access roads, signage	Erosion, loss of vegetation, spread of alien invasive vegetation	**Objective:** To ensure that general inspections and maintenance work entails full consideration of the surrounding environment. **Target:** • Continually maintain access roads leading to towers during maintenance activities in order to prevent erosion. • Avoid unnecessary site clearing/vegetation clearing between towers as far as possible. • During maintenance activities, vehicles must only be driven on existing, maintained access roads and not drive indiscriminately through natural areas. • Tower footprints and rehabilitated construction areas must be inspected every six months inspected for erosion and measures must be implemented to curb erosion. • In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties, and it is therefore recommended that the declared weed and invader species be removed around each tower footprint during maintenance activities. • During maintenance activities, no illicit fires may be lit for any reason.	No litter, erosion prevented, presenceof natural vegetation	Eskom	During operational life of transmission line	Eskom environmental department	Continually

Tower Number	Sensitivity	Mitigation Measures	PerformanceIndicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
3	*Sclerocarya birrea* subsp. *Caffra* (Marula) – 30 meters from tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula treesundisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
4 to 8	High levels of avifauna activity	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers.	No injured birds. Bird diverters/flappers present.	Eskom	During operational life of transmission line	Eskom environmental department	Continually

9	Severe erosionpotential	**Mitigation:** Continually and regularly inspect for signs of erosion and is any erosion is present, implement measures such as brush-packs, silt fences or berms in order to curb erosion. During maintenance activities erosion should be monitored to prevent gully formation and siltation of downstream water resources. Where erosion is noted, erosion berms must be installed. The following points should serve to guide the placement of erosion berms: • Where the track has slope of less than 2%, berms every 50m should be installed. • Where the track slopes between 2% and 10%. berms every 25m should be installed. • Where the track slopes between 10%-15% berms every 20m should be installed.	No erosion.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
10 to 13	High levels of avifaunal activity	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers.	No injured birds. Bird diverters/flappers present.	Eskom	During Operational life of transmission line	Eskom Environmental department	Continually
14	Situated close to a riparian zone	**Mitigation:** • Maintenance activities must not encroach upon riparian zone. • No maintenance vehicles must be allowed to drive through the riparian zone.	Riparian zone – area of intermitted vegetation adjacent tothe water source is undisturbed.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
14 to 18	High levels of avifaunal activity	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers.	No injured birds. Bird diverters/flappers present.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
19	Steep gradient with erosion risk	**Mitigation:** • Continually inspect for signs of erosion and if any erosion is present, implement measures such as brush packs, silt fences or berms in order to curb erosion.	No erosion additional erosion.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
39 to 47	High levels of avifaunal activity	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers.	No injured birds. Bird diverters/flappers present.	Eskom	During operational life of transmission line	Eskom environmental department	Continually

48 to 51	Rocky ridge habitat presents at Tower 48 and 49 which is in a very good condition. Suitable habitat for RDL/protected species in the families *Orchidiaceae* and *Iridiaceae*. Wetlands in the vicinity of Towers 48 and 49 High levels of avifaunal activity.	**Mitigation:** • Exercise caution when performing maintenance activities in the vicinity of Towers 48 and 49 in order to prevent unnecessary disturbance of habitat. • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers. • Ensure that no maintenance vehicles or maintenance activities encroach upon the wetlands in the vicinity of Towers 48 and 49.	Habitat is undisturbed. Bird diverters and anti-perching deterrents present. No damage to adjacent wetlands.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
52 to 60	High levels of avifaunal activity	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers.	No injured birds. Bird diverters/flappers present.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
61 to 62	Wetlands in the vicinity of Towers 48 and 49 High levels of avifaunal activity.	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers. • Ensure that no maintenance vehicles or maintenance activities encroach upon the wetlands in the vicinity of Towers 61 and 62.	No injured birds. Bird diverters/flappers present. No damage to adjacent wetlands.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
63 to 69	High levels of avifaunal activity	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers.	No injured birds. Bird diverters/flappers present.	Eskom	During operational life of transmission line	Eskom environmental department	Continually

83	*Sclerocarya birrea* subsp. *Caffra* (Marula) – close to tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula trees undisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
93	*Sclerocarya birrea* subsp. *Caffra* (Marula) – close to tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula trees undisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
100	*Sclerocarya birrea* subsp. *Caffra* (Marula) – 25 meters from tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula trees undisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
102	*Sclerocarya birrea* subsp. *Caffra* (Marula) – close to tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula trees undisturbed	Eskom	During operational life of Transmission line	Eskom environmental department	Continually
107	*Sclerocarya birrea* subsp. *Caffra* (Marula) – 40 meters from tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula trees undisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
113	*Sclerocarya birrea* subsp. *Caffra* (Marula) – 50 meters from tower	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way.	Marula trees undisturbed	Eskom	During operational life of transmission	Eskom environmental department	Continually

	footprint	• If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998			line		
113 to 125	Steep gradient with erosion risk. Suitable habitat for *Sclerocarya birrea* subsp. *Caffra* (Marula), although none were observed. High levels of avifaunal activity.	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surroundingthe tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must beobtained in terms of the National Forest Act of 1998; • During maintenance activities, ensure that bird diverters/bird flappers remain in place toensure continued collision prevention • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers. • Continually inspect for signs of erosion and is any erosion is present, implement measuressuch as brush-packs, silt fences or berms in order to curb erosion.	Marula treesundisturbed. Bird diverters in place. No additional erosion.				
127 and 128	*Sclerocarya birrea* subsp. *Caffra* (Marula) – close to tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula treesundisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
175	*Sideroxylon inerme* (Milkwood) within and surrounding tower footprint.	**Mitigation:** • During maintenance activities, individual *Sideroxylon inerme* (Milkwood) trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Milkwood treesundisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
182	*Sclerocarya birrea* subsp. *Caffra* (Marula) – 55 meters from tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula treesundisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually

186 to 191	High levels of avifaunal activity	**Mitigation:** • During maintenance activities, ensure that bird diverters/bird flappers remain in place to ensure continued collision prevention. • During maintenance, maintain anti-perching/anti-roosting bird deterrents on top of towers.	No injured birds. Bird diverters/flappers present.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
193	*Sideroxylon inerme* (Milkwood) within and surrounding tower footprint	**Mitigation:** • During maintenance activities, individual *Sideroxylon inerme* (Milkwood) trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Milkwood trees undisturbed	Eskom	During operational life of Transmission line	Eskom environmental department	Continually
195	*Sclerocarya birrea* subsp. *Caffra* (Marula) – 25 meters from tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Marula trees undisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
199	*Sideroxylon inerme* (Milkwood) approximately 50 metres from the tower footprint. Wetlands in the vicinity of tower footprint.	**Mitigation:** • During maintenance activities, individual *Sideroxylon inerme* (Milkwood) trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998. • Ensure that no maintenance vehicles or maintenance activities encroach upon the wetlands in the vicinity of Tower 199.	Milkwood trees undisturbed. No damage to adjacent wetlands.	Eskom	During operational life of transmission line	Eskom environmental department	Continually

200	*Sideroxylon inerme* (Milkwood) within tower footprint. *Boophane disticha* (Poison bulb) within towerfootprint.	**Mitigation:** • During maintenance activities, individual *Sideroxylon inerme* (Milkwood) trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998. • Ensure that no maintenance vehicles or maintenance activities encroach upon the wetlands in the vicinity of Tower 199. • The relevant permits must be obtained in terms of the KwaZulu-Natal Nature Conservation Management Amendment Act of 1999 should any other individuals of *Boophane disticha* (Poison Bulb) be moved or SAS 213153 August 2013 11 Tower Number. Ecological Sensitivity/Issues Recommended mitigation relocated. • Care must be exercised during operational activities to not disturb the protected plants, in particular mention is made of vehicles which may accidently drive over the *Boophane disticha* in their dormant life cycle phase.	Milkwood trees undisturbed. Poison bulbs undisturbed unless relocated with granted permit.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
205	*Sideroxylon inerme* (Milkwood) within tower footprint. Tower is situated within a riparian zone and associated wetland.	**Mitigation:** • During maintenance activities, individual *Sideroxylon inerme* (Milkwood) trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998. • Continually monitor tower footprint for signs of erosion, sedimentation and incision during maintenance activities. • Ensure that no maintenance vehicles or maintenance activities unnecessarily encroach upon the riparian zone.	Milkwood trees undisturbed. Erosion is controlled. No damage towetlands.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
207	*Sclerocarya birrea* subsp. *Caffra* (Marula) – 25 meters from tower footprint	**Mitigation:** • During maintenance activities, individual *Sclerocarya birrea* subsp. *caffra* trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998.	Marula treesundisturbed.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
209	Wetlands in the vicinity of tower footprint.	**Mitigation:** • Ensure that no maintenance vehicles or maintenance activities encroach upon the wetlands in the vicinity of Tower 209.	No damage towetlands.	Eskom	During operational life of transmission line	Eskom environmental department	Continually

211	*Sideroxylon inerme* (Milkwood) approximately 40 meters from tower footprint.	**Mitigation:** • During maintenance activities, individual *Sideroxylon inerme* (Milkwood) trees surrounding the tower may not be cut or disturbed in any way. • If these trees are to be disturbed or damaged in any way, the relevant permits must be obtained in terms of the National Forest Act of 1998	Milkwood trees undisturbed	Eskom	During operational life of transmission line	Eskom environmental department	Continually
215	Tower is situated within a riparian zone and associated wetland.	**Mitigation:** • Continually monitor tower footprint for signs of erosion and incision during maintenance activities. • Ensure that no maintenance vehicles or maintenance activities unnecessarily encroach upon the riparian and wetland zones.	Erosion is controlled. Wetlands not damaged.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
229	Wetlands in the vicinity of tower footprint.	**Mitigation:** • Ensure that no maintenance vehicles or maintenance activities encroach upon the wetlands in the vicinity of Tower 229.	No damage to wetlands.	Eskom	During operational life of transmission line	Eskom environmental department	Continually
233 to 234	Tower is situated within a riparian zone and associated wetland.	**Mitigation:** • Continually monitor tower footprint for signs of erosion and incision during maintenance activities. • Ensure that no maintenance vehicles or maintenance activities unnecessarily encroach upon the riparian and wetland zones.	Erosion is controlled. Wetlands not damaged.	Eskom	During operational life of transmission line	Eskom environmental department	Continually

No-go alternative (compulsory)

The no-go alternative involves not going ahead with the strengthening of the power corridor to meet the growing demand in KwaZulu Natal. Eskom's transmission network supplying electricity into the Eastern Region requires strengthening to meet the growing demand in KwaZulu Natal in-order to avoid load shedding because of limited Transmission capacity, as well as to improve service quality and reliability.

For more alternatives, please continue as alternative D, E, etc.

4.5 SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to decide in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES	[redacted]

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

[redacted]

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the department in respect of the application:

The majority of impacts from the proposed activity will be during the construction and operations phases of the project. As a result, the mitigation measures are listed hereunder:

a) Vehicle movements during the construction phase should be limited to a low speed. Vehicles should also stick to the designated routes;

b) Construction personnel or vehicles may not leave the demarcated construction site except those authorised to do so. Those areas surrounding the construction sites, should be considered as "no-go" areas for employees and machinery;

c) Continuous dust suppression will be required in order to limit the amount of dust being blown away from the roads and construction site;

d) Removal of soils during construction should be done with caution removing only what is needed;

e) A fence should be erected around the construction site to prohibit movement beyond these

fences;

f) It should be noted that the subterranean presence of archaeological and/or historical sites, features or artefacts is always a distinct possibility. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence;

g) The presence of several plants of conservation importance within the general surrounds should be established;

h) Killing or poaching of any bird species should be avoided by means of awareness programmes presented to the construction personnel;

i) Power lines should be made more visible to birds that are prone to collide with them. Install flappers on power lines where a collision hazard is a risk;

j) Unskilled and unemployed labour should be sourced from the surrounding local communities as far as possible. Skills development opportunities should be granted to community members and local job seekers;

k) Consult with households living in informal settlements next to the main road leading to the substation, prior to construction, to determine ways to mitigate any negative effect on them;

l) All employees (including contractors) should undergo health and safety training on a regular basis;

m) A Health and Safety Plan should be implemented, and it must be ensured that all site managers are trained in First Aid and other relevant safety courses;

n) Construction related noise is generally intermittent and should be limited to daylight hours when ambient noise levels are highest; and

o) Appropriate traffic management measures should be planned for and implemented. Signs placed to indicate road works ahead prior to commencement of construction. Stop and Go traffic control to be used during road upgrade.

Is an EMPr attached?	YES - X	■

The EMPr must be attached as Appendix F.

4.6 SECTION G: DECLARATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

I, **Lufuno Nengwani** declare that I –

(a) act as the independent environmental practitioner in this application;
(b) do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
(c) do not have and will not have a vested interest in the proposed activity proceeding;
(d) have no, and will not engage in, conflicting interests in the undertaking of the activity;
(e) undertake to disclose, to the Competent Authority, any material information that has or may have the potential to influence the decision of the Competent Authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006;
(f) will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
(g) will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the Department in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the Department may be attached to the report without further amendment to the report;
(h) will keep a register of all interested and affected parties that participated in a public participation process; and
(i) will provide the Department with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.

Signature of the Environmental Assessment Practitioner:

Kimopax (Pty) Ltd

Name of company:

18th of May 2023

Date:

Appendix A:

EAP's Curriculum Vitae and Professional Registration Certificate

QUALIFICATIONS

BESc Mining and Environmental Geology, University of Venda, Venda, South Africa, 2012

CERTIFICATIONS/ SHORTCOURSES

Introduction to Integrated Waste and Materials Management, Institute of Waste Management of South Africa,

June 2020 — July 2020

ISO 14001:2015 - Environmental Management Systems (EMS) 1428-15701051, Alison

June 2020 — July 2020

ISO Management System Audit Techniques and Best Practices, Alison

July 2020 — July 2020

PERSONAL DETAILS

Name : Lufuno Nengwani

Gender : Male

Year of Experience : 6 years

SKILLS AND COMPETENCIES

- Environmental Impact Assessment (EIA)
- ISO 9001
- ISO 14001
- ISO 45001
- Project Management
- ArcGIS (Fundamentals for GIS) and ArcGIS online
- ERDAS Imagine
- Biological Hazards, Noise and Vibration
- ISO Management System Audit Techniques and Best Practices
- Integrated Waste and Materials Management

WORK EXPERIENCE

Kimopax (Pty)Ltd ***South Africa***

Environmental Consultant

(January 2022 To Present)

Geoluken Consulting (Pty) Ltd ***South Africa***

Senior Environmental Consultant

(August 2018 – Date)

Crysbol (Pty)Ltd ***South Africa***

Freelance Environmental Manager

(June 2019 To January 2022)

Multiview Investments (Pty)Ltd ***South Africa***

Geological and Environmental Practitioner

(June 2019 To January 2019)

ISO 9001:2015 - Quality Management System (QMS), Alison

May 2020 — June 2020

Project Management, eLearning College

May 2020 — July 2020

Computer Programming for Everyone, University of Leeds and Institute of Coding

April 2020 — April 2020

PROFESSIONAL AFFILIATIONS

South African Council for Natural Scientific Professions (SACNASP): Reg no. 126141

Geo-information Society of South Africa (GISSA):

Reg No. RSXZ-7654

Geological Society of South Africa (GSSA) Reg No 966060

- Ensure Emergency procedures are up to date, implemented (personnel trained etc.) and effective
- Compilation of Environmental Performance Reports
- Compiling and Reviewing of EMPs and EIAs for Prospecting
- Preparing risk assessments, work instructions and ensuring continued auditing of these processes to capture changes in environment and other risks
- Planning and implementing ways to reduce any non-compliance or breaches regarding safety, compliance and environment
- measuring, monitoring and providing reports on continuous improvement in safety and compliance
- Investigating incidents to find root cause and contributing factors and recommending preventative action.
- Performing field investigations including environmental sampling (air quality, soil, vapour, groundwater, wastewater and surface water)
- Applying for general and hazardous waste permits/licenses and ensuring the implementation of permit/license conditions.
- Supervision of subcontractors during field work
- Supporting site teams to ensure compliance with existing procedures and developing effective working practices.
- Carrying site audits and inspections on construction sites and producing relevant observation reports.
- Advise on accident and/or incident investigations
-

PROJECT HISTORY

YEAR(S)	SELECTED PROJECT NAME AND DESCRIPTION	LOCATION
2022	Kego Mining Coal Processing Plant on Farm Goedehoop 315 JS, Steve Tshwete Local Municipality.	Mpumalanga, South Africa
2022	Celeste Erasmus: S24G application for the Establishment of Stables at the Portion 27 of the Farm Middleburg Town and Townlands 287 JS.	Mpumalanga, South Africa
2022	Mining Right application for Environmental authorisation on farm Dunbar 119 IP, and Houtkop 152 IP.	North West Province, South Africa
2021	Eskom: Environmental Audit for Kusile Power Station Ash Dam Constriction.	Mpumalanga, South Africa
2021	Eskom: Environmental Audit for Kusile Power Station Ash Coal Stock Yard.	Mpumalanga, South Africa
2021	Environmental Authorisation and Basic Assessment for Coal prospecting right application for Bloemendal 18 HU.	KwaZulu-Natal, South Africa
2021	Mining Permit application for building sand (Silica), Concrete Sand (Silica), Crusher Sand (Silica), Filling Sand (Silica), Foundry Sand (Silica), Glass Sand, Metallurgical Silica, Silcrete (Silica), Silica Sand (General) and Silicon Ore on the farm Groenfontein 526 IR.	Mpumalanga, South Africa
2021	Environmental Authorisation and Basic Assessment for Coal prospecting right application for Boschhoek 156 HU and Vaalkrantz HU Farms.	KwaZulu-Natal, South Africa
2021	Environmental Impact Assessment for prospecting right with Bulk Sampling for coal, Pseudocoal and Torbanite/Oil Shale on Jubilee No1 9642 HT.	KwaZulu-Natal, South Africa
2021	Water Use License Application for Development of 60MW Natural Gas Electricity And 10 MW PV Solar Plant	Gauteng, South Africa
2021	Environmental Authorisation and Basic Assessment to prospect for Heavy minerals (general), Lead, Lithium ore, Manganese ore, Nickel ore, Platinum Group Metals (PGMs), Rare Earth, Rutile (heavy minerals), Aluminium ore, and Zinc ore in respect of UG2 and Merensky only excluding chrome on farm Groenfontein 138 JP	North West, South Africa
2021	Environmental Authorisation and Basic Assessment to prospect for Aluminium Ore, Magnesite, Rare Earth Minerals and Rutile (Heavy Minerals) on Groot Gewaagd 270 IN Farm and et.al	North West, South Africa

YEAR(S)	SELECTED PROJECT NAME AND DESCRIPTION	LOCATION
2022	Kego Mining Coal Processing Plant on Farm Goedehoop 315 JS, Steve Tshwete Local Municipality.	Mpumalanga, South Africa
2022	Celeste Erasmus: S24G application for the Establishment of Stables at the Portion 27 of the Farm Middleburg Town and Townlands 287 JS.	Mpumalanga, South Africa
2022	Mining Right application for Environmental authorisation on farm Dunbar 119 IP, and Houtkop 152 IP.	North West Province, South Africa
2021	Environmental Impact Assessment for prospecting right with Bulk Sampling for coal on the Frischgewaagd 74 HT, Pivaanspoort 80 HT, Geluk 17067 HT and Geluk 17097 HT Farms	KwaZulu-Natal, South Africa
2021	Geohydrological Studies For WULA on Koppieskraal Cemetery	Gauteng, South Africa
2021	Geohydrological Studies For WULA on Putfontein Cemetery	Gauteng, South Africa
2021	Environmental Authorization and Basic Assessment to Prospect for Cobalt, copper, lead and zinc minerals	Gauteng, South Africa
2021	Environmental Authorisation and Basic Assessment for Coal prospecting right application on the Nooitgedacht 388 HT Farm	KwaZulu-Natal, South Africa
2020 - 2021	Water Use License Application for Development of 60MW Natural Gas Electricity And 10 MW PV Solar Plant in Arcelor Mittal Pretoria.	Gauteng, South Africa
2020 - 2021	Environmental Authorisation and Basic Assessment to prospect Diamond, Manganese, Iron, Silver, Titanium, Vanadium, and Copper On Houtbosch 65 JN and et.al	North West, South Africa
2020 - 2021	Environmental Authorisation and Basic Assessment to prospect for Diamond, Manganese, Iron, Silver, Titanium, Vanadium, Copper, PGM and Gold ores on Koodoos Rand 321 IN Farm, and et.al.	North West, South Africa
2020 - 2021	Environmental Authorisation and Basic Assessment to prospect for Diamond, Manganese, Iron, Silver, Titanium, Vanadium, Copper, PGM, Gold ores, Rare Earth and Heavy Minerals on Blaauw Krans 256 IN.	North West, South Africa
2020 - 2021	Environmental Authorisation and Basic Assessment to prospect for Magnetite, Lead, Aluminum, Manganese, Iron, Titanium, Vanadium, Copper, Rare Earth, Lithium, Zinc, Heavy Minerals, Lower Group (LG) and Middle Group (MG) Chromitite Layer on Pedeskraal 279 JQ Farm.	North West, South Africa

YEAR(S)	SELECTED PROJECT NAME AND DESCRIPTION	LOCATION
2022	Kego Mining Coal Processing Plant on Farm Goedehoop 315 JS, Steve Tshwete Local Municipality.	Mpumalanga, South Africa
2022	Celeste Erasmus: S24G application for the Establishment of Stables at the Portion 27 of the Farm Middleburg Town and Townlands 287 JS.	Mpumalanga, South Africa
2022	Mining Right application for Environmental authorisation on farm Dunbar 119 IP, and Houtkop 152 IP.	North West Province, South Africa
2020 - 2021	Environmental Authorization Application and Basic Assessment to Prospect for Cobalt, copper, lead and zinc minerals on the Onder Plaats 401 Farm,	Northern Cape, South Africa
2020 - 2021	Environmental Authorization Application and Basic Assessment to Prospect for Cobalt, copper, lead and zinc minerals on the Curries Camp 457 Farm and Zoovoorby 458 Farm.	Northern Cape, South Africa
2019 - 2020	Mining permit for Aggregate, Stone Aggregate, Gravel and Sand Mineral on the farm Voorspoed 458 KS.	Limpopo, South Africa
2019	Water Use License Application for Tiger Brand_Albany	Gauteng, South Africa
2018	Old ash waste removal and rehabilitation operation for Jackaroo Park Mine Dump	Mpumalanga, South Africa
2018	Old ash waste removal and rehabilitation operation for Witbank Mine Dump	Mpumalanga, South Africa
2018	Prospecting Right with Bulk Sampling for Proposed 'Vogelstruiskraal Mine'	North West, South Africa
2018	Prospecting Right with Bulk Sampling for Proposed 'Mimosa Mine'	North West, South Africa
2018	Resource Estimation for 'Mooifontein Colliery'	Mpumalanga, South Africa
2018	Resource Estimation for 'Driehoek Colliery'	Mpumalanga, South Africa
2018	Resource Estimation for Boschmansfontein Mine	Mpumalanga, South Africa
2017	Water Use License Application for Mooifontein Colliery	Mpumalanga, South Africa
2017	Water Use License Application for Kendal Coal Washing Plant	Mpumalanga, South Africa

YEAR(S)	SELECTED PROJECT NAME AND DESCRIPTION	LOCATION
2022	Kego Mining Coal Processing Plant on Farm Goedehoop 315 JS, Steve Tshwete Local Municipality.	Mpumalanga, South Africa
2022	Celeste Erasmus: S24G application for the Establishment of Stables at the Portion 27 of the Farm Middleburg Town and Townlands 287 JS.	Mpumalanga, South Africa
2022	Mining Right application for Environmental authorisation on farm Dunbar 119 IP, and Houtkop 152 IP.	North West Province, South Africa
2017	Mining Permit Application for Driehoek Colliery	Mpumalanga, South Africa
2017	Mining Permit Application for Geluksoord Colliery	Mpumalanga, South Africa
2017	Driehoek Colliery Geophysical and Core Drilling Explorations	Mpumalanga, South Africa
2017	Geluksoord Colliery Geophysical and Core Drilling Explorations	Mpumalanga, South Africa

Appendix B:

List of specialists

TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT:

THE PROPOSED CONSTRUCTION OF THE UMFLOLOZI-MBEWU (THETA) TRANSMISSION LINE, KWAZULU-NATAL PROVINCE.

PRODUCED BY:

APPLICANT	ENVIRONMENTAL CONSULTANT	IMPLEMENTING AGENT
Eskom	MCA	kimopax GROUP Inspire | Enhance | Innovate

MARCH 2023

CONDITIONS RELATING TO THIS REPORT

DECLARATION OF INTEREST

Mawenje Consulting Africa (MCA) (Pty) Ltd has no vested interest in the property studied nor is it affiliated with any other person/body involved with the property and/or proposed development. MCA (Pty) Ltd is not a subsidiary, legally or financially of the proponent. The study was undertaken by Mr Tshuxekani Maluleke, he is a registered Natural Scientists with the following details:

QUALIFICATIONS

SPECIALIST	QUALIFICATION
Mr Tshuxekani Maluleke (SACNASP Reg. No. 120501)	MSc Environmental Sciences (Wits University) BSc Hons Zoology (University of Limpopo) BSc Hons Animal, Plant and Environmental Sciences (Wits University)

APPROVAL

PREPARED BY:

Mr Tshuxekani Maluleke

Wetland and Biodiversity Specialist

Msc. Environmental Sciences

SACNASP

14 March 2023

PEER REVIEWED BY:

Dr Gabriel Ngorima

Environmental Management

Ecologist And Natural Scientist

14 March 2023

INDEMNITY

Although Mawenje Consulting Africa Pty (Ltd) exercises due care and diligence in rendering services and preparing documents, the client takes full responsibility for this report and its implementation in terms of the National Environmental Management Act of 1998, and exempt Mawenje Consulting Africa Pty (Ltd) and its associates and their sub-contractors from any legal responsibility based on the timing of the assessment, the result and the duration thereof, which has an influence on the credibility and accuracy of this report. Mawenje Consulting Africa Pty (Ltd) accepts no liability, and the client indemnifies Mawenje Consulting Pty (Ltd) and its directors, managers, agents, and employees against all actions, claims, demands, losses, liabilities, costs, damages, and expenses arising from or in connection with services rendered, directly or indirectly, by Mawenje Consulting Africa Pty (Ltd) and by the use of this document.

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LIST OF ABBREVIATIONS

ALARP	As Low as Reasonably Practicable
BES	Biodiversity and Ecosystem Services
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CBD	Convention on Biological Diversity
CR	Critically Endangered
ESA	Ecological Support Areas
EN	Endangered
GIS	Geographic Information System
I&APS	Interested & Affected Parties
IPPC	International Plant Protection Convention
IUCN	International Union for Conservation of Nature
LC	Least Concern
NBF	National Biodiversity Framework
NEMA	National Environmental Management Act (Act 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
PA	Protected Areas
SANBI	South African National Biodiversity Institute
SSC	Species of Special Concern
VU	Vulnerable

DEFINITIONS

Alien animal	**(a) Any live vertebrate, including a bird and a reptile, but excluding a fish, belonging to a species or subspecies that is not a recognised domestic species and the natural habitat of which is not in the Republic; or** **(b) The egg of such vertebrate.**
Biodiversity	Means the diversity of animals, plants or other organisms, including the diversity of animals, plants or other organisms found within and between— (a) Ecosystems; (b) Habitats; (c) The ecological complexes of which these systems and habitats are part; and (d) Species.
CITES	Means the Convention on International Trade in Endangered Species of Wild Fauna and Flora;
Endangered Species	Means a species is endangered when it is facing a very high risk of extinction in the wild in the near future and includes— (*a*) Any living or dead specimen of such a species; or (*b*) Any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.
Environment	Means the surroundings within which humans exist and that are made up of— (*a*) The land, water and atmosphere of the earth; (*b*) Microorganisms, plant and animal life; (*c*) Any part or combination of (*a*) and (*b*) and the interrelationships amongst and between them; and (*d*) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;
Indigenous plant	(*a*) Means any living or dead plant which is indigenous to the Republic, whether artificially propagated or in its wild state; and

	(*b*) Includes the flower, pollen, seed, cone, fruit, bulb, tuber, stem or root or any other part or derivative of such plant but does not include a plant declared a weed in terms of any legislation.
Protected area	Means— (*a*) A provincial nature reserves; (*b*) A site of ecological importance; (*c*) A protected environment; (*d*) A private nature reserves; or (*e*) A resource use area.
Protected environment	Means an area declared a Protected Environment or Private Nature Reserve in terms of section 21 (1) (*a*).

1 INTRODUCTION

Mawenje Consulting Africa (MCA) (Pty) Ltd has been appointed by Kimopax (Pty) Ltd on behalf of Eskom Holding to conduct a Terrestrial Biodiversity Impact Assessment along the Umfolozi-Mbewu Transmission Line Servitude in the KwaZulu Natal Province. The purpose of this study is to describe and characterise the terrestrial environment, habitats and species present on site. Biodiversity is defined according to the National Environmental Management: Biodiversity Act of 2004 (NEMBA), as "the variability among living organisms from all sources including, terrestrial, aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems". The NEMBA legislation upholds the country's commitment to the protection of South Africa's biological resources and it is imperative that development takes place in a sustainable way to achieve this.

2 PROJECT DESCRIPTION

Eskom's transmission network supplying electricity into the Eastern Region requires strengthening to meet the growing demand in KwaZulu Natal in-order to avoid load shedding as a result of limited Transmission capacity, as well as to improve service quality and reliability. The strengthening of the power corridor will entail phased construction of 765kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies (KZN 765 kV Strengthening Review – GP Report_17/51) have also indicated that in order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 400kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

3 STUDY AREA

The transmission line is going to be located in the uMfolozi Local Municipality within the King Cetshwayo District Municipality of KwaZulu Natal, South Africa. The transmission line starts North-west of Mpunga passing over land and streams that feed into the wit-mfolozi river. The lines pass over areas such as Ntandeka, Langakazi and are also adjacent to other townships/villages. **Figure 1** below shows the locality of the transmission line and the estimated length in kilometres of the Umfolozi-Mbewu Transmission Line. The study site is dominated by cultivated and forestry plantations (**Figure 2**).

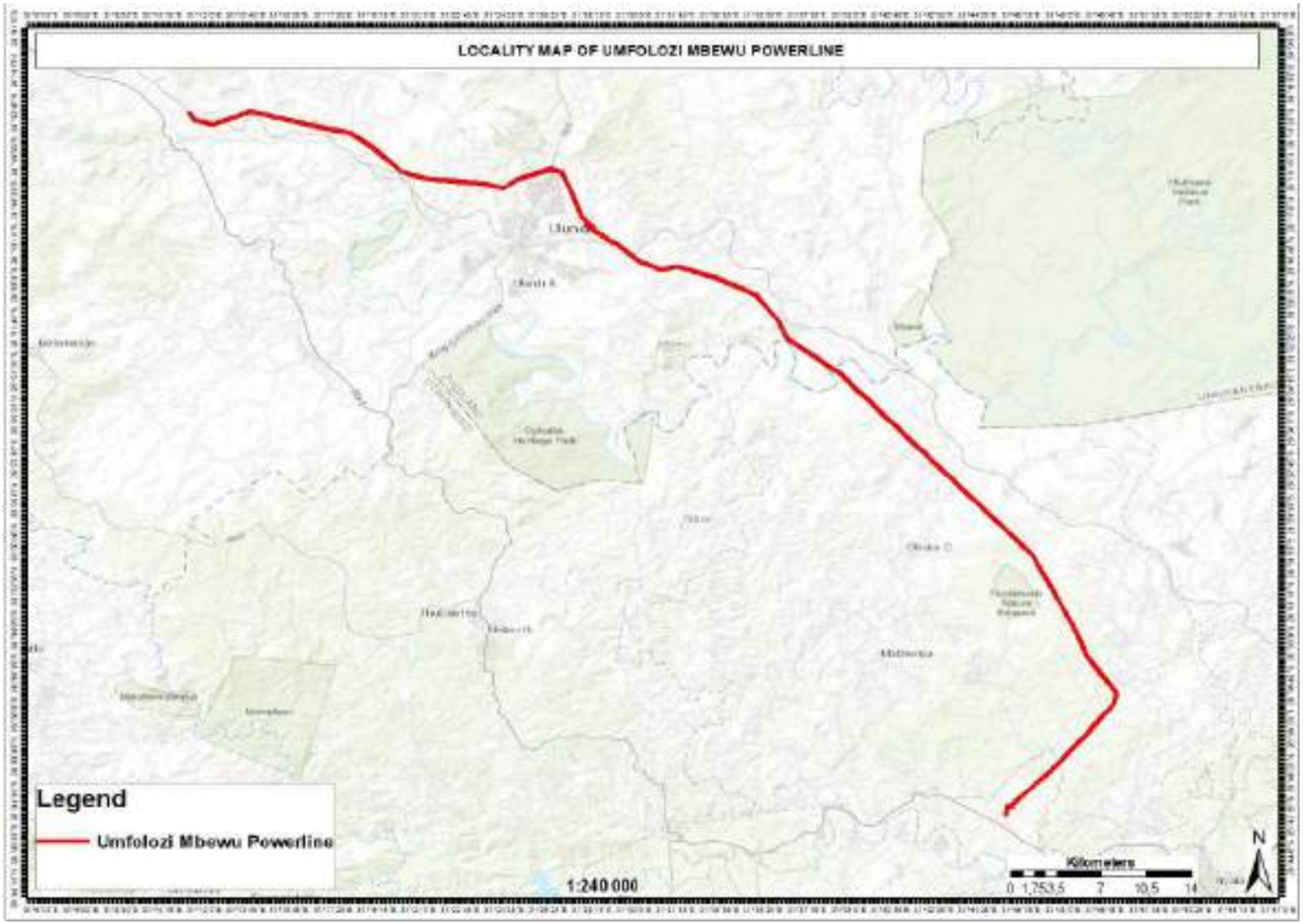

Figure 1:Locality Map.

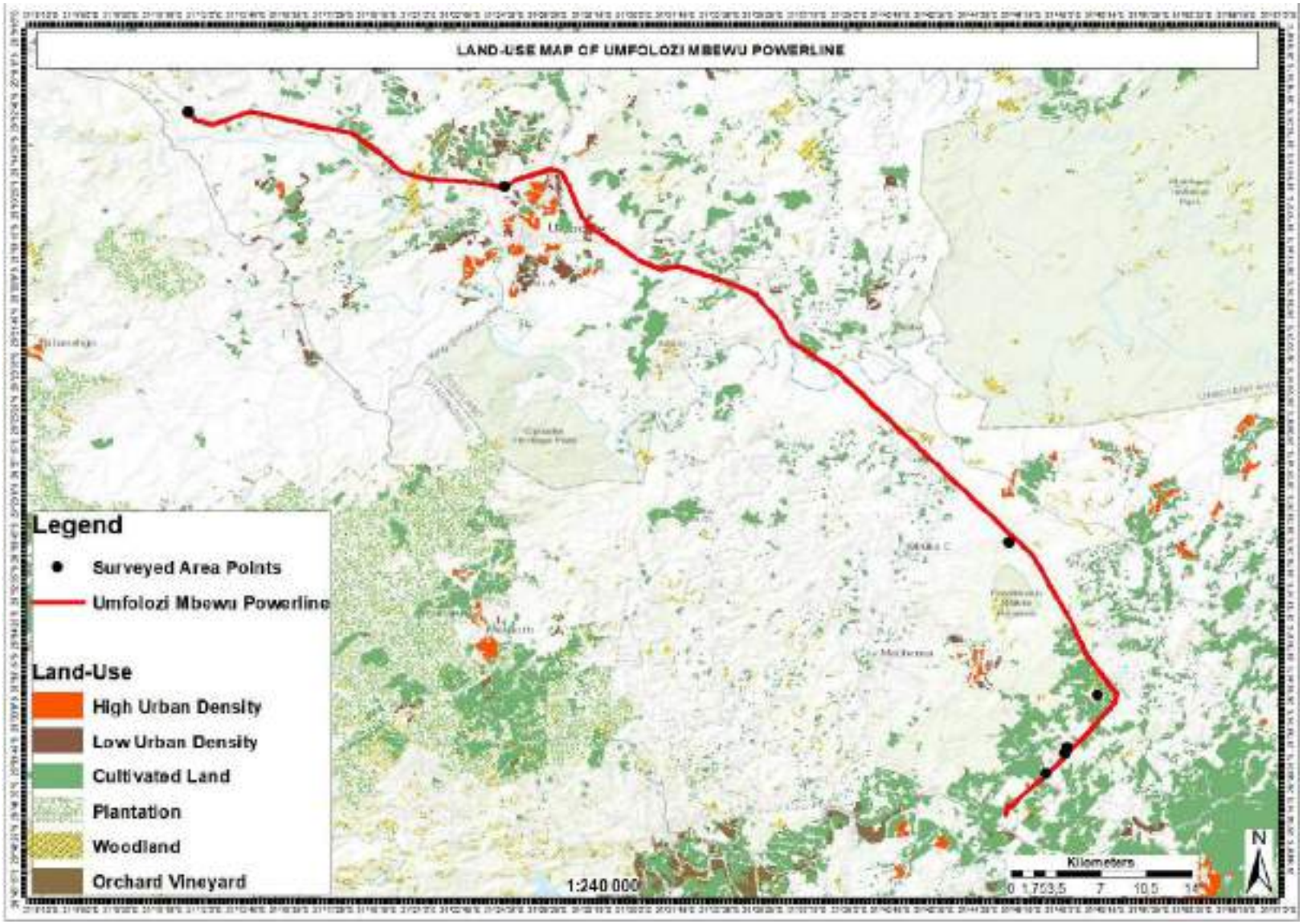

Figure 2: Landuse Map

4 TERMS OF REFERENCE

Mawenje Consulting Africa (MCA) Pty (Ltd) has been appointed to undertake the following specialist functions:

- Assess the potential impacts of the proposed project on both the fauna and flora.
- Provide mitigation measures, rehabilitation process and/or vegetation removal procedures that would reduce the potential impacts of the developments on biodiversity.

1.1 SCOPE OF STUDY

4.1.1 Floral study:

- Conduct fieldwork to locate and identify the current state of vegetation on the study area, with emphasis on the footprint of the project.
- Determine the species that are present onsite.
- Identify sensitive vegetation types and critical biodiversity areas on site.
- Identify Critical Biodiversity and Ecological Support Areas onsite.
- Determine whether the location of the proposed Umfolozi-Mbewu Transmission line is located within the distribution range of species listed as Vulnerable, Endangered or Critically Endangered and Protected.
- Provide photographic evidence of the current state of vegetation onsite (i.e. natural or transformed, disturbed etc.) identify and describe the conservation value and conservation planning that are relevant to the site.
- Determine alien species present onsite and the recommended management actions.
- Describe the potential direct, indirect and cumulative negative and positive impacts of the proposed activity on the vegetation species during construction, operation and decommissioning phases of the project.
- Identification of issues and potential direct, indirect and cumulative biodiversity impacts.
- Provide monitoring requirements, mitigation measures and recommendations.

4.1.2 Faunal study:

- Conduct fieldwork to describe and assess the current state of terrestrial fauna in the area.

- Describe the existing micro-habitats, and the species associated with those habitats.
- Provide a description of species composition and conservation status in terms of protected, endangered or vulnerable faunal species.
    - This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may not necessarily occur on site, but which are likely to be impacted upon as a result of the proposed development.

5 LEGAL FRAMEWORK

The following national and provincial legislative guidelines and requirements were followed as part of this study:

5.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO 107 OF 1998) (NEMA) AS AMENDED

This Act embraces all three (3) fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures. NEMA provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

5.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO 10 OF 2004) (NEM: BA)

NEMBA was signed into law in mid-2004 and entered into effect on 1 September 2004. NEM: BA provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

5.3 THE NATIONAL BIODIVERSITY FRAMEWORK (2017-2022)

The National Biodiversity Framework (NBF) is a requirement under Section 38 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, hereafter referred to as the 'Biodiversity Act'). The NBF is a short to medium-term coordination tool that shows the alignment between the strategic objectives and outcomes identified in the National Biodiversity Strategy and Action Plan (NBSAP v.2, 2015) and other key national strategies, frameworks and systems that currently guide the work of the biodiversity sector and identifies mechanisms through which this work is coordinated. It also identifies a set of interventions or "acceleration measures" that can unlock or fast-track implementation of the NBSAP and indicates the relative roles of the many agencies involved in implementing these activities. The purpose of the NBF is not to provide a comprehensive review of all work currently being undertaken in the biodiversity sector, nor to list all of the actions required to conserve and manage South Africa's biodiversity in support of sustainable development.

5.4 KWAZULU-NATAL NATURE CONSERVATION MANAGEMENT ACT 1997

This Act makes provision for the protection of the natural environment of the KwaZulu-Natal province. It establishes the KwaZulu-Natal Nature Conservation Board and the KwaZulu-Natal Nature Conservation Service and grants powers to the Minister to establish a local board in respect of one or more protected areas. The Minister, being a member of the Kwazulu Natal Executive Council, shall be responsible for nature conservation policy and the implementation of provisions of this Act. He or she may, in consultation with the Board, proclaim an area to be a protected area. The Board shall, among other things, direct management nature conservation and protected areas in the province, develop and promote ecotourism in protected areas and ensure the efficient management of the Conservation Service. The Conservation Service shall, among other things, provide support to the Board and local boards in management of nature conservation and protected areas.

5.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO 43 OF 1983) (CARA):

This act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

5.6 THE NATIONAL FOREST ACT (ACT NO 84 OF 1998) (NFA)

The main objective of the National Forests Act, 1998 is to promote the sustainable management and development of forests and to provide protection for certain forests and trees. This said protection is provided through the protection of all natural forests (Section 7 (1), the protection of all trees declared to be protected in terms of section 12(1) of the Act, and the regulation of certain activities in a proclaimed State Forest (Section 23(1)(a) – (k)). It should be noted that there are other environmental legislation administered by other State Departments that also regulate natural resources. The Act is responsible for:

- Promotes the sustainable management and development of forests for the benefit of all;
- Creates the conditions necessary to restructure forestry in South Africa;
- Provide special measures for the protection of certain forests and protected trees;
- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- Promotes community forestry; and
- Promotes greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

5.7 CONVENTION ON BIOLOGICAL DIVERSITY

The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources.

5.8 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)

The CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Through its three appendices, the Convention accords varying degrees of protection to more than 30,000 plant and animal species.

5.9 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The CMS, or the Bonn Convention aims to conserve terrestrial, marine and avian migratory species throughout their range. Parties to the CMS work together to conserve migratory species and their habitats by providing strict protection for the most endangered migratory

species, by concluding regional multilateral agreements for the conservation and management of specific species or categories of species, and by undertaking co-operative research and conservation activities.

5.10 THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The objectives of the Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. The Treaty covers all plant genetic resources for food and agriculture, while it's Multilateral System of Access and Benefit-sharing covers a specific list of 64 crops and forages. The Treaty also includes provisions on Farmers' Rights.

5.11 CONVENTION ON WETLANDS (POPULARLY KNOWN AS THE RAMSAR CONVENTION)

The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention covers all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.

5.12 WORLD HERITAGE CONVENTION (WHC)

The primary mission of the WHC is to identify and conserve the world's cultural and natural heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through a closer co-operation among nations.

5.13 RAMSAR CONVENTION

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. The treaty was adopted in the Iranian city of Ramsar in 1971 and the Convention's member countries cover all geographic regions of the planet.

5.14 INTERNATIONAL PLANT PROTECTION CONVENTION (IPPC)

The IPPC aims to protect world plant resources, including cultivated and wild plants by preventing the introduction and spread of plant pests and promoting the appropriate measures for their control. The convention provides the mechanisms to develop the International Standards for Phytosanitary Measures (ISPMs), and to help countries to implement the ISPMs and the other obligations under the IPPC, by facilitating the national capacity development, national reporting and dispute settlement. The Secretariat of the IPPC is hosted by the Food and Agriculture Organization of the United Nations (FAO).

6 SITE CHARACTERISTICS

6.1 GEOLOGY & SOILS

6.1.1 Geology & Soils Associated With The Svl 23 Zululand Lowveld Vegetation Unit

Most of the area is underlain by Black-clay soils and duplex soils derived from a distinct variety of clastic sediments of the Dwyka, Ecca, Beaufort and igneous rocks of the Lebombo Groups (all of the Karoo Supergroup). Also well-drained soil forms occur especially on stony slopes. Land types Fb and Ea, with some Db and Dc.

6.1.2 Geology & Soils Associated With The Svl 22 Northern Zululand Sourveld

A section of the powerline consists of Well-drained and shallow soil forms (Glenrosa and Mispah forms) derived from various lithologies; predominantly, Dwyka Group diamictites, but also shale, siltstone and sandstone from the Madzaringwe and Pietermaritzburg Formations, all of the Karoo Supergroup. Archaean granite and gneiss are also significant. Land types mainly Fb and Fa, with some Ac.

6.1.3 Geology & Soils Associated With The Gm 15 Paulpietersburg Moist Grassland Vegetation Unit

This area is underlain by Archaean granite and gneiss partly covered by Karoo Supergroup sediments (Madzaringwe Formation) and intruded by Karoo Dolerite Suite dykes and sills. Dominant soils on the sedimentary parent material are yellow apedal, well drained, with a depth of >800 mm and a clay content of >35%, representing the soil series: Hutton, Clovelly and Griffin. Shortlands soils are dominant on dolerite. Dominant land type Ac, with Fa and Ba of subordinate importance.

6.1.4 Geology & Soils Associated With The Gs 2 Ithala Quartzite Sourveld Bushveld Vegetation Unit

Quartzite of the Mozaan Group (Pongola Supergroup) of the Randian age supporting shallow soils typical of Fb (prevalent) and Fa (marginal) land types.

6.2 CLIMATE

The study site experiences Summer rainfall with some rain in winter. The Mean Annual Precipitation ranges between 500–900 mm (highest in the southeast). The study is generally a frost-free area. The Mean monthly maximum and minimum temperatures for Mpila Camp (Hluhluwe-iMfolozi Park) rnages between 38.5°C and 7.8°C for February and June, respectively. in the region northwest of Nongoma, towards the mistbelt Ngome Forest. Frost very infrequent to occasional.

6.3 VEGETATION TYPES ALONG THE 90KM UMFOLOZI-MBEWU TRANSMISSION LINE

6.3.1 SVl 23 Zululand Lowveld

The Umfolozi-Mbewu Transmision Line Access Road consist of the **SVl 23 Zululand Lowveld (Figure 3)** vegetation type which features extensive flat or only slightly undulating landscapes supporting complex of various bushveld units ranging from dense thickets of *Dichrostachys cinerea* and *Acacia* species, through park-like savanna with flat-topped *A. tortilis* to tree-dominated woodland with broad-leaved open bushveld with *Sclerocarya birrea* subsp. *caffra* and *A. nigrescens*. Tall grassveld types with sparsely scattered solitary trees and shrubs form a mosaic with the typical savanna thornveld, bushveld and thicket patches.

The **SVl 23 Zululand Lowveld** is distributed within the KwaZulu-Natal Province, Swaziland and Mpumalanga Province: Main extent from around Big Bend south to Mkuze, Hluhluwe, Ulundi to just north of the Ongoye Forest. An isolated patch is found on the Swaziland-Mpumalanga border. Altitude about 50–450 m.

The SVl 23 Zululand Lowveld is classified as Vulnerable. A conservation target of 19% has been set, with some 11% statutorily conserved mainly in the Hluhluwe-iMfolozi Park and Phongolapoort Nature Reserve. Almost 1% is protected in the private Masibekela Wetland. Much of the area between Magudu, Mkuze and Nongoma is managed as private game farms and lodges. About 26% of the area has been transformed, mostly by cultivation. Erosion is variable from low to high.

6.3.2 SVl 22 Northern Zululand Sourveld

The proposed transmission line also traversers the SVl **22 Northern Zululand Sourveld** vegetation type (**Figure 3**). This vegetation type consist of dominant structural vegetation type is wooded grassland, in places pure sour grasslands and rarely also dense bushveld thickets. Terrain is mainly low, undulating mountains, sometimes highly dissected, and also some moderately undulating plains and hills.

The SVl **22 Northern Zululand Sourveld** vegetation type is naturally found in the KwaZulu-Natal Province and Swaziland: From the Lusthof area in Swaziland southwards with scattered patches in northern Zululand in the surrounds of Hlomohlomo, east of Louwsburg, Nongoma and the vicinity of Ulundi including Nkandla. In the Hluhluwe-iMfolozi Park it occurs at highest altitudes in the park. Altitude mainly 450–900 m.

The SVl **22 Northern Zululand Sourveld** is classified as Vulnerable. A 19% conservation target has been set. An estimated 4% is statutorily conserved, mainly in the Hluhluwe-iMfolozi Park and Ithala Game Reserve. Some 22% already transformed, mainly by cultivation and plantations. Erosion is generally moderate to high.

6.3.3 Gm 15 Paulpietersburg Moist Grassland

The proposed development traverses the **Gm 15 Paulpietersburg Moist Grassland** vegetation type (**Figure 3**). This vegetation unit consists Mainly undulating with moderately steep slopes, but valley basins are wide and flat and mountainous areas occur mostly along the northern and eastern boundary. Tall closed grassland rich in forbs and dominated by *Tristachya leucothrix*, *Themeda triandra* and *Hyparrhenia hirta*. Evergreen woody vegetation is characteristic on rocky outcrops.

The **Gm 15 Paulpietersburg Moist Grassland** vegetation type is naturally found in the KwaZulu-Natal and Mpumalanga Provinces: Broad surrounds of Piet Retief, Paulpietersburg and Vryheid, extending westwards to east of Wakkerstroom. Occurs in the uppermost catchments of the Phongolo River. Altitude 920–1 500 m.

The **Gm 15 Paulpietersburg Moist Grassland** vegetation is classified as Vulnerable. A conservation target of 24% has been set, while Only very small portion statutorily conserved in Witbad, Vryheid Mountain, Paardeplaats and Phongola Bush Nature Reserves. Some private reserves protect small patches (Rooikraal, Mhlongamvula, Kombewaria). About one third already transformed by plantations or cultivated land. Heavy livestock grazing and altered fire regimes have greatly reduced the area of grasslands of high conservation value.

Aliens such as species of *Acacia*, *Eucalyptus* and *Pinus* are of major concern in places. Erosion very low (80%) or low (13%).

6.3.4 Gs 2 Ithala Quartzite Sourveld

A small section of the transmission line will be located within the **Gs 2 Ithala Quartzite Sourveld (Figure 3)**. The Gs 2 Ithala Quartzite Sourveld is typically found in Low mountain ranges and undulating hills with rocky lowlands. The general pattern is a mosaic of woody shrubs and small trees in rocky areas, interspersed in the grass layer. Vegetation structure varies according to altitude and rockiness, but the basal density of the grass sward is relatively low. This unit occurs in the zone between Grassland and Savanna where the dominant grassland gives way to woodland as elevation decreases. The grasslands are species-rich covering a variety of altitudes but sharing common species unique to the dystrophic quartzite geology.

This vegetation unit is generally found in KwaZulu-Natal and Mpumalanga Provinces and Swaziland. It is Confined to large quartzite patches that occur from Amsterdam, southwards east of Piet Retief and through Mahamba, to the Paris Dam and Ithala Game Reserve, with isolated outcrops near Magudu.It prefers altitudes that range from 440–1 360 m.

The Gs 2 Ithala Quartzite Sourveld is classified as **Least threatened**. The conservation target of 27% has not been reached. A total of 10% of this unit is protected within the Ithala Game Reserve. Land use pressures on this unit are low, probably because of its low nutrient status and rocky nature. Approximately 5% is under plantations and a further 5% has been transformed into cultivated land. Soil erosion potential is low.

The taxa associated with the dominant vegetation units are summarized on Table 1 below.

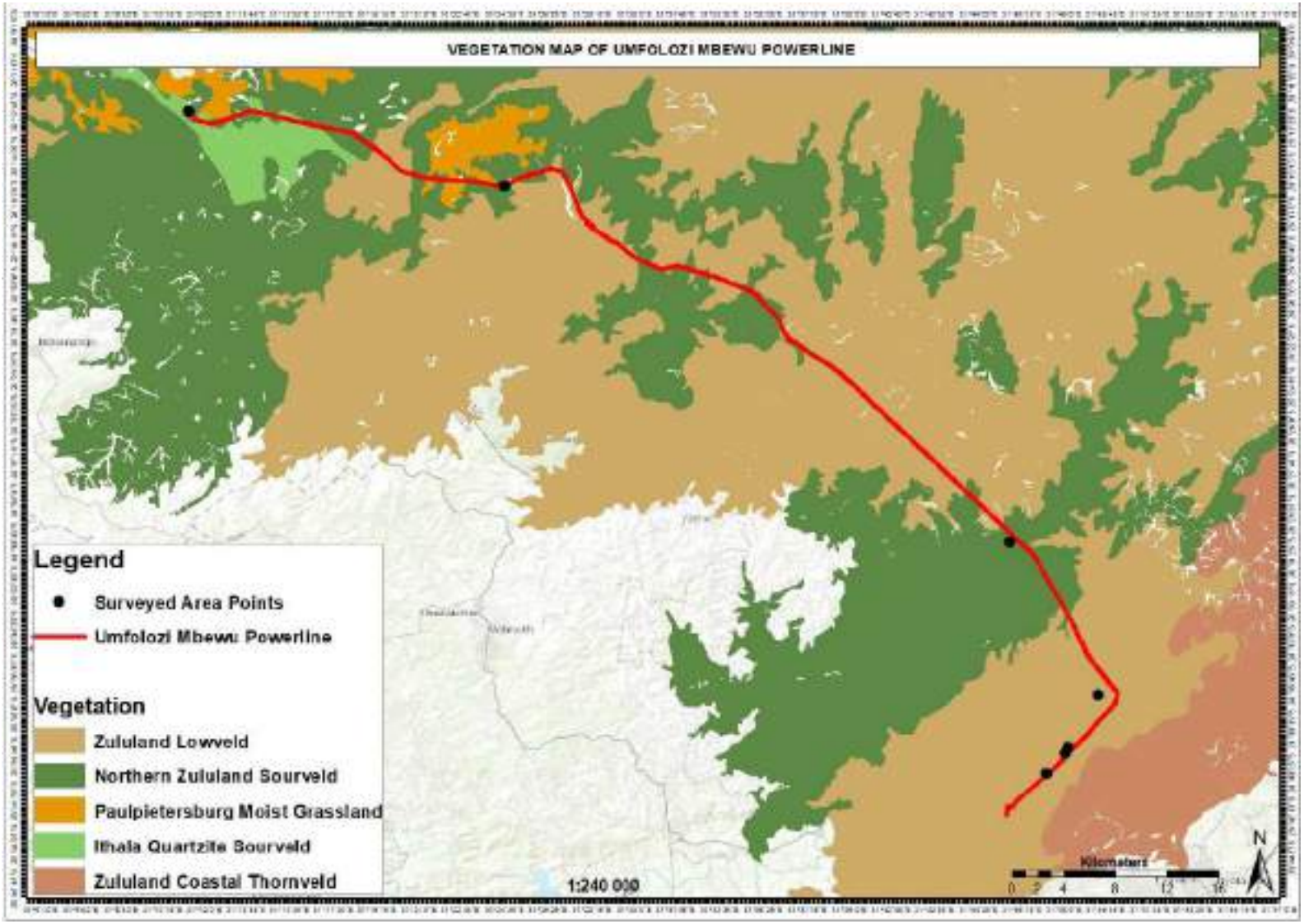

Figure 3: The vegetation type associated with the proposed transmission line (2012 Vegetation Map)

Table 1: Important Taxa within the study site (Mucina and Rutherford 2006)

PLANT FORM	SPECIES
	SVl 23 Zululand Lowveld
Tall Trees	*Acacia burkei (d), A. nigrescens (d), Sclerocarya birrea subsp. caffra (d). Small Trees: Acacia tortilis subsp. heteracantha (d), A. gerrardii, A. natalitia, A. nilotica, A. senegal var. rostrata, A. welwitschii subsp. welwitschii, Boscia albitrunca, Combretum apiculatum, C. molle, Ozoroa paniculosa, Phoenix reclinata, Schotia brachypetala, Spirostachys africana, Teclea gerrardii, Ziziphus mucronata.*
Succulent Trees	*Aloe marlothii subsp. marlothii, Euphorbia grandidens, E. ingens.*
Tall Shrubs	*Dichrostachys cinerea (d), Euclea divinorum (d), Coptosperma supra-axillare, Crotalaria monteiroi, Euclea crispa subsp. crispa, E. schimperi, Galpinia transvaalica, Gardenia volkensii, Gymnosporia maranguensis, G. senegalensis, Jatropha zeyheri, Lycium acutifolium, Olea europaea subsp. africana, Tarchonanthus parvicapitulatus, Tephrosia polystachya, Triumfetta pilosa var. tomentosa.*
Low Shrubs	*Barleria obtusa, Crossandra greenstockii, Felicia muricata, Gymnosporia heterophylla, Indigofera trita subsp. subulata, Justicia flava, J. protracta subsp. protracta, Melhania didyma, Orthosiphon serratus, Pearsonia sessilifolia, Ruellia cordata, Sida serratifolia, Tetraselago natalensis.*
Succulent Shrubs	*Euphorbia grandicornis, E. trichadenia, E. vandermerwei.*
Soft Shrub	*Pavonia columella.*
Herbaceous Climber	*Fockea angustifolia.*
Graminoids	*Dactyloctenium australe (d), Enteropogon monostachyus (d), Eragrostis capensis (d), E. curvula (d), E. racemosa (d), Heteropogon contortus (d), Panicum maximum (d), Sporobolus pyramidalis (d), Themeda triandra (d), Aristida bipartita, A. congesta, Bothriochloa insculpta, Chloris mossambicensis, Cymbopogon caesius, Digitaria natalensis, Leptochloa eleusine, Panicum deustum, Schizachyrium sanguineum, Setaria incrassata, Sporobolus nitens, Trachypogon spicatus, Tristachya leucothrix.*

Herbs	*Acrotome hispida, Argyrolobium rupestre, Aspilia mossambicensis, Chamaecrista biensis, C. mimosoides, Corchorus asplenifolius, Felicia mossamedensis, Gerbera ambigua, Helichrysum rugulosum, Hibiscus pusillus, Kohautia virgata, Lotononis eriantha, Senecio latifolius, Stachys aethiopica, Tragia meyeriana, Vernonia capensis.*
Succulent Herb	*Aloe parvibracteata.*
SVl 22 Northern Zululand Sourveld	
Small Trees	*Acacia sieberiana var. woodii (d), A. natalitia, A. nilotica, A. tortilis subsp. heteracantha, Plectroniella armata.*
Tall Shrubs	*Gardenia volkensii, Gnidia caffra, G. kraussiana.*
Low Shrubs	*Agathisanthemum bojeri, Chaetacanthus burchellii, Crossandra fruticulosa, C. greenstockii, Diospyros galpinii, Phyllanthus glaucophyllus, Ruellia cordata, Syncolostemon argenteus, Tetraselago natalensis.*
Succulent Shrub	*Aloe vanbalenii.*
Woody Climber	*Cryptolepis oblongifolia*
Herbaceous Climber	*Cyphostemma schlechteri*
Graminoids	*Eragrostis curvula (d), Hyparrhenia hirta (d), Microchloa caffra (d), Themeda triandra (d), Tristachya leucothrix (d), Alloteropsis semialata subsp. semialata, Digitaria argyrograpta, D. tricholaenoides, Diheteropogon amplectens, Elionurus muticus, Loudetia simplex, Trachypogon spicatus.*
Herbs	*Alepidea longifolia, Argyrolobium adscendens, Aster bakerianus, Berkheya speciosa, Chascanum hederaceum, Crabbea hirsuta, Gazania krebsiana subsp. serrulata, Gerbera ambigua, Helichrysum mixtum, H. nudifolium var. pilosellum, Hemizygia pretoriae subsp. pretoriae, Hermannia grandistipula, Hypericum aethiopicum, Lichtensteinia interrupta, Pimpinella caffra, Senecio glaberrimus, S. latifolius, Stachys nigricans, Vernonia galpinii, V. oligocephala.*
Geophytic Herbs	*Hypoxis hemerocallidea, Pachycarpus concolor.*
Succulent Herbs	*Aloe minima, A. parvibracteata, Senecio oxyriifolius*

Gs 2 Ithala Quartzite Sourveld	
Small Trees	*Combretum molle (d), Englerophytum magalismontanum (d), Syzygium legatii (d), Acacia caffra, A. davyi, Cassipourea swaziensis, Cussonia natalensis, Dombeya cymosa, Faurea rochetiana, F. saligna, Ficus burtt-davyi, Lannea discolor, Pachystigma macrocalyx, Pavetta edentula, Protea caffra subsp. caffra, P. roupelliae subsp. roupelliae, Pterocarpus angolensis.*
Tall Shrubs	*Morella piluli¬fera (d), Pavetta gracilifolia (d), Protea gaguedi, Rhus pallens, R. pentheri.*
Woody Climber	*Jasminum multipartitum.*
Low Shrubs	*Gymnosporia tenuispina (d), Helichrysum lepidissimum (d), Lopholaena platyphylla.*
Succulent Shrub	*Crassula sarcocaulis.*
Graminoids	*Heteropogon contortus (d), Hyperthelia dissoluta (d), Loudetia simplex (d), Monocymbium ceresiiforme (d), Panicum natalense (d), Themeda triandra (d), Trachypogon spicatus (d), Bothriochloa insculpta, Diheteropogon amplec¬tens, Melinis nerviglumis, Pogonarthria squarrosa, Sporobolus pectinatus.*
Herbs	*Anisopappus smutsii (d), Xerophyta reti¬nervis..*
Succulent Herb	*Aloe cooperi subsp. cooperi*
Succulent Herbaceous Climber	*Ceropegia sandersonii*
Gm 15 Paulpietersburg Moist Grassland	
Graminoids:	*Alloteropsis semialata subsp. eckloniana (d), Andropogon schirensis (d), Brachiaria serrata (d), Ctenium concinnum (d), Cymbopogon caesius (d), Digitaria tricholaenoides (d), Eragrostis racemosa (d), Harpochloa falx (d), Heteropogon contortus (d), Hyparrhenia hirta (d), Loudetia simplex (d), Microchloa caffra (d), Monocymbium ceresiiforme (d), Rendlia altera (d), Setaria nigrirostris (d), Themeda triandra (d), Tristachya leucothrix (d), Andropogon appendiculatus, Cynodon hirsutus, Diheteropogon amplectens,*

	D. filifolius, Elionurus muticus, Eragrostis chloromelas, E. curvula, E. plana, Festuca scabra, Melinis nerviglumis, Panicum ecklonii, P. natalense, Trachypogon spicatus, Urelytrum agropyroides.
Herbs:	*Argyrolobium speciosum (d), Cissus diversilobata (d), Dicoma zeyheri (d), Eriosema kraussianum (d), Geranium wakkerstroomianum (d), Helichrysum nudifolium var. nudifolium (d), Ipomoea oblongata (d), Pelargonium luridum (d), Acalypha glandulifolia, A. peduncularis, Acanthospermum australe, Aster bakerianus, Becium filamentosum, Berkheya setifera, Dicoma anomala, Euryops laxus, E. transvaalensis subsp. setilobus, E. transvaalensis subsp. transvaalensis, Helichrysum rugulosum, H. simillimum, Indigofera hilaris var. hilaris, I. velutina, Kohautia amatymbica, Pearsonia grandifolia, Pentanisia prunelloides subsp. latifolia, Senecio bupleuroides, S. coronatus, S. inornatus, S. isatideus, S. latifolius, Sonchus nanus, Thunbergia atriplicifolia, Vernonia capensis, V. natalensis, Xerophyta retinervis.*
Herbaceous Climber:	*Rhynchosia totta.*
Geophytic Herbs:	*Chlorophytum haygarthii (d), Gladiolus aurantiacus (d), Agapanthus inapertus subsp. intermedius, Asclepias aurea, Cheilanthes hirta, Cyrtanthus tuckii var. transvaalensis, Hypoxis colchicifolia, H. costata, H. rigidula var. pilosissima, Moraea brevistyla, Pteridium aquilinum, Watsonia latifolia, Zantedeschia rehmannii.*
Succulent Herbs:	*Aloe ecklonis, A. maculata, Lopholaena segmentata.*
Small Trees:	*Canthium cili-atum (d), Dombeya rotundifolia, Vangueria infausta.*
Succulent Tree:	*Aloe marlothii subsp. marlothii..*
Tall Shrubs:	*Calpurnia sericea (d), Rhus rehmanniana (d), Diospyros lycioides subsp. guerkei, Euclea crispa subsp. crispa. Low Shrubs: Rhus discolor (d), Anthospermum rigidum subsp. pumilum, A. rigidum subsp. rigidum, Clutia monticola, Diospyros galpinii, Erica oatesii, E. woodii, Hermannia geniculata, Indigofera arrecta, Otholobium wilmsii, Polygala uncinata, Pseudarthria hookeri, Rubus rigidus.*
Succulent Shrub:	*Euphorbia pulvinata*

6.4 2014 KWAZULU NATAL (KZN) BIODIVERSITY SECTOR PLANS

According to the 2014 Kwa Zulu Natal Biodiversity Conservation Plan[1], the Umfolozi-Mbewu (Theta) Transmission line is located within a Critical Biodiversity Area (CBA). Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. A small section of the transmission line passes through an Ecological Support Area (ESA)(**Figure 4**, Sensitivity map). Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services.

NB! The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes[2].

[1] MTPA. 2014. Mpumalanga Biodiversity Sector Plan Handbook. Compiled by Lötter M.C., Cadman, M.J. and Lechmere-Oertel R.G. Mpumalanga Tourism & Parks Agency, Mbombela (Nelspruit)
[2] Chapter 12 of the National Biodiversity Assessment (Driver et al. 2012)

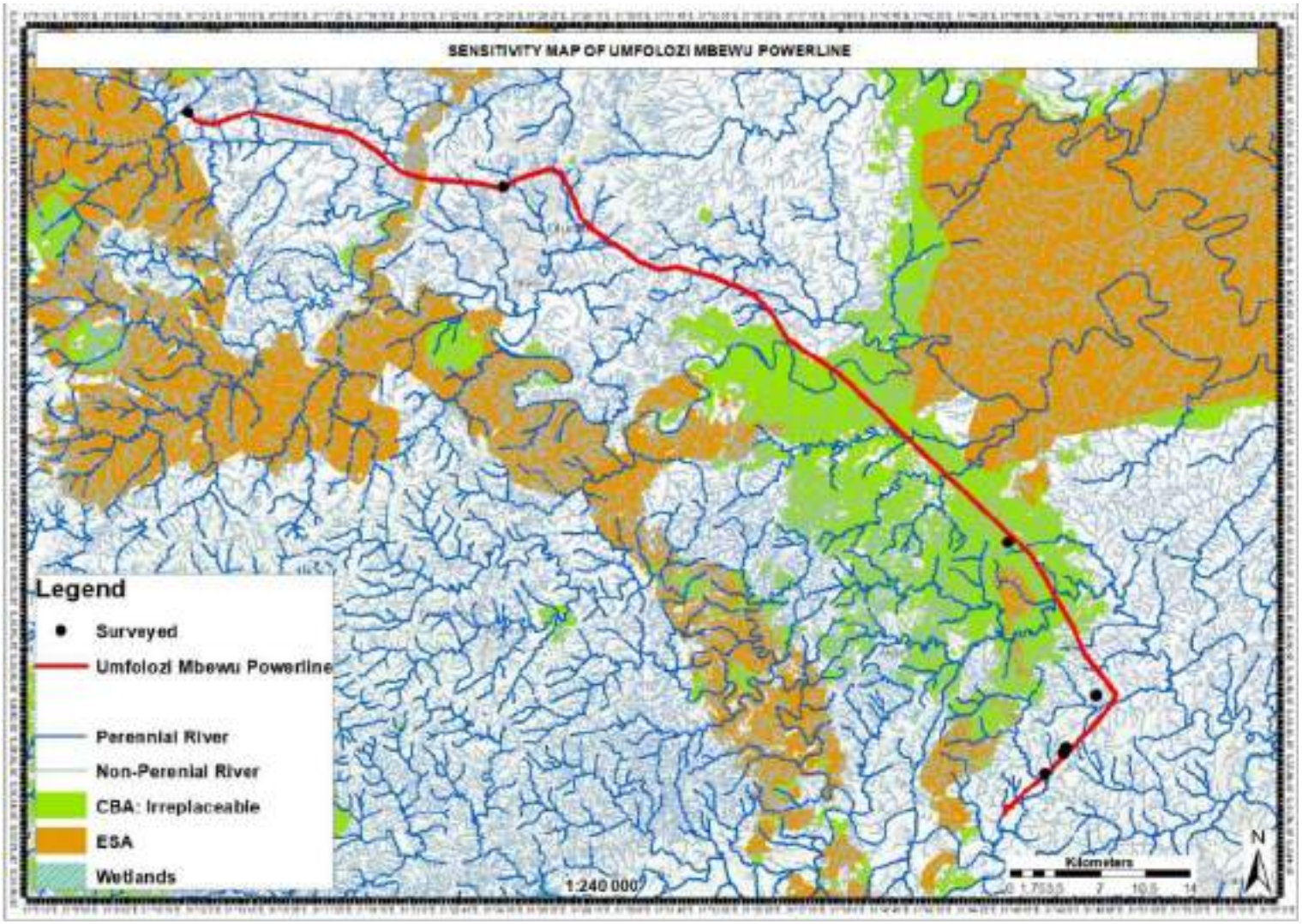

Figure 4: Sensitivity Map

6.5 WATERCOURSES ON SITE

The aquatic sensitivity of the proposed site is classified as **VERY HIGH** in the Screening Report. The National Freshwater Ecosystems Priority Areas (NFEPA) identifies important wetlands in South Africa (**Figure 5**), The study site falls under the Usuthu to Mhlathuze Water Management Area (WMA=10). **Figure 5** is a specific representation of the watercourses/wetlands that are found along the proposed Umfolozi-Mbewu Transmission Line. The proposed transmission line will be located within 500m of a number of watercourses.

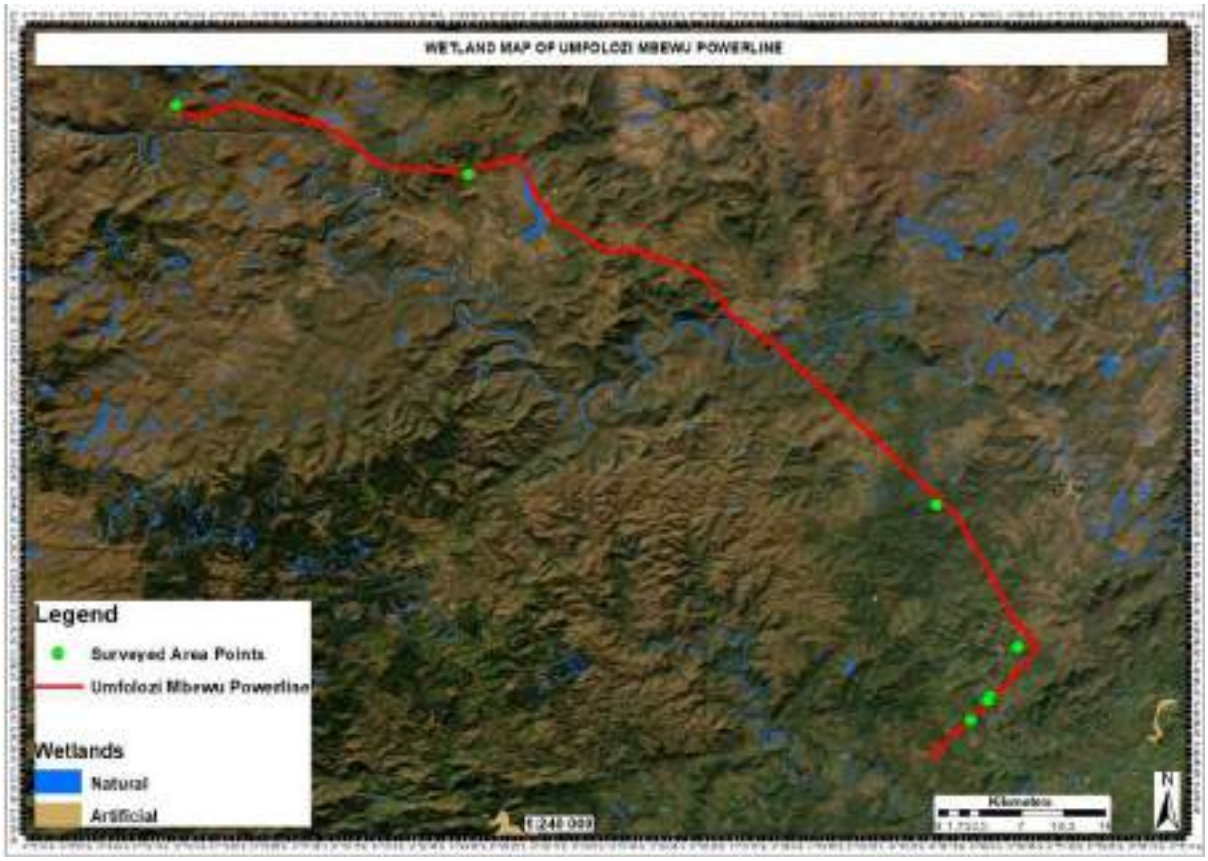

Figure 5: Wetland/Watercourses along the Marieskop Access Road.

7 METHODOLOGY

The site visits were done on the **17-19 January 2023**. The site visit entailed walking and driving the study site (90km, 80m wide) while investigating both fauna and flora. Sampling points were predetermined to guide the site inspection process. The aim of the fieldwork component was to scan the study site to gain insight into the current faunal and floral assemblages, to detect any special species that might be present on site.

7.1 SPECIES OF SPECIAL CONCERN (SSC)

The International Union of Conservation Networks (IUCN) is the international authority for Red Data species. In South Africa, the Threatened Species Programme (TSP) undertakes this role, in collaboration with the South Africa National Biodiversity Institute (SANBI). SSC include any national Red Data, Nationally Protected, Provincially Protected or endemic species recorded on site. The Red Data listed flora and fauna species identified were classified according to the following categories:

- Extinct (EX) – No known individuals remaining;
- Extinct in the Wild (EW) – Known only to survive in captivity, or as a naturalized population outside its historic range;
- Critically Endangered (CR) – Extremely high risk of extinction in the wild;
- Endangered (EN) – High risk of extinction in the wild;
- Vulnerable (VU) – High risk of endangerment in the wild;
- Near Threatened (NT) – Likely to become endangered in the near future;
- Least Concern (LC) – Lowest risk. Does not qualify for a more at risk category. Widespread and abundant taxa are included in this category;
- Data Deficient (DD) – Not enough data to make an assessment of its risk of extinction; and
- Not Evaluated (NE) – Has not yet been evaluated against the criteria.

7.2 IMPACTS ASSESSMENT

The potential impacts of the proposed expansion, existing operations and the alternatives were rated using a clearly defined rating scale. The significance rating formula is as follows:

Significance = Consequence x Probability

Where

Consequence = Type of Impact x (Intensity + Spatial Scale + Duration)

And

Probability = Likelihood of an Impact Occurring

In addition, the formula for calculating consequence:

***Type of Impact** = **+1** (Positive Impact) or **-1** (Negative Impact)*

The weight assigned to the various parameters for positive and impacts to biodiversity is provided for in the formula and is presented in **Table 2.** The probability consequence matrix is displayed in **Table 3**, with the impact significance rating described in **Table 4**.

Table 2: Biodiversity Impact Assessment Parameter Ratings

Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or ecosystem. Persistent severe damage. Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	Noticeable, on-going social and environmental benefits which have improved the livelihoods and living standards of the local community in general and the environmental features.	International The effect will occur across international borders.	Permanent: No Mitigation The impact will remain long after the life of the Project.	Certain/ Definite. There are sound scientific reasons to expect that the impact will definitely occur.
6	Significant impact on highly valued species, habitat or ecosystem. Irreparable damage to highly valued items of cultural significance or breakdown of social order.	Great improvement to livelihoods and living standards of a large percentage of population, as well as significant increase in the quality of the receiving environment.	National Will affect the entire country.	Beyond Project Life The impact will remain for some time after the life of a Project.	Almost certain/Highly probable It is most likely that the impact will occur.
5	Very serious, long-term environmental impairment of ecosystem function that	On-going and widespread positive benefits to local communities which	Province/ Region Will affect the entire province or region.	Project Life	Likely The impact may occur.

Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
	may take several years to rehabilitate. Very serious widespread social impacts. Irreparable damage to highly valued items.	improves livelihoods, as well as a positive improvement to the receiving environment.		The impact will cease after the operational life span of the project	
4	Serious medium-term environmental effects. Environmental damage can be reversed in less than a year. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense social benefits to some people. Average to intense environmental enhancements.	Municipal Area Will affect the whole municipal area.	Long term 6-15 years.	Probable Has occurred here or elsewhere and could therefore occur.
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month.	Average, on-going positive benefits, not widespread but felt by some.	Local Extending across the site and to nearby settlements.	Medium term 1-5 years.	Unlikely Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility that the impact will occur.

Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
	On-going social issues. Damage to items of cultural significance.				
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by very few of population.	Limited Limited to the site and its immediate surroundings.	Short term Less than 1 year.	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the Project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures.
1	Limited damage to minimal area of low significance	Some low-level social and environmental benefits felt	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month.	Highly unlikely/None Expected never to happen.

Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
	that will have no impact on the environment. Minimal social impacts, low-level repairable damage to commonplace structures.	by very few of the population.			

Table 3: Probability Consequence Matrix

	Significance
Probability	
	Consequence

Table 4: Significance Threshold Limits

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment.	
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation	

Score	Description	Rating
	of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects.	
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	

7.3 STUDY LIMITATIONS

- The site inspection is based on sample across the 90km long and 80m wide servitude, rather the entire 90km servitude.
- It is assumed that plant species flowering only during specific times of the year could be confused with a very similar species of the same genus.
- Some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.
- Data collection in this study relied heavily on data from representative, homogenous sections of vegetation units, as well as general observations, analysis of satellite imagery from the past until the present, generic data and a desktop analysis.
- No faunal trapping was conducted as part of this study. The faunal assessment relied heavily on desktop and literature studies, supported by on-site observations.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

8 RESULTS OF THE FLORA ASSESSMENT

The study site (approximately 90km) is naturally supposed to consist of five vegetation units namely, Zululand Lowveld, Northern Zululand Sourveld, Paulpietersburg Moist Grassland,

Ithala Quartzite Sourveld and Zululand Coastal Thornveld vegetation units (**Figure 3, above**). However as indicated in the landuse Map (**Figure 2, above**) that land has been transformed by agricultural activities with patches of indigenous vegetation across the proposed servitude (**Figures 6-9**).The transformation/ disturbance onsite has created an suitable habitat for proliferation of invasive alien plant species (**Figure 10**). The area near the substation has a large Lantana camara infestation, and thus any disturbance to the land will exacerbate the infestation. The study site has indigenous vegetation scattered across the broader area, however there are small sections of the servitude that will be located in disturbed land.

Figure 6:Over of the study site along the proposed servitude (Points 38-40) .

Figure 7: Overview of Point 38-30, the servitude is dominated by indigenous plant species.

Figure 8: Overview of the servitude near Ulundi (Located between Point 16-15).

Figure 9: Starting Point of the proposed powerline.

Figure 10: Alien invasive plant species (A -Lantana camara , B-*Opuntia* spp, and C-*Cereus jamacaru*

8.1 FLORA SPECIES OF SPECIAL CONCERN

One national protected plant species was recorded on site, namely *Sclerocarya birrea* (Marula) within the study site. The Marula Plant is a medium-sized to large deciduous tree with an erect trunk and rounded crown. It is one of the plants that played a role in feeding people in ancient times. The study site was found to be rich in endemic species. Endemism is the ecological state where species are confined to a specific region or habitat. Some endemic species were recorded on site such as the *Acacia species*, which was abundant throughout the habitats on site (**Figure 10**).

Figure 11: *Sclerocarya birrea* (Marula) observed within the study site.

8.1.1 Ethnobotanical plant species

Ethnobotany/ Ethnoecology is a branch of botany that focuses on the use of plants for medicines, cultural and recreational purposes. The overexploitation of indigenous plants for ethnobotanical purposes can be detrimental to populations of those particular plant species, and the other species that depend on its existence for their survival.

South Africa has a rich diversity of medicinal plants that not only have a global significance, but also have a cultural and historical role (van Wyk *et al*. 2009). There is a rapidly growing concern for conservation of medicinal plants that are dwindling in number due to illegal harvesting (Institute of Natural Resources 2003). This is particularly apparent in rural areas where medicinal plants are overexploited by traditional doctors.

The study site has an abundance of Aloe species onsite (**Figure 12**). Aloe species have economic and cultural value. Aloes have a very long history of medicinal, cosmetic and cultural uses. Many early civilizations were familiar with the healing properties of *Aloe vera* in particular. This species likely originates from the Arabian Peninsula, but is today cultivated almost world-wide and has become naturalised in many areas. Over the past decades the use of *Aloe ferox*, indigenous to South Africa, in the traditional pharmaceutical and cosmetic industry has increased significantly[3].

Figure 12: Aloe species observed along the servitude of the proposed transmission line.

9 RESULTS OF THE FAUNA ASSESSMENT

9.1 MAMMALS

According to the desktop study conducted, the species listed in **Table 5** were identified as being possible to occur within the study area or the immediate vicinity of the proposed construction area. It must be noted that some of these species are very sensitive to habitat and in some instances; the likeliness for them to occur is minimal. There are nine Red List mammal species that have a HIGH chance of occurring in the study area. Cattle and other domestic animals graze in the property.

[3] http://pza.sanbi.org/aloe-genus

Table 5: Sensitive mammals that are likely to occur onsite

COMMON NAME	RECORDED ON SITE
Spotted necked otter	None
Greater dwarf shrew	None
Pangolin	None
Rock dormouse	None
Lesser grey-brown musk	None
African weasel	None
Brown hyena	None
Honey badger	None
Southern hedgehog	None

9.1.1 Field Investigation Findings

The site is also used for grazing by cattle (**Figure 13**). None of the sensitive mammals which were expected were spotted on site except for droppings of smaller mammals such as hare or rabbit species. The presence of the agricultural activities and the seasonality issues may explain why all the sensitive mammals were not seen during the site visit. Some of the expected animals are nocturnal, and thus may only be seen at night.

Figure 13: Grazing Cattle Observed onsite.

9.2 REPTILES

There are three Red List reptile species that could occur in the study area, i.e. the African rock python, the Swazi rock snake and the variegated wolk snake. All three of these have a high chance of occurring in the study area, on the basis of habitat requirements and are most likely to occur in rocky habitats, either on rocky outcrops or in rocky, well wooded valleys.

9.2.1 Field investigation findings

None of the expected reptiles were observed on site during the site visit.

9.3 AVIFAUNA

Birds are generally regarded as good ecological indicators, because their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological conditions are directly linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index,

2007). Land cover is directly linked to habitats within the study area. The diversity of these habitats should give rise to many different species.

According to the South African Bird Atlas Project (SABAP2), almost 300 species of birds have been identified in the Sekhukhuneland area; the majority of these birds are comprised of Bushveld, Grassland and Mountainous species. All birds that could be present within the vicinity of the study area are listed in **Table *6***.

Table 6: Red Data bird species potentially found within the study site.

Scientific Name	Common Name	IUCN Status
Geronticus calvus	Southern Bald Ibis	VU
Sagittarius serpentarius	Secretary bird	NT
Gyps coprotheres	Cape Vulture	VU
Stephanoaetus coronatus	African Crowned Eagle	NT
Circus ranivorus	African Marsh-Harrier	VU
Circus maurus	Black Harrier	NT
Falco biarmicus	Lanner Falcon	LC
Alcedo semitorquata	Half Collared Kingfisher	CR
Bugeranus carunculatus	Wattled Crane	VU
Anthropoides paradiseus	Blue Crane	VU
Balearica regulorum	Grey Crowned Crane	VU
Eupodotis senegalensis	White-bellied Korhaan	VU

9.3.1 Field investigation findings

A few avifaunal species were spotted onsite during the site visit, the species were observed within a watercourses. The proposed development might have a negative impacts on the avifaunal species.

9.4 INVERTEBRATES

Butterflies are a good indication of the habitats available in a specific region (Woodhall 2005). Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope or endemic species (specific habitat requirements with populations concentrated in a small area) which may be very specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and therefore identify. A list of butterflies that are likely to be observed on the study site and the surrounding areas are summarised in **Table 7**.

Table 7: Butterfly species expected to occur on site.

Scientific Name	Common Name
Melanitis leda Helena	Evening Brown
Acraea anemosa	Broad-bordered Acraea
Acreae neobule	Wandering Acraea
Danaus chrysippus	African Monarch butterfly
Junonia hierta cebrene	Yellow Pansy butterfly
Danays chrysippus	Southern Milkweed
Charaxes jasius	Koppie Emperor
Cyclyrius pirithous	Common Blue
Hyalites esebria	Dusky Acrea butterfly
Phalantha aethiopica	Poplar Leopard
Alaena amazoula	Yellow Zulu
Catacroptera cloanthe	Pirate butterfly
Charaxes achaemenses	Bushveld Emperor
Pinacopteryx eriphia	Zebra White butterfly
Eurema brigitta	Broad-bordered yellow
Vanessa cardui	Painted Lady
Papilio demodocus	Citrus Swallowtail butterfly

9.4.1 Field investigation findings

Figure 14:Eurydema oleracea observed onsite.

Figure 15: Snail observed onsite.

10 IMPACT ASSESSMENT

The impact assessment is aimed at predicting potential impacts of the proposed project. Impact assessment strives to avoid damage, loss of ecosystems services, and where they cannot be avoided, to reduce and mitigate these impacts (DEA, 2013). Offsets to compensate for loss of habitat are regarded as a last resort, after all efforts have been made to avoid, reduce and mitigate. The mitigation hierarchy is represented in **Table 8**.

Table 8: Mitigation hierarchy of impacts

Avoid or Prevent	Refers to considering options in project location, sitting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services and people. This is the best option but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts, construction should not take place. In such cases, it is unlikely to be possible or appropriate to rely on the other steps in the mitigation.
Minimise	Refers to considering alternatives in the project location, sitting, scale, layout, technology and phasing that would minimise impacts on biodiversity, associated ecosystem services. In cases where there are environmental constraints, every effort should be made to minimise impacts.
Rehabilitate	Refers to rehabilitation of areas where impacts are unavoidable, and measures are provided to return impacted areas to near natural state or an agreed land use after mine closure. Rehabilitation can, however, fall short of replicating the diversity and complexity of natural systems.
Offset	Refers to measures over and above rehabilitation to compensate for the residual negative impacts on biodiversity after every effort has been made to minimise and then rehabilitate the impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

A small portion of the study site is anticipated to be lost due to the proposed transimion line construction and associated activities. The impact of the proposed activity will involve a loss of habitat for both flora and fauna.

10.1 LOSS OF HABITAT

The study site still has areas that have vegetation regarded as intact and to some degree species diverse. In addition to this, the transmission line crosses a Critical Biodiversity Area (CBA), with endemics and protected plant species present. As a result of this, the impacts

of the proposed construction and associated aspects and features, although limited in extent are regarded as significant. Due to disturbance of the soil and removal of vegetation, it is likely that alien plants will continue to establish on site.

Alien plants often reduce the diversity of an area due to their invasive habit. Invasive plants grow prolifically and out-compete native species. Loss of vegetation will be reversible, due to the nature of the proposed development. Many species in this habitat are adapted to specific soil composition and structure and the natural species composition cannot be restored after disturbance to the soil (Victor et al. 2005). The impacts attributed with the loss of habitat are listed below in the phase they occur.

10.1.1 Construction phase

Table 9: Loss of habitat during construction phase

Loss of habitat					
Phase	**Construction**				
Criteria	**Details / Discussion**				
Description of impact	• Removal of vegetation • Disturbance of the soil • Vehicle operation				
Mitigation required	• Minimise the impacted area and clear only what it is required. • Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation • Employ stormwater management measures				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.1.2 Operational phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur. In addition, vehicular transport through the site may increase the risk of roadkill of fauna species that occur.

Table 10: Loss of habitat during operation phase

Loss of habitat					
Phase	**Operational**				
Criteria	**Details / Discussion**				
Description of impact	• Establishment of alien plant species in disturbed areas				
Mitigation required	• Manage alien invasive species establishment continually through environmentally friendly chemical or mechanical removal. • Reinstate vegetation cover through concurrent rehabilitation.				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.1.3 Decommissioning phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur as vehicles and machinery move throughout the site and disturb the soil.

Table 11: Loss of habitat during decommissioning

Loss of habitat					
Phase	**Decommissioning**				
Criteria	**Details / Discussion**				
Description of impact	• Removal infrastructure and equipment • Disturbance of the soil • Vehicle operation				
Mitigation required	• Minimise the impacted area and revegetate with indigenous where disturbed • Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation • Employ stormwater management measures				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***

Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.1.4 Post-closure phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion should be monitored for up to three years after closure.

Table 12: Loss of habitat during post-closure phase

Loss of habitat					
Phase	**Post-closure**				
Criteria	**Details / Discussion**				
Description of impact	• On-going establishment of alien plant species in disturbed areas				
Mitigation required	• Manage alien invasive species establishment continually through chemical or mechanical removal. • Revegetation of the site where previously disturbed.				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.2 LOSS OF SPECIES OF SPECIAL CONCERN (SSC)

The loss of vegetation habitat on site will reduce the area available for fauna species. Since fauna have the ability to flee the area, the impacts on common animal species are not regarded as significant. Endemic fauna, however, have specific habitat requirements and the impacts on these species are considered to be highly significant.

The impact of the loss of plant SSC can be reduced by implementing a plant relocation strategy. Plant SSC can be located, removed (and seeds collected) and relocated either in an area within proximity to the site or a nursery. If plants are to be translocated to a different area, it is imperative that the donor and host habitat are similar with regard to topography, geology, soil form and orientation of the slope face. Alternatively, a nursery can be established on site where SSC can be relocated to. Loss of some SSC will invariably occur during either process.

10.2.1 Construction phase

The greatest impact is expected during the construction phase for loss of SSC.

Table 13: Loss of SSC during construction phase

Loss of SSC					
Phase	**Construction**				
Criteria	**Details / Discussion**				
Description of impact	• Removal of vegetation • Increased human presence • Machinery and vehicle operation (noise)				
Mitigation required	• Minimise the impacted area and clear only what is required • Tag and avoid all Red Data plants • Plant SSC according to a relocation plan as a last resort • Restricting blasting and operation of machinery to daylight hours				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.2.2 Operational phase

No impacts to SSC are expected during the operational phase.

10.2.3 Decommissioning phase

No impacts to SSC are expected during the decommissioning phase.

10.2.4 Post-closure phase

No impacts to SSC are expected during the Post closure phase.

10.3 CUMULATIVE IMPACTS

The proposed project area is located in an area that is regarded as ecologically sensitive, however the servitude cuts through areas that have been affected by agricultural activities (sugar cane plantations). The area has evidence of disturbance from the ongoing anthropogenic landuses operations. According to the above risk assessment the proposed project and associated infrastructures will place additional pressure on the environment especially on the fauna; that will be subjected to increased human presence, reduction in habitat and elevated noise levels. The results of the fauna survey indicate that fauna activity within the area might temporary decline during the construction phase, it will be re-instated after construction. Further to this, the cumulative loss of fauna and flora is expected.

11 DISCUSSION

The bulk of the study site is located along a Critical Biodiversity Area (CBA), an Ecological Support Area (ESA). The access road traverses five different vegetation units, four of which are classified as Vulnerable. The vegetation units have been affected by the ongoing land uses which include sugarcane plantations, however there are areas that are dominated by indigenous vegetation. The impacts of the proposed development on the indigenous vegetation are considered significant, however since the impacts will be restricted to the servitude, and thus the impacts can be mitigated.

Since endemism and species richness are highly relevant to the prioritisation of areas for conservation, due to the existing disturbance the site has lost some of sensitivity especially along cultivated land. Loss of endemic plant diversity in the study site will also result in a loss of faunal biodiversity and a resultant loss of faunal SSC. This is of specific relevance to invertebrates, since they are dependent on those plant species.

Due to the nature of the proposed development the impact is expected to be significant but can be mitigated if the proposed development is restricted to the servitude. In addition to loss of important natural heritage, alien invasion is expected to occur, resulting in further degradation of vegetation. However, if the proposed is executed as per the Environmental

Management Programme will help minimise the impact by restricting the development to areas that are already disturbed and conserving the undisturbed sites.

12 CONCLUSION AND RECOMMENDATIONS

The study site was surveyed on the 16-19 January 2023 to ascertain the overall state of biodiversity. According to the South African National Biodiversity Institute (SANBI), the majority of the powerline transmission servitude cuts through a Critical Biodiversity and Ecological Support Area, this implies that the proposed site plays a role in meeting biodiversity targets for ecosystems, species and ecological processes as identified in a systematic biodiversity plan. The proposed site has suffered general veld transformation because of the forestry and sugarcane plantation and associated activities. The proposed site has a number of protected trees namely *Sclerocarya birrea* (Marula), in addition to this the study site has a number of watercourses which are considered as sensitive habitats. Specific conclusions and recommendations are listed below:

- When selecting alternatives, it recommended to select sites have been impacted if possible, inorder to minimise the footprint of the project. The pristine sites should be used as a last resort. This will help conserve the remaining vegetation, and thus maintain ecosystem services.
- If any of the plant Species of Special Concern such as the Marula tree are identified during clearing of vegetation for the construction area, they should be recorded with a GPS and reported so that a relocation strategy can be employed by a suitably qualified botanical specialist. Given that plant SSC are present in large numbers on site, it is highly likely that some of these species will be encountered. No plant SSC should be destroyed as a result of the proposed activity.
- Fauna and Flora monitoring is recommended. The following should be adhered to for the monitoring programme:
  - Monitoring must take place on a monthly basis during the construction phase, and once after construction;
  - Monitoring must be completed by qualified specialists;
  - Adaptive management must be applied;
  - Monitoring during the wet season is essential; and
  - Findings must be compared to previous years.

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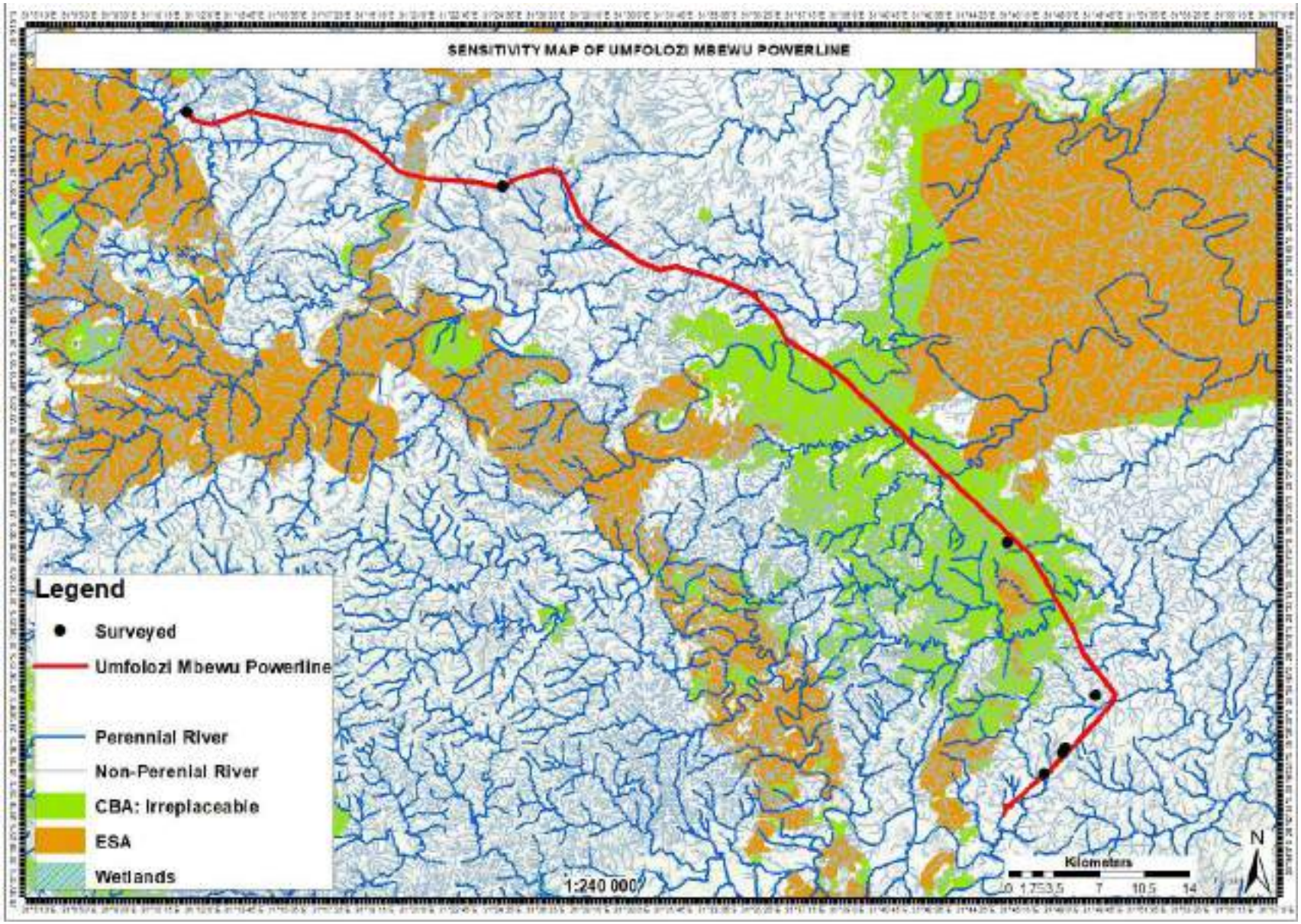
APPENDIX A: SENSITIVITY MAP


SENSITIVITY MAP OF UMFOLOZI MBEWU POWERLINE
Legend
Surveyed
Umfolozi Mbewu Powerline
Perennial River
Non-Perenial River
CBA: Irreplaceable
ESA
Wetlands
1:240 000
Kilometers
0 1.753.5 7 10.5 14
N

APPENDIX B: PLANT SPECIES

Spreadsheet for creating species lists for describing vegetation types. It allows formatting in the paragrpaphs as contained in the book Mucina and Rutherford (2

VegType	Name of vegetation type. Full name, e.g. SVcb 21 Soutpansberg Mountain Bushveld
TaxonList	Important Taxa; Endemic Taxa; Biogeogrphically Important Taxa.
SubDivision	Vegetation type subdivision (optional, e.g. 'Mistbelt bush clumps', 'Open savanna sandveld' in SVcb 21 Soutpansberg Mountain Bushveld)
FamilyName	Name of family in which the taxon is classified. This is not essential, but is useful for quality control purposes.
GrowthForm	Refer to Table 2.1 (page 26 of Mucina & Rutherford (2006))
TaxonName	Name of taxon. Normally no subspecies or variety, unless they are diagnostic or endemic. Avoid sp. or spp. Do not abbreviate genus names - tha
Superscript	Superscript. It must include an explanation of what the superscript means.
text for superscript	e.g. ([T]Cape thickets, [W]Wetlands) e.g. T for 'Cape Thickets' in FFs1, page 99 of Mucina & Rutherf
Dominant	Dominant (biomass) or prominent (e.g. conspicuous). See p. 27 of Mucina & Rutherford (2006). Other unformatted suggested text can be put her
Sort	This gives the order in which the author intends the species to be listed. Not essential, but highly desirable to give the author's choice.
Qualifier	Any qualifier as it appears in the book.e.g. variant 'speciosa'; (West Coast endemic); (southernmost distribution limit)
Growth Form Sort	Refer to the tab **Growth forms and order**. The order should normally follow the order already used in the biome.

VegType	TaxonList	SubDivision	FamilyName	GrowthForm	TaxonName
SVl 23 Zululand Lowveld	Biogeographically Important Taxa		FABACEAE	Small Tree	Acacia theronii
SVl 23 Zululand Lowveld	Biogeographically Important Taxa		SOLANACEAE	Tall Shrub	Lycium shawii
SVl 23 Zululand Lowveld	Important Taxa		ACANTHACEAE	Low Shrubs	Barleria obtusa
SVl 23 Zululand Lowveld	Important Taxa		ACANTHACEAE	Low Shrubs	Crossandra greenstockii
SVl 23 Zululand Lowveld	Important Taxa		ACANTHACEAE	Low Shrubs	Justicia flava
SVl 23 Zululand Lowveld	Important Taxa		ACANTHACEAE	Low Shrubs	Justicia protracta subsp. protracta

SVl 23 Zululand Lowveld	Important Taxa	ACANTHACEAE	Low Shrubs	Ruellia cordata
SVl 23 Zululand Lowveld	Important Taxa	ANACARDIACEAE	Small Trees	Ozoroa paniculosa
SVl 23 Zululand Lowveld	Important Taxa	ANACARDIACEAE	Tall Trees	Sclerocarya birrea subsp. caffra
SVl 23 Zululand Lowveld	Important Taxa	APOCYNACEAE	Herbaceous Climber	Fockea angustifolia
SVl 23 Zululand Lowveld	Important Taxa	ARECACEAE	Small Trees	Phoenix reclinata
SVl 23 Zululand Lowveld	Important Taxa	ASPHODELACEAE	Succulent Herb	Aloe parvibracteata
SVl 23 Zululand Lowveld	Important Taxa	ASPHODELACEAE	Succulent Trees	Aloe marlothii subsp. marlothii
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Herbs	Aspilia mossambicensis
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Herbs	Felicia mossamedensis
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Herbs	Gerbera ambigua
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Herbs	Helichrysum rugulosum
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Herbs	Senecio latifolius
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Herbs	Vernonia capensis
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Low Shrubs	Felicia muricata
SVl 23 Zululand Lowveld	Important Taxa	ASTERACEAE	Tall Shrubs	Tarchonanthus parvicapitulatus
SVl 23 Zululand Lowveld	Important Taxa	CAPPARACEAE	Small Trees	Boscia albitrunca
SVl 23 Zululand Lowveld	Important Taxa	CELASTRACEAE	Low Shrubs	Gymnosporia heterophylla
SVl 23 Zululand Lowveld	Important Taxa	CELASTRACEAE	Tall Shrubs	Gymnosporia maranguensis
SVl 23 Zululand Lowveld	Important Taxa	CELASTRACEAE	Tall Shrubs	Gymnosporia senegalensis
SVl 23 Zululand Lowveld	Important Taxa	COMBRETACEAE	Small Trees	Combretum apiculatum
SVl 23 Zululand Lowveld	Important Taxa	COMBRETACEAE	Small Trees	Combretum molle
SVl 23 Zululand Lowveld	Important Taxa	EBENACEAE	Tall Shrubs	Euclea crispa subsp. crispa
SVl 23 Zululand Lowveld	Important Taxa	EBENACEAE	Tall Shrubs	Euclea divinorum
SVl 23 Zululand Lowveld	Important Taxa	EBENACEAE	Tall Shrubs	Euclea schimperi
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Herbs	Tragia meyeriana
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Small Trees	Spirostachys africana
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Succulent Shrubs	Euphorbia grandicornis
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Succulent Shrubs	Euphorbia trichadenia
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Succulent Shrubs	Euphorbia vandermerwei
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Succulent Trees	Euphorbia grandidens
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Succulent Trees	Euphorbia ingens
SVl 23 Zululand Lowveld	Important Taxa	EUPHORBIACEAE	Tall Shrubs	Jatropha zeyheri
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Herbs	Argyrolobium rupestre

SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Herbs	Chamaecrista biensis
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Herbs	Chamaecrista mimosoides
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Herbs	Lotononis eriantha
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Low Shrubs	Indigofera trita subsp. subulata
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Low Shrubs	Pearsonia sessilifolia
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Small Trees	Acacia gerrardii
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Small Trees	Acacia natalitia
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Small Trees	Acacia nilotica
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Small Trees	Acacia senegal var. rostrata
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Small Trees	Acacia tortilis subsp. heteracantha
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Small Trees	Acacia welwitschii subsp. welwitschii
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Small Trees	Schotia brachypetala
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Tall Shrubs	Crotalaria monteiroi
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Tall Shrubs	Dichrostachys cinerea
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Tall Shrubs	Tephrosia polystachya
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Tall Trees	Acacia burkei
SVl 23 Zululand Lowveld	Important Taxa	FABACEAE	Tall Trees	Acacia nigrescens
SVl 23 Zululand Lowveld	Important Taxa	LAMIACEAE	Herbs	Acrotome hispida
SVl 23 Zululand Lowveld	Important Taxa	LAMIACEAE	Herbs	Stachys aethiopica
SVl 23 Zululand Lowveld	Important Taxa	LAMIACEAE	Low Shrubs	Orthosiphon serratus
SVl 23 Zululand Lowveld	Important Taxa	LYTHRACEAE	Tall Shrubs	Galpinia transvaalica
SVl 23 Zululand Lowveld	Important Taxa	MALVACEAE	Herbs	Corchorus asplenifolius
SVl 23 Zululand Lowveld	Important Taxa	MALVACEAE	Herbs	Hibiscus pusillus
SVl 23 Zululand Lowveld	Important Taxa	MALVACEAE	Low Shrubs	Melhania didyma
SVl 23 Zululand Lowveld	Important Taxa	MALVACEAE	Low Shrubs	Sida serratifolia
SVl 23 Zululand Lowveld	Important Taxa	MALVACEAE	Soft Shrub	Pavonia columella
SVl 23 Zululand Lowveld	Important Taxa	MALVACEAE	Tall Shrubs	Triumfetta pilosa var. tomentosa
SVl 23 Zululand Lowveld	Important Taxa	OLEACEAE	Tall Shrubs	Olea europaea subsp. africana
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Aristida bipartita
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Aristida congesta
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Bothriochloa insculpta
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Chloris mossambicensis
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Cymbopogon caesius
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Dactyloctenium australe

SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Digitaria natalensis
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Enteropogon monostachyus
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Eragrostis capensis
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Eragrostis curvula
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Eragrostis racemosa
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Heteropogon contortus
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Leptochloa eleusine
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Panicum deustum
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Panicum maximum
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Schizachyrium sanguineum
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Setaria incrassata
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Sporobolus nitens
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Sporobolus pyramidalis
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Themeda triandra
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Trachypogon spicatus
SVl 23 Zululand Lowveld	Important Taxa	POACEAE	Graminoids	Tristachya leucothrix
SVl 23 Zululand Lowveld	Important Taxa	RHAMNACEAE	Small Trees	Ziziphus mucronata
SVl 23 Zululand Lowveld	Important Taxa	RUBIACEAE	Herbs	Kohautia virgata
SVl 23 Zululand Lowveld	Important Taxa	RUBIACEAE	Tall Shrubs	Coptosperma supra-axillare
SVl 23 Zululand Lowveld	Important Taxa	RUBIACEAE	Tall Shrubs	Gardenia volkensii
SVl 23 Zululand Lowveld	Important Taxa	RUTACEAE	Small Trees	Teclea gerrardii
SVl 23 Zululand Lowveld	Important Taxa	SCROPHULARIACEAE	Low Shrubs	Tetraselago natalensis
SVl 23 Zululand Lowveld	Important Taxa	SOLANACEAE	Tall Shrubs	Lycium acutifolium

FAUNAL ASSESSMENT:THE PROPOSED CONSTRUCTION OF THE UMFLOLOZI-MBEWU (THETA) TRANSMISSION LINE, KWAZULU-NATAL PROVINCE.

PRODUCED BY:

APPLICANT	ENVIRONMENTAL CONSULTANT	IMPLEMENTING AGENT
Eskom	MCA	kimopax GROUP Inspire | Enhance | Innovate

FEBRUARY 2023

CONDITIONS RELATING TO THIS REPORT

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Mawenje Consulting Africa (MCA) (Pty) Ltd has no vested interest in the property studied nor is it affiliated with any other person/body involved with the property and/or proposed development. MCA (Pty) Ltd is not a subsidiary, legally or financially of the proponent. The study was undertaken by Mr Tshuxekani Maluleke, he is a registered Natural Scientists with the following details:

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REPORT NAME	**2023 FAUNAL ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF THE UMFLOLOZI-MBEWU (THETA) TRANSMISSION LINE, KWAZULU-NATAL PROVINCE.**
REFERENCE	MCA_FAU/2023
SUBMITTED TO	ESKOM HOLDINGS KIMOPAX GROUP
AUTHOR(S)	TSHUEXEKANI MALULEKE MSC. ENV SCIENCE (WITS UNIVERSITY)
INTERNAL REVIEWER	DR GABRIEL NGORIMA MSC. ENV SCIENCE (WITS UNIVERSITY)

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ACRONYMS

BA	Basic Assessment (in terms of NEMA)
BSP	Biodiversity Sector Plan
CBA	Critical Biodiversity Area
CITES	Conservation on International Trade in Endangered Species
CP	Conservation Plan
CR	Critically Endangered
DAFF	Department of Agriculture Forestry and Fisheries
DEA	Department of Environmental Affairs
DT	Moderate degraded Thornveld
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
EN	Endangered
ESA	Ecological Support Area
GA	General Authorization
GRV	Highly degraded grassy road verge
IBA	Important Bird Area
IDF	Integrated Development Framework
IDP	Integrated Development Plan

IUCN	International Unit for Conservation of Nature
LC	Least concern
MEC	Member of the Executive Council/Committee
MOO	Mine overburden overgrowth
NBF	The National Biodiversity Framework
NBSAP	The National Biodiversity Strategy and Action Plan
NEM:BA	National Environmental Management: Biodiversity Act, (Act No. 10 OF 2004)
NEMA	National Environmental Management Act, 107 of 1998 as amended
NEMPAA	The National Environmental Management: Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NPA	National Protected Area
NPAES	National Protected Areas Expansion Strategy
NSBA	The National Spatial Biodiversity Assessment
NT	Near Threatened
NWA	National Water Act
POSA	Plants of Southern Africa
PPE	Personal Protective Equipment
RV	Riparian vegetation
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDF	Spatial Development Framework

1. INTRODUCTION AND PROJECT LOCATION

Mawenje Consulting Africa (MCA) (Pty) Ltd has been appointed by Kimopax (Pty) Ltd on behalf of Eskom Holding to conduct a faunal assessment along the proposed 90km Umfolozi-Mbewu (Theta) Transmission. Eskom's transmission network supplying electricity into the Eastern Region requires strengthening to meet the growing demand in KwaZulu Natal in-order to avoid load shedding as a result of limited Transmission capacity, as well as to improve service quality and reliability. The strengthening of the power corridor will entail phased construction of 765kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies (KZN 765 kV Strengthening Review – GP Report_17/51) have also indicated that in order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 400kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

2. STUDY AREA

The transmission line is going to be located in the uMfolozi Local Municipality within the King Cetshwayo District Municipality of KwaZulu Natal, South Africa. The transmission line starts North-west of Mpunga passing over land and streams that feed into the wit-mfolozi river. The lines pass over areas such as Ntandeka, Langakazi and are also adjacent to other townships/villages. Figure 1 below shows the locality of the transmission line and the estimated length in kilometres of the Umfolozi-Mbewu Transmission Line. The study site is dominated by cultivated and forestry plantations (Figure 2).

3. TERMS OF REFERENCE

3.1 BASELINE FAUNAL ASSESSMENT

MCA has been appointed to conduct a faunal assessment of the proposed development site. The terms of reference are as follows:

i. Use databases to identify fauna possibly occurring on site.
ii. Determine the faunal species present within the site extent.
iii. Determine the presence of species of conservation concern.
iv. Determine the ecological state of the faunal diversity within the site extent.
v. Compile a report with all findings, including mapping of sensitive ecological areas.

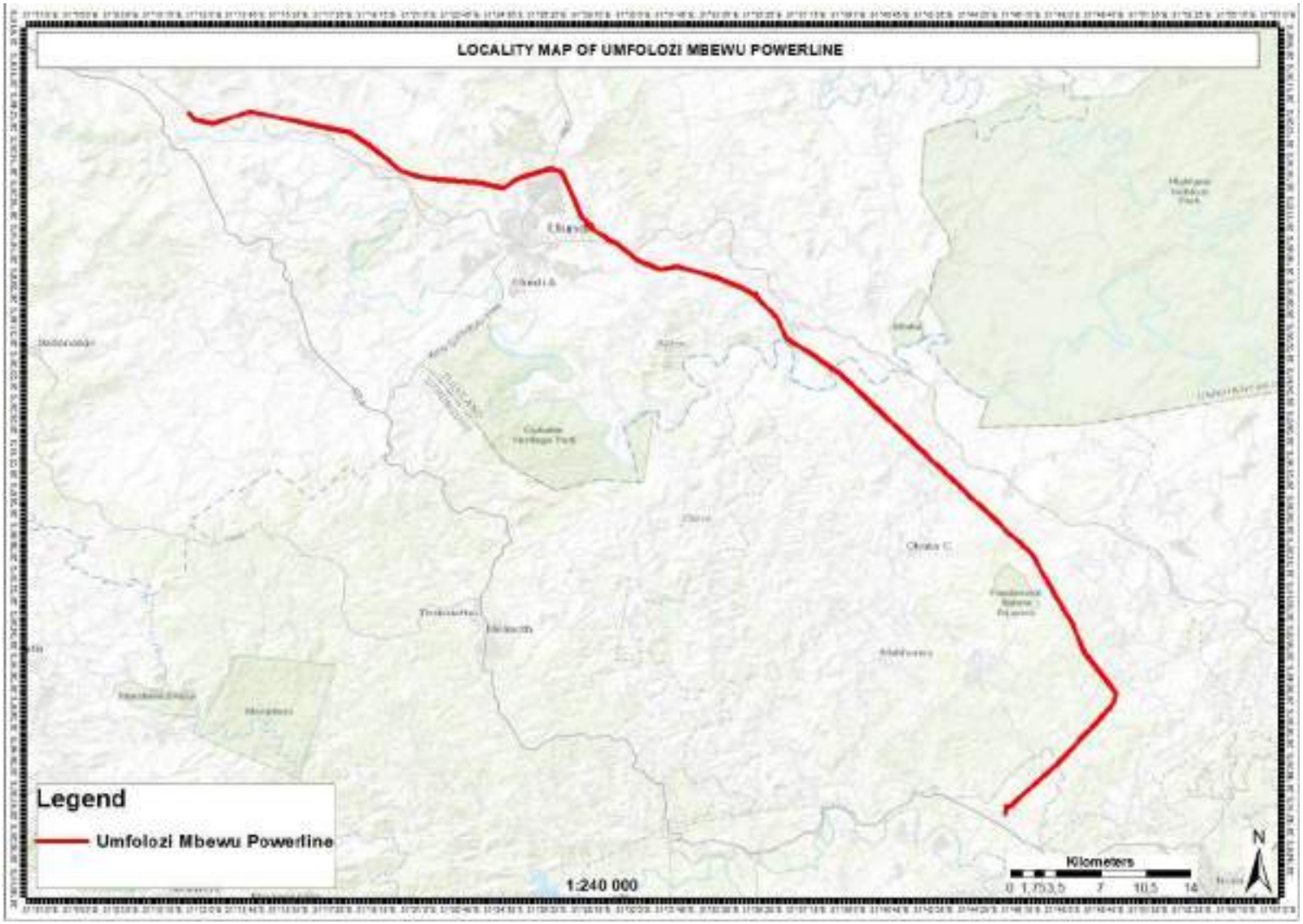

Figure 1:Locality Map.

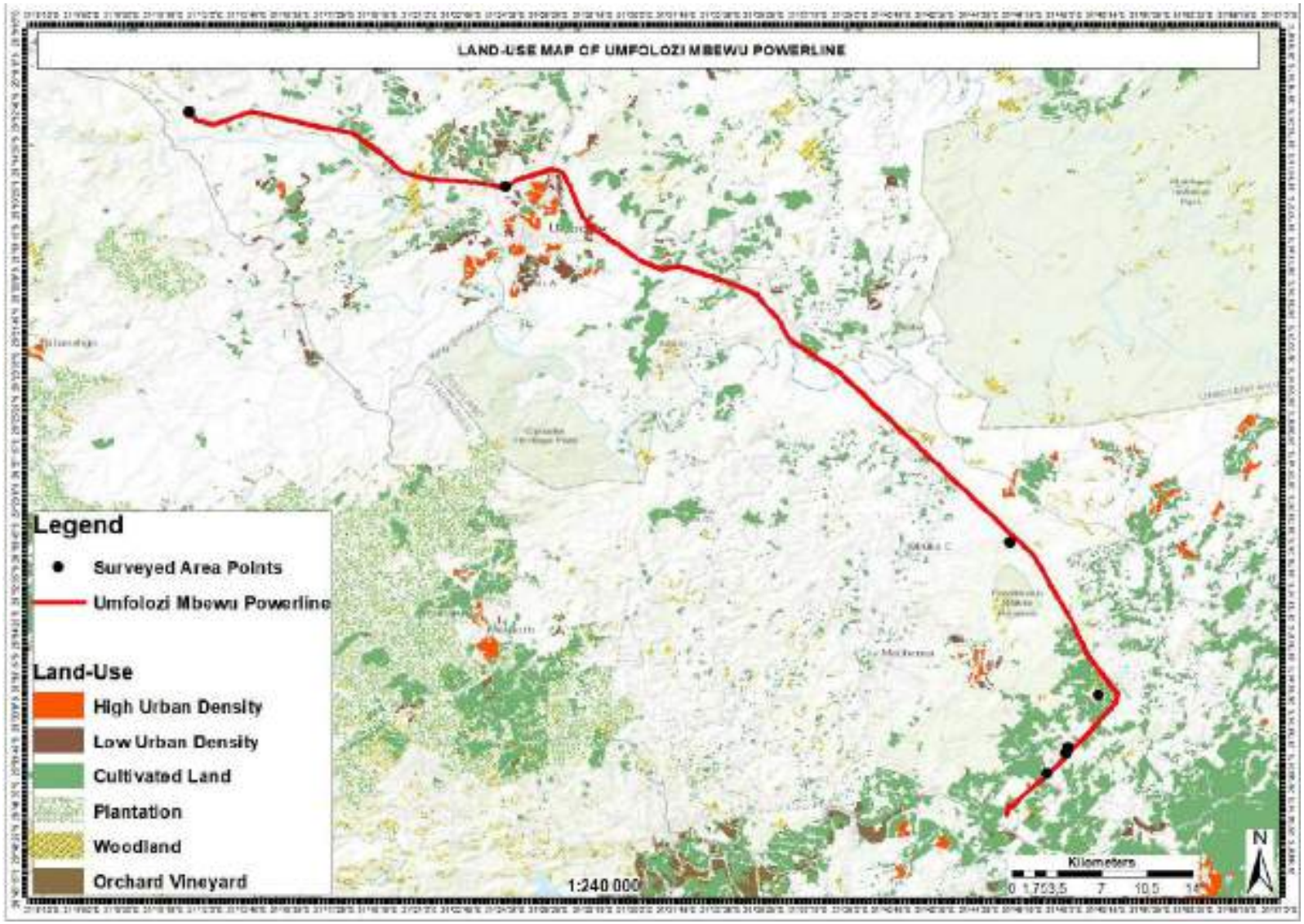

Figure 2: Landuse Map

3.2 ASSUMPTIONS, LIMITATIONS, UNCERTAINTIES, AND GAP ANALYSIS

- The findings, results, observations, conclusions, and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the perceived impacts on Fauna and habitats.
- Limited time in the field means that important components of the local Fauna (i.e., nest sites or localised areas of key habitats for rare or threatened species) could have been missed.
- The site visits as well as personal experience of the Fauna of the area and of similar species in different parts of South Africa, through the specialist's experience working across the country, goes some way to remedying any knowledge deficiencies.
- This report is based on currently available information and, as a result, the following limitations and assumptions are implicit:
- The data analysed in this report is based on a single site survey of plant and animal species conducted in January 2022. This therefore does not allow for seasonal trends to be assessed,
- The fieldwork timing was therefore suitable for the level of study required for this project.
- Species of conservation concern are difficult to find and difficult to identify due to seasonal variations, thus species described in this report do not comprise an exhaustive list. It is likely that additional species of conservation concern may be encountered during operation of the development and post summer rains.
- The ecology of the site was assessed on a sample basis, and as such is a representative selection of the site only.
- Due to the limited field time, and the roaming/nocturnal nature of many faunal species, certain species may have gone undetected.
- The report is based on the current operations, likely to undergo several iterations and refinements before it can be regarded as definitive.
- No mammal trapping was undertaken as this method of assessment only caters for mammal assemblages found during that survey period. Rather, vegetation on site and a desktop survey was utilised to provide information into the report with ground truthing exercises done to confirm conditions within the study area.

4. LEGISLATION GUIDING THIS ASSESSMENT

Legislation provides the means for key legal considerations of importance to projects. This provides the framework for the protection of fauna and flora on a Provincial and National scale. Key legislation is as follows:

4.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO 107 OF 1998) (NEMA) AS AMENDED

This Act embraces all three (3) fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures. NEMA provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

4.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO 10 OF 2004) (NEM: BA)

NEMBA was signed into law in mid-2004 and entered into effect on 1 September 2004. NEM: BA provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

4.3 THE NATIONAL BIODIVERSITY FRAMEWORK (2017-2022)

The National Biodiversity Framework (NBF) is a requirement under Section 38 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, hereafter referred to as the 'Biodiversity Act'). The NBF is a short to medium-term coordination tool that shows the alignment between the strategic objectives and outcomes identified in the National Biodiversity Strategy and Action Plan (NBSAP v.2, 2015) and other key national strategies, frameworks and systems that currently guide the work of the biodiversity sector and identifies mechanisms through which this work is coordinated. It also identifies a set of interventions or "acceleration measures" that can unlock or fast-track implementation of the NBSAP and indicates the relative roles of the many agencies involved in implementing these activities. The purpose of the NBF is not to provide a comprehensive review of all work currently being undertaken in the biodiversity sector, nor to list all of the actions required to conserve and manage South Africa's biodiversity in support of sustainable development.

4.4 KWAZULU-NATAL NATURE CONSERVATION MANAGEMENT ACT 1997

This Act makes provision for the protection of the natural environment of the KwaZulu-Natal province. It establishes the KwaZulu-Natal Nature Conservation Board and the KwaZulu-Natal Nature Conservation Service and grants powers to the Minister to establish a local board in respect of one or more protected areas. The Minister, being a member of the Kwazulu Natal Executive Council, shall be responsible for nature conservation policy and the implementation of provisions of this Act. He or she may, in consultation with the Board, proclaim an area to be a protected area. The Board shall, among other things, direct management nature conservation and protected areas in the province, develop and promote ecotourism in protected areas and ensure the efficient management of the Conservation Service. The Conservation Service shall, among other things, provide support to the Board and local boards in management of nature conservation and protected areas.

4.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO 43 OF 1983) (CARA):

This act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

4.6 CONVENTION ON BIOLOGICAL DIVERSITY

The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources.

4.7 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)

The CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Through its three appendices, the Convention accords varying degrees of protection to more than 30,000 plant and animal species.

4.8 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The CMS, or the Bonn Convention aims to conserve terrestrial, marine and avian migratory species throughout their range. Parties to the CMS work together to conserve migratory species and their habitats by providing strict protection for the most endangered migratory species, by concluding

regional multilateral agreements for the conservation and management of specific species or categories of species, and by undertaking co-operative research and conservation activities.

4.9 THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The objectives of the Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. The Treaty covers all plant genetic resources for food and agriculture, while it's Multilateral System of Access and Benefit-sharing covers a specific list of 64 crops and forages. The Treaty also includes provisions on Farmers' Rights.

4.10 CONVENTION ON WETLANDS (POPULARLY KNOWN AS THE RAMSAR CONVENTION)

The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention covers all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.

4.11 WORLD HERITAGE CONVENTION (WHC)

The primary mission of the WHC is to identify and conserve the world's cultural and natural heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through a closer co-operation among nations.

4.12 RAMSAR CONVENTION

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. The treaty was adopted in the Iranian city of Ramsar in 1971 and the Convention's member countries cover all geographic regions of the planet.

4.13 INTERNATIONAL PLANT PROTECTION CONVENTION (IPPC)

The IPPC aims to protect world plant resources, including cultivated and wild plants by preventing the introduction and spread of plant pests and promoting the appropriate measures for their control. The convention provides the mechanisms to develop the International Standards for Phytosanitary Measures (ISPMs), and to help countries to implement the ISPMs and the other obligations under the IPPC, by facilitating the national capacity development, national reporting and dispute settlement. The Secretariat of the IPPC is hosted by the Food and Agriculture Organization of the United Nations (FAO).

5. SITE DESCRIPTION

5.1 GEOLOGY & SOILS

5.1.1 Geology & Soils Associated With The Svl 23 Zululand Lowveld Vegetation Unit

Most of the area is underlain by Black-clay soils and duplex soils derived from a distinct variety of clastic sediments of the Dwyka, Ecca, Beaufort and igneous rocks of the Lebombo Groups (all of the Karoo Supergroup). Also well-drained soil forms occur especially on stony slopes. Land types Fb and Ea, with some Db and Dc.

5.1.2 Geology & Soils Associated With The Svl 22 Northern Zululand Sourveld

A section of the powerline consists of Well-drained and shallow soil forms (Glenrosa and Mispah forms) derived from various lithologies; predominantly, Dwyka Group diamictites, but also shale, siltstone and sandstone from the Madzaringwe and Pietermaritzburg Formations, all of the Karoo Supergroup. Archaean granite and gneiss are also significant. Land types mainly Fb and Fa, with some Ac.

5.1.3 Geology & Soils Associated With The Gm 15 Paulpietersburg Moist Grassland Vegetation Unit

This area is underlain by Archaean granite and gneiss partly covered by Karoo Supergroup sediments (Madzaringwe Formation) and intruded by Karoo Dolerite Suite dykes and sills. Dominant soils on the sedimentary parent material are yellow apedal, well drained, with a depth of >800 mm and a clay content of >35%, representing the soil series: Hutton, Clovelly and Griffin. Shortlands soils are dominant on dolerite. Dominant land type Ac, with Fa and Ba of subordinate importance.

5.1.4 Geology & Soils Associated With The Gs 2 Ithala Quartzite Sourveld Bushveld Vegetation Unit

Quartzite of the Mozaan Group (Pongola Supergroup) of the Randian age supporting shallow soils typical of Fb (prevalent) and Fa (marginal) land types.

5.2 CLIMATE

The study site experiences Summer rainfall with some rain in winter. The Mean Annual Precipitation ranges between 500–900 mm (highest in the southeast). The study is generally a frost-free area. The Mean monthly maximum and minimum temperatures for Mpila Camp (Hluhluwe-iMfolozi Park) rnages between 38.5°C and 7.8°C for February and June, respectively. in the region northwest of Nongoma, towards the mistbelt Ngome Forest. Frost very infrequent to occasional.

5.3 VEGETATION TYPES ALONG THE 90KM UMFOLOZI-MBEWU TRANSMISSION LINE

5.3.1 SVl 23 Zululand Lowveld

The Umfolozi-Mbewu Transmision Line Access Road consist of the **SVl 23 Zululand Lowveld (Figure 3)** vegetation type which features extensive flat or only slightly undulating landscapes supporting complex of various bushveld units ranging from dense thickets of *Dichrostachys cinerea* and *Acacia* species, through park-like savanna with flat-topped *A. tortilis* to tree-dominated woodland with broad-leaved open bushveld with *Sclerocarya birrea* subsp. *caffra* and *A. nigrescens*. Tall grassveld types with sparsely scattered solitary trees and shrubs form a mosaic with the typical savanna thornveld, bushveld and thicket patches.

The **SVl 23 Zululand Lowveld** is distributed within the KwaZulu-Natal Province, Swaziland and Mpumalanga Province: Main extent from around Big Bend south to Mkuze, Hluhluwe, Ulundi to just north of the Ongoye Forest. An isolated patch is found on the Swaziland–Mpumalanga border. Altitude about 50–450 m.

The SVl 23 Zululand Lowveld is classified as Vulnerable. A conservation target of 19% has been set, with some 11% statutorily conserved mainly in the Hluhluwe-iMfolozi Park and Phongolapoort Nature Reserve. Almost 1% is protected in the private Masibekela Wetland. Much of the area between Magudu, Mkuze and Nongoma is managed as private game farms and lodges. About 26% of the area has been transformed, mostly by cultivation. Erosion is variable from low to high.

5.3.2 SVl 22 Northern Zululand Sourveld

The proposed transmission line also traversers the SVl **22 Northern Zululand Sourveld** vegetation type (**Figure 3**). This vegetation type consist of dominant structural vegetation type is wooded grassland, in places pure sour grasslands and rarely also dense bushveld thickets. Terrain is mainly low, undulating mountains, sometimes highly dissected, and also some moderately undulating plains and hills.

The SVl **22 Northern Zululand Sourveld** vegetation type is naturally found in the KwaZulu-Natal Province and Swaziland: From the Lusthof area in Swaziland southwards with scattered patches in northern Zululand in the surrounds of Hlomohlomo, east of Louwsburg, Nongoma and the vicinity of Ulundi including Nkandla. In the Hluhluwe-iMfolozi Park it occurs at highest altitudes in the park. Altitude mainly 450–900 m.

The SVl **22 Northern Zululand Sourveld** is classified as Vulnerable. A 19% conservation target has been set. An estimated 4% is statutorily conserved, mainly in the Hluhluwe-iMfolozi Park and Ithala Game Reserve. Some 22% already transformed, mainly by cultivation and plantations. Erosion is generally moderate to high.

5.3.3 Gm 15 Paulpietersburg Moist Grassland

The proposed development traverses the **Gm 15 Paulpietersburg Moist Grassland** vegetation type (**Figure 3**). This vegetation unit consists Mainly undulating with moderately steep slopes, but valley basins are wide and flat and mountainous areas occur mostly along the northern and eastern boundary. Tall closed grassland rich in forbs and dominated by *Tristachya leucothrix*, *Themeda triandra* and *Hyparrhenia hirta*. Evergreen woody vegetation is characteristic on rocky outcrops.

The **Gm 15 Paulpietersburg Moist Grassland** vegetation type is naturally found in the KwaZulu-Natal and Mpumalanga Provinces: Broad surrounds of Piet Retief, Paulpietersburg and Vryheid, extending westwards to east of Wakkerstroom. Occurs in the uppermost catchments of the Phongolo River. Altitude 920–1 500 m.

The **Gm 15 Paulpietersburg Moist Grassland** vegetation is classified as Vulnerable. A conservation target of 24% has been set, while Only very small portion statutorily conserved in Witbad, Vryheid Mountain, Paardeplaats and Phongola Bush Nature Reserves. Some private reserves protect small patches (Rooikraal, Mhlongamvula, Kombewaria). About one third already transformed by plantations or cultivated land. Heavy livestock grazing and altered fire regimes have greatly reduced the area of grasslands of high conservation value. Aliens such as species of *Acacia*, *Eucalyptus* and *Pinus* are of major concern in places. Erosion very low (80%) or low (13%).

5.3.4 Gs 2 Ithala Quartzite Sourveld

A small section of the transmission line will be located within the **Gs 2 Ithala Quartzite Sourveld (Figure 3)**. The Gs 2 Ithala Quartzite Sourveld is typically found in Low mountain ranges and undulating hills with rocky lowlands. The general pattern is a mosaic of woody shrubs and small trees in rocky areas, interspersed in the grass layer. Vegetation structure varies according to altitude and rockiness, but the basal density of the grass sward is relatively low. This unit occurs in the zone between Grassland and Savanna where the dominant grassland gives way to woodland as elevation decreases. The grasslands are species-rich covering a variety of altitudes but sharing common species unique to the dystrophic quartzite geology.

This vegetation unit is generally found in KwaZulu-Natal and Mpumalanga Provinces and Swaziland. It is Confined to large quartzite patches that occur from Amsterdam, southwards east of Piet Retief and through Mahamba, to the Paris Dam and Ithala Game Reserve, with isolated outcrops near Magudu.It prefers altitudes that range from 440–1 360 m.

The Gs 2 Ithala Quartzite Sourveld is classified as **Least threatened**. The conservation target of 27% has not been reached. A total of 10% of this unit is protected within the Ithala Game Reserve. Land use pressures on this unit are low, probably because of its low nutrient status and rocky nature. Approximately 5% is under plantations and a further 5% has been transformed into cultivated land. Soil erosion potential is low.

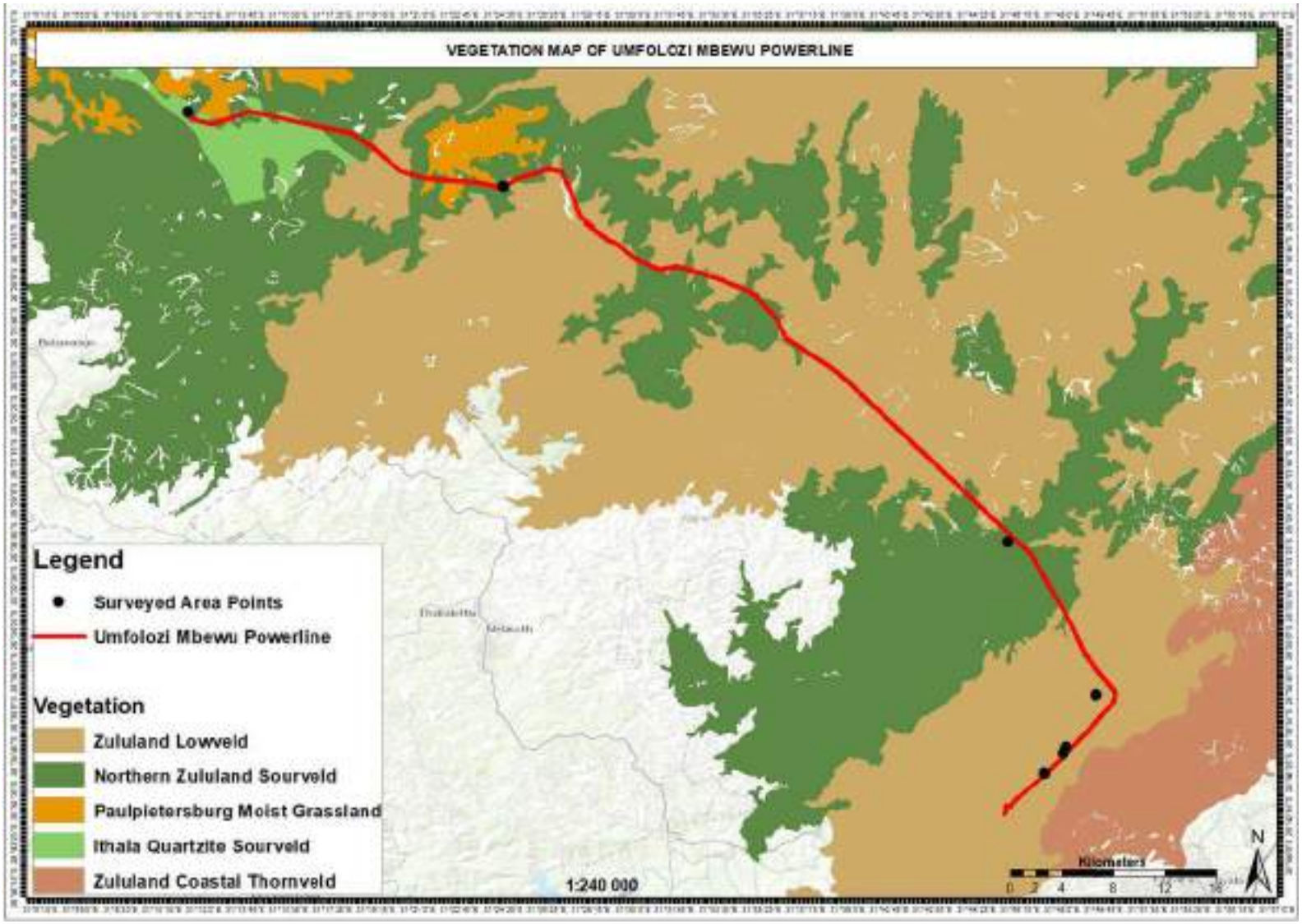

Figure 3: The vegetation type associated with the proposed transmission line (2012 Vegetation Map

The taxa associated with the dominant vegetation units are summarized on Table 1 below.

Table 1: Important Taxa within the study site (Mucina and Rutherford 2006)

PLANT FORM	SPECIES
SVl 23 Zululand Lowveld	
Tall Trees	*Acacia burkei (d), A. nigrescens (d), Sclerocarya birrea subsp. caffra (d). Small Trees: Acacia tortilis subsp. heteracantha (d), A. gerrardii, A. natalitia, A. nilotica, A. senegal var. rostrata, A. welwitschii subsp. welwitschii, Boscia albitrunca, Combretum apiculatum, C. molle, Ozoroa paniculosa, Phoenix reclinata, Schotia brachypetala, Spirostachys africana, Teclea gerrardii, Ziziphus mucronata.*
Succulent Trees	*Aloe marlothii subsp. marlothii, Euphorbia grandidens, E. ingens.*
Tall Shrubs	*Dichrostachys cinerea (d), Euclea divinorum (d), Coptosperma supra-axillare, Crotalaria monteiroi, Euclea crispa subsp. crispa, E. schimperi, Galpinia transvaalica, Gardenia volkensii, Gymnosporia maranguensis, G. senegalensis, Jatropha zeyheri, Lycium acutifolium, Olea europaea subsp. africana, Tarchonanthus parvicapitulatus, Tephrosia polystachya, Triumfetta pilosa var. tomentosa.*
Low Shrubs	*Barleria obtusa, Crossandra greenstockii, Felicia muricata, Gymnosporia heterophylla, Indigofera trita subsp. subulata, Justicia flava, J. protracta subsp. protracta, Melhania didyma, Orthosiphon serratus, Pearsonia sessilifolia, Ruellia cordata, Sida serratifolia, Tetraselago natalensis.*
Succulent Shrubs	*Euphorbia grandicornis, E. trichadenia, E. vandermerwei.*
Soft Shrub	*Pavonia columella.*
Herbaceous Climber	*Fockea angustifolia.*
Graminoids	*Dactyloctenium australe (d), Enteropogon monostachyus (d), Eragrostis capensis (d), E. curvula (d), E. racemosa (d), Heteropogon contortus (d), Panicum maximum (d),*

	Sporobolus pyramidalis (d), Themeda triandra (d), Aristida bipartita, A. congesta, Bothriochloa insculpta, Chloris mossambicensis, Cymbopogon caesius, Digitaria natalensis, Leptochloa eleusine, Panicum deustum, Schizachyrium sanguineum, Setaria incrassata, Sporobolus nitens, Trachypogon spicatus, Tristachya leucothrix.
Herbs	*Acrotome hispida, Argyrolobium rupestre, Aspilia mossambicensis, Chamaecrista biensis, C. mimosoides, Corchorus asplenifolius, Felicia mossamedensis, Gerbera ambigua, Helichrysum rugulosum, Hibiscus pusillus, Kohautia virgata, Lotononis eriantha, Senecio latifolius, Stachys aethiopica, Tragia meyeriana, Vernonia capensis.*
Succulent Herb	*Aloe parvibracteata.*
SVl 22 Northern Zululand Sourveld	
Small Trees	*Acacia sieberiana var. woodii (d), A. natalitia, A. nilotica, A. tortilis subsp. heteracantha, Plectroniella armata.*
Tall Shrubs	*Gardenia volkensii, Gnidia caffra, G. kraussiana.*
Low Shrubs	*Agathisanthemum bojeri, Chaetacanthus burchellii, Crossandra fruticulosa, C. greenstockii, Diospyros galpinii, Phyllanthus glaucophyllus, Ruellia cordata, Syncolostemon argenteus, Tetraselago natalensis.*
Succulent Shrub	*Aloe vanbalenii.*
Woody Climber	*Cryptolepis oblongifolia*
Herbaceous Climber	*Cyphostemma schlechteri*
Graminoids	*Eragrostis curvula (d), Hyparrhenia hirta (d), Microchloa caffra (d), Themeda triandra (d), Tristachya leucothrix (d), Alloteropsis semialata subsp. semialata, Digitaria argyrograpta, D. tricholaenoides, Diheteropogon amplectens, Elionurus muticus, Loudetia simplex, Trachypogon spicatus.*

Herbs	*Alepidea longifolia, Argyrolobium adscendens, Aster bakerianus, Berkheya speciosa, Chascanum hederaceum, Crabbea hirsuta, Gazania krebsiana subsp. serrulata, Gerbera ambigua, Helichrysum mixtum, H. nudifolium var. pilosellum, Hemizygia pretoriae subsp. pretoriae, Hermannia grandistipula, Hypericum aethiopicum, Lichtensteinia interrupta, Pimpinella caffra, Senecio glaberrimus, S. latifolius, Stachys nigricans, Vernonia galpinii, V. oligocephala.*
Geophytic Herbs	*Hypoxis hemerocallidea, Pachycarpus concolor.*
Succulent Herbs	*Aloe minima, A. parvibracteata, Senecio oxyriifolius*
Gs 2 Ithala Quartzite Sourveld	
Small Trees	*Combretum molle (d), Englerophytum magalismontanum (d), Syzygium legatii (d), Acacia caffra, A. davyi, Cassipourea swaziensis, Cussonia natalensis, Dombeya cymosa, Faurea rochetiana, F. saligna, Ficus burtt-davyi, Lannea discolor, Pachystigma macrocalyx, Pavetta edentula, Protea caffra subsp. caffra, P. roupelliae subsp. roupelliae, Pterocarpus angolensis.*
Tall Shrubs	*Morella piluli¬fera (d), Pavetta gracilifolia (d), Protea gaguedi, Rhus pallens, R. pentheri.*
Woody Climber	*Jasminum multipartitum.*
Low Shrubs	*Gymnosporia tenuispina (d), Helichrysum lepidissimum (d), Lopholaena platyphylla.*
Succulent Shrub	*Crassula sarcocaulis.*
Graminoids	*Heteropogon contortus (d), Hyperthelia dissoluta (d), Loudetia simplex (d), Monocymbium ceresiiforme (d), Panicum natalense (d), Themeda triandra (d), Trachypogon spicatus (d), Bothriochloa insculpta, Diheteropogon amplec¬tens, Melinis nerviglumis, Pogonarthria squarrosa, Sporobolus pectinatus.*
Herbs	*Anisopappus smutsii (d), Xerophyta reti¬nervis..*

Succulent Herb	*Aloe cooperi subsp. cooperi*
Succulent Herbaceous Climber	*Ceropegia sandersonii*
Gm 15 Paulpietersburg Moist Grassland	
Graminoids:	*Alloteropsis semialata subsp. eckloniana (d), Andropogon schirensis (d), Brachiaria serrata (d), Ctenium concinnum (d), Cymbopogon caesius (d), Digitaria tricholaenoides (d), Eragrostis racemosa (d), Harpochloa falx (d), Heteropogon contortus (d), Hyparrhenia hirta (d), Loudetia simplex (d), Microchloa caffra (d), Monocymbium ceresiiforme (d), Rendlia altera (d), Setaria nigrirostris (d), Themeda triandra (d), Tristachya leucothrix (d), Andropogon appendiculatus, Cynodon hirsutus, Diheteropogon amplectens, D. filifolius, Elionurus muticus, Eragrostis chloromelas, E. curvula, E. plana, Festuca scabra, Melinis nerviglumis, Panicum ecklonii, P. natalense, Trachypogon spicatus, Urelytrum agropyroides.*
Herbs:	*Argyrolobium speciosum (d), Cissus diversilobata (d), Dicoma zeyheri (d), Eriosema kraussianum (d), Geranium wakkerstroomianum (d), Helichrysum nudifolium var. nudifolium (d), Ipomoea oblongata (d), Pelargonium luridum (d), Acalypha glandulifolia, A. peduncularis, Acanthospermum australe, Aster bakerianus, Becium filamentosum, Berkheya setifera, Dicoma anomala, Euryops laxus, E. transvaalensis subsp. setilobus, E. transvaalensis subsp. transvaalensis, Helichrysum rugulosum, H. simillimum, Indigofera hilaris var. hilaris, I. velutina, Kohautia amatymbica, Pearsonia grandifolia, Pentanisia prunelloides subsp. latifolia, Senecio bupleuroides, S. coronatus, S. inornatus, S. isatideus, S. latifolius, Sonchus nanus, Thunbergia atriplicifolia, Vernonia capensis, V. natalensis, Xerophyta retinervis.*
Herbaceous Climber:	*Rhynchosia totta.*
Geophytic Herbs:	*Chlorophytum haygarthii (d), Gladiolus aurantiacus (d), Agapanthus inapertus subsp. intermedius, Asclepias aurea, Cheilanthes hirta, Cyrtanthus tuckii var. transvaalensis, Hypoxis colchicifolia, H. costata, H. rigidula var. pilosissima, Moraea brevistyla, Pteridium aquilinum, Watsonia latifolia, Zantedeschia rehmannii.*

Succulent Herbs:	*Aloe ecklonis, A. maculata, Lopholaena segmentata.*
Small Trees:	*Canthium cili-atum (d), Dombeya rotundifolia, Vangueria infausta.*
Succulent Tree:	*Aloe marlothii subsp. marlothii..*
Tall Shrubs:	*Calpurnia sericea (d), Rhus rehmanniana (d), Diospyros lycioides subsp. guerkei, Euclea crispa subsp. crispa. Low Shrubs: Rhus discolor (d), Anthospermum rigidum subsp. pumilum, A. rigidum subsp. rigidum, Clutia monticola, Diospyros galpinii, Erica oatesii, E. woodii, Hermannia geniculata, Indigofera arrecta, Otholobium wilmsii, Polygala uncinata, Pseudarthria hookeri, Rubus rigidus.*
Succulent Shrub:	*Euphorbia pulvinata*

6. METHODOLOGY

The assessment can be broken down into two sections, a desktop assessment and site verification.

Databases allow for the rapid assessment of species which are predicted to occur in an area. These databases are compiled using verified citizen science observations, as well as correlating species and their habitat requirements and assigning the result to a habitat type. This results in species predicted for an area. This may often result in a wide paucity in data as no previous observations have been made in an area, resulting in no predicted data for that species in that area. This means that verification of faunal data is essential in filling in gaps that may occur at desktop level. Additionally, very little data is available for the study site, as such, a reference site (Hluhluwe–iMfolozi Park) has been combined with data available for the site.

A site visit was conducted on the 16th-19th January 2023 to conduct necessary in-field procedures to verify the presence of fauna within the study area.

6.1 DESKTOP ASSESSMENT

6.1.1 CRITICALLY BIODIVERSITY AREAS

Critical Biodiversity Areas (CBAs) can be divided into two subcategories, namely Irreplaceable and Optimal. Each of these can in turn be subdivided into additional subcategories. The CBA categories

are based on the optimised outputs derived using systematic conservation planning software, with the Planning Units (PU) identified representing the localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved.

6.1.2 Ezemvelo KZN wildlife (C-Plan & SEA Database)

The C-Plan is a systematic conservation-planning package that consists of metadata within a shapefile, used by ArcGIS (or similar tool), which analyses biodiversity features and landscape units. C-Plan is used to identify a national reserve system that will satisfy specified conservation targets for biodiversity features (Lombard *et al*, 2003). These units or measurements are ideal for areas which have not been sampled. The C-Plan is an effective conservation tool when determining priority areas at a regional level and is being used throughout South Africa to identify areas of conservation value. Some of this information extends into the Eastern Cape.

The Strategic Environmental Assessment (SEA, 2000) Plan is a database of the modelled distribution of a selection of red data and endemic species that could, or are likely, to occur in an area.

6.1.3 Protected and conservation areas of South Africa

The Department of Environmental Affairs (DEA) have released an online map tool detailing the protected areas and associated 5km buffer. No sites fall within the 5km buffer set by the DEA.

6.1.4 South African Bird Atlas Project 2

The South African Bird Atlas Project 2 (SABAP2) is the most important regional decision making tool for avian conservation. The results of this project lead to the potential red listing on a regional and international scale. The project uses five minute by five minute pentads with citizen scientists providing birding checklists for those pentads. The output is a tool which recites species seen within those pentads.

6.1.5 Animal Demographic Unit

The Animal Demographic Units (ADU) Virtual Museum tool was used to identify presence of amphibians (FrogMAP), reptiles (ReptileMAP), mammals (MammalMAP) and butterflies (LepiMAP). The ADU use citizen science to contribute species lists and locations which get added to one degree grids.

6.2 SITE VERIFICATION

site visit was conducted on the 16th-19th January 2023. Weather conditions were extremely hot (38°c-42°c).

Data collection involved fixed point avifaunal observations at various points around the site, which were chosen based on the habitat types present on site. At each of these points, both visual observations and identification through bird calls was deemed sufficient in noting a bird species. Additionally, at each point and along the length of the line, opportunistic observations of fauna were made, and if possible, photographs of the individuals were taken. Time and budgetary constraints limited the use of pitfall traps and night time herpetofaunal sampling.

6.2.1 Mammals

A walk through of the site was done during the site survey whereby mammal species were identified by visual sightings as well as by means of spoor, droppings and roosting sights and available habitat. Mammals were identified using Field Guide to Mammals of Southern Africa (Stuart and Stuart; 2001) and The Mammals of the Southern African Sub region (Skinners and Chimimba; 2005).

6.2.2 Herpetofauna

Comprehensive amphibian surveys can only be undertaken by nocturnal surveys throughout the duration of the wet season. This was beyond the current scope of the assessment and the area was surveyed diurnally for possible habitat for amphibian species. Hydrology scan (Appendix 4) was obtained to determine the presence of rivers and wetlands within the study area and these areas were surveyed for amphibian species. Based on available habitat observed during the field survey, amphibians were identified through a literature review, by use of the Frog Atlas (developed by the Animal Demography Unit, Cape Town University) and the field guide Frogs & Frogging in Southern Africa (Carruthers, 2001).

7. RESULTS

7.1 DESKTOP STUDY

7.1.1 Critical Biodiversity Areas

According to the 2014 Kwa Zulu Natal Biodiversity Conservation Plan , the Umfolozi-Mbewu (Theta) Transmission line is located within a Critical Biodiversity Area (CBA). Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. A small section of the transmission line passes through an

Ecological Support Area (ESA)(Figure 4, Sensitivity map). Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services.

NB! The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes .

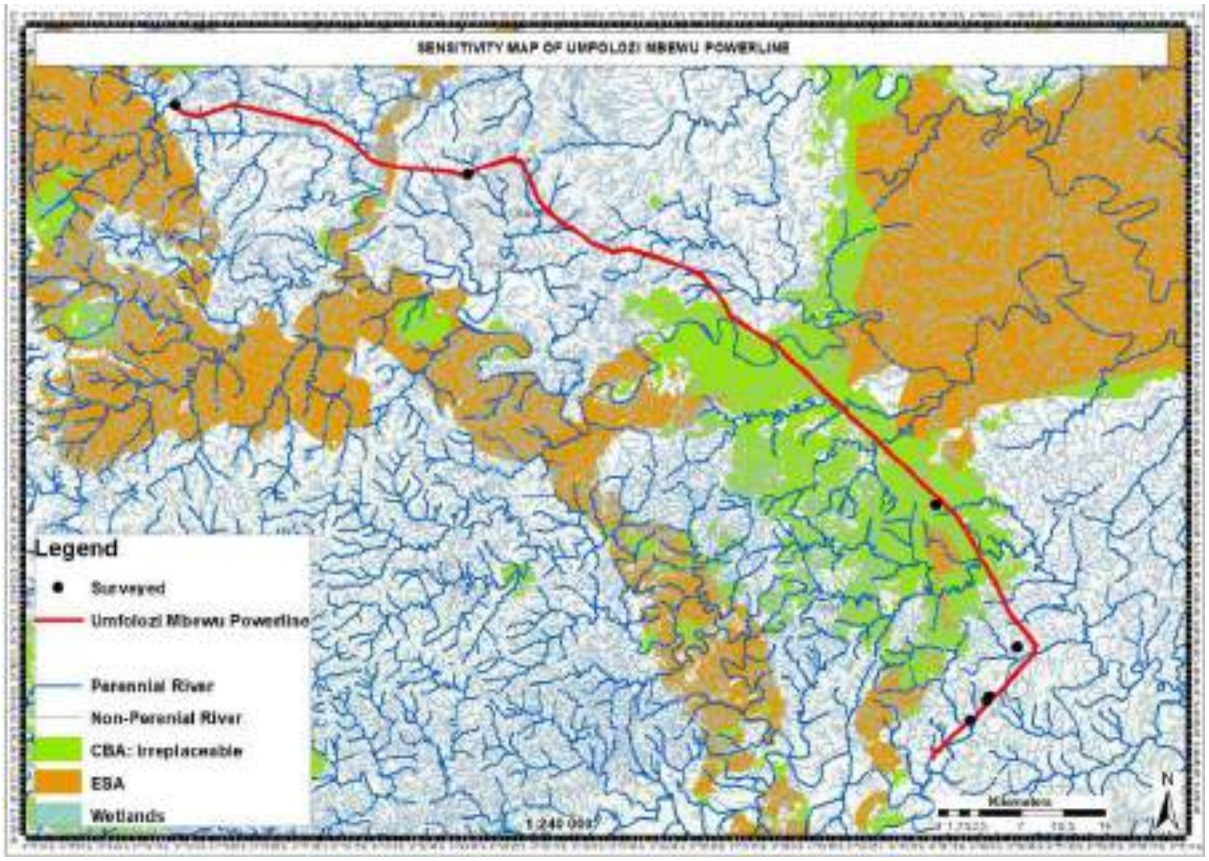

Figure 4: Sensitivity Map

7.1.2 South African Bird Atlas Project 2

Seven species of conservation concern occur within the pentad according to SABAP 2 (**Table 2**). The likelihood of each of these species occurring on site is relatively high as the habitat types for each of these species to occur in is present. Additionally, the proposed transmission is located within close proximity of a Important Bird Area (IBA) (**Figure 5**). Important Bird and Biodiversity Areas (IBAs), as defined by BirdLife International, constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified

nationally through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria. Essentially, these are the most important sites for conserving.

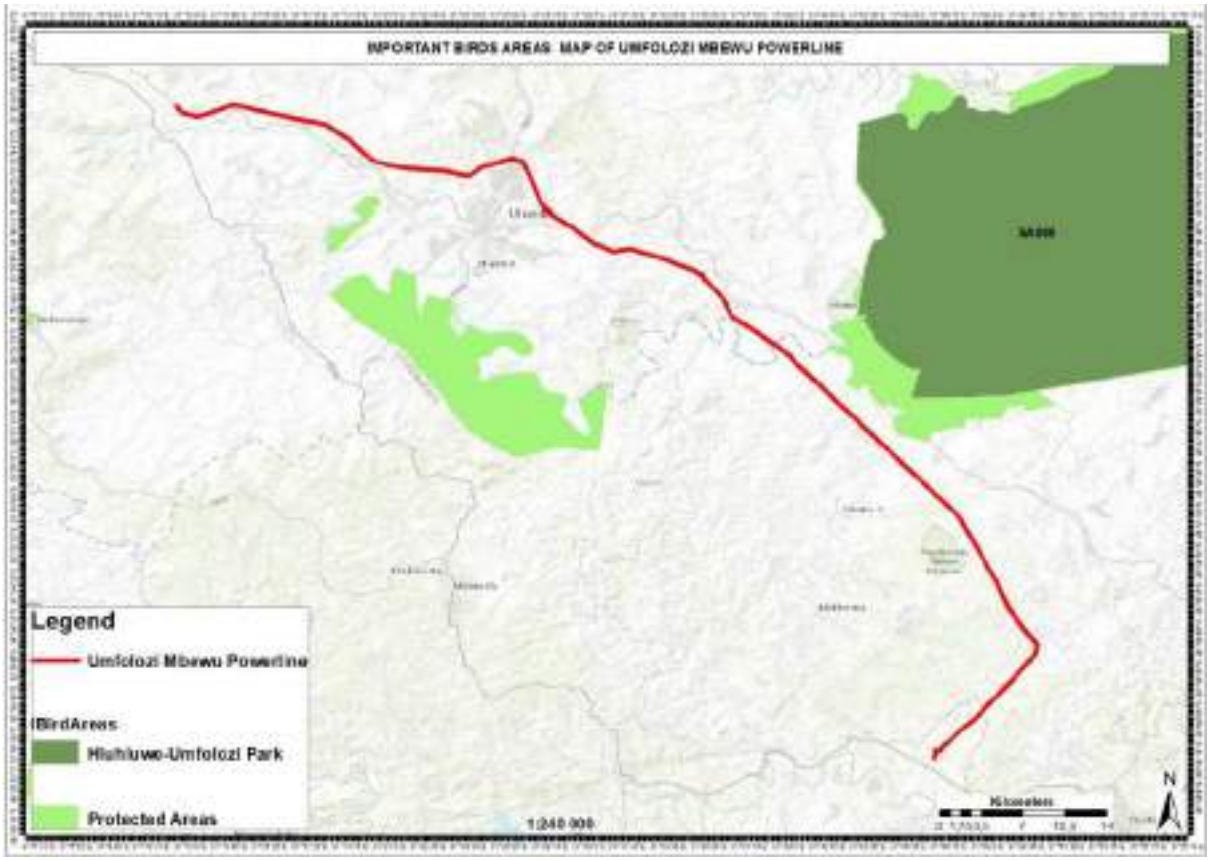

Figure 5: Important Birds Area Map

Table 2: Avifaunal species of conservation concern according to SABAP 2.

SCIENTIFIC NAME	COMMON NAME	RED LIST (REGIONAL, GLOBAL)	OBSERVED ONSITE (YES/NO)
Gyps Africanus	White-backed Vulture	CR, CR	NO
Gyps Coprotheres	Cape Vulture	EN, EN	NO
Aquila Rapax	Tawny Eagle	EN, LC	NO
Bucorvus Leadbeateri	Southern Ground-hornbill	EN, VU	NO
Eupodotis Senegalensis	White-bellied Korhaan	VU, LC	NO
Falco Biarmicus	Lanner Falcon	VU, LC	NO
Geronticus Calvus	Southern Bald Ibis	VU, VU	NO

7.1.3 Animal Demographic Unit databases

Please note, no butterfly species of conservation concern were highlighted in the LepiMAP, however, butterflies are referred to in the site verification section.

FrogMAP highlights that one amphibian species of conservation concern may occur in the area. The potential for Bilbo's Rain Frog occurring on site is low as the species prefers areas with grassy verges alongside exotic plantations. There are no exotic plantations within the site area.

Table 3: Amphibians of conservation concern occurring on site according to the ADU FrogMAP.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS
Breviceps Bagginsi	Bilbo's Rain Frog	Near Threatened

According to MammalMAP, 9 mammal species of conservation concern may occur in the area (**Table 5**). Of these species, it is likely that Spotted Hyena, Southern African Vlei Rat, Dark-footed Mouse Shrew, Sclater's Mouse Shrew and Leopard occur on site, while the other species will need to be introduced back into this area, which is possible.

Table 4: Mammal species of conservation concern potentially occurring on site according to the ADU MammalMAP.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS
Ourebia Ourebi	Oribi	Endangered
Crocuta Crocuta	Spotted Hyaena	Near Threatened (2016)
Otomys Auratus	Southern African Vlei Rat	Near Threatened (2016)
Paraxerus Palliatus	Red Bush Squirrel	Near Threatened (2016)
Acinonyx Jubatus	Cheetah	Vulnerable (2016)
Myosorex Cafer	Dark-footed Mouse Shrew	Vulnerable (2016)
Myosorex Sclateri	Sclater's Mouse Shrew	Vulnerable (2016)
Panthera Pardus	Leopard	Vulnerable (2016)
Loxodonta Africana	African Bush Elephant	Vulnerable A2a (2008)

According to ReptileMAP, two reptile species of conservation concern may occur within the site (**Table 5**). The Natal Black Snake is unlikely to occur here as this species prefers coastal bush, while the Natal Hinged Tortoise may occur here due to its preference for tropical lowveld to mesic thickets in the south of its range.

Table 5: Reptile species of conservation concern potentially occurring on site according to the ADU ReptileMAP.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS
MACRELAPS MICROLEPIDOTUS	**Natal Black Snake**	**Near Threatened (Sarca 2014)**

Kinixys Natalensis	Natal Hinged Tortoise	**Vulnerable (IUCN, 2019)**

7.2 SITE VERIFICATION

7.2.1 Avifauna

Birds are regarded as one of the most useful bioindicators, and they have been used extensively as models to determine ecosystem function (see review Koskimies 1989; Potts et al. 2014; Bregman et al. 2016). More than 340 bird species are known to occur in the along the study area (**Figures 6 and 7**). Generally, the areas are of Low Sensitivity due to homogenous vegetation and disturbed habitats. Furthermore, no Species of Conservation Concern were observed during the survey. Below is the table containing species recorded on site during the survey.

Figure 6: Bird that are commonly observed with the proximity of the proposed transmission line

Pied Crow

Spurwinged Goose

Blacksmith Lapwing

Western Cattle Egret

Magpie Shrike

Black collared Barbet

Lilac-breasted Roller

Southern-yellow billed

Arrow-marked Babbler

Crowned Lapwing

Common Myna

Kurrichane Thrush

Figure 7: Some of the birds observed within the site.

7.2.2 Butterflies and other invertebrates

A total of 121 butterfly species are predicted to be occur on site, with only three being seen. No butterflies of conservation concern were seen on site. Some species seen can be found below from **Figure 8**. The other invertebrates are depicted on Figures 9 and

Figure 8: Biblia ilithya.

Figure 9:Eurydema oleracea observed onsite.

Figure 10: Snail observed onsite.

7.2.3 Amphibians

A total of 17 species are predicted to occur on site with none being seen on site. Potential for them to occur on site are very high due to the watercourses that are located within 500m of the 90km transmission line. Additionally, amphibians will occur within drainage lines within the project area.

7.2.4 Mammals

The following list of potential animal SCC were derived from current literature for vegetation found in the area as well as the international IUCN Red Data list, the South African Red Data List, and CITES. The results are summarised in Table 6 while a full species list appears in Appendix A.

Table 6: List of potential mammals that maybe found onsite

Scientific name	Common name	IUCN Threat status
Nycteris macrotis	Large eared slit faced bat	LC
Orycteropus afer	Aardvark	LC
Canis mesomelas	Black-backed Jackal	LC
Equus quagga	Plains Zebra	NT
Tragelaphus strepsiceros	Greater Kudu	LC
Giraffa camelopardalis	The South African Giraffe	VU
Connochaetes taurinus	Blue wildebeest	LC
Paraxerus cepapi	Smith's Bush Squirrel	LC
Syncerus caffer	Cape Buffalo	LC
Pedetes capensis	South African Spring Hare	LC

Damaliscus lunatus	Common Tsessebe	LC
Mellivora capensis	Honey Badger	LC
Aepyceros melampus	Impala	LC
Genetta maculata	Common Large-spotted Genet	LC
Sylvicapra grimmia	Bush Duiker	LC

Figure 11: Grazing Cattle Observed onsite.

7.2.5 Reptiles

A total of 26 species are predicted to occur on site, with only two reptile species being seen – Variable skink (*Trachylepis varia*; **Figure 12**) and Rainbow Skink (*Trachylepis margaritifer*), with none of them being species of conservation concern. The area provides ample habitat for reptiles.

Figure 12: Examples of the Rainbow Skink.

8. MITIGATION MEASURES

Mitigation measure mentioned in this report revolve around the need to avoid disturbance around the construction site. This is seen as the main negative impacts of the proposed development.

- Construction activities must be limited to the allowed working area only, with all areas outside of this being demarcated as strictly no go areas.
- An independent Environmental Control Officer should conduct monthly site inspections to assess the Contractors compliance with the EMPr.
- Permits for the removal and relocation of plants and animals must be in place before any construction can commence.
- A search and rescue operation, undertaken by a suitably qualified person, must be undertaken before construction commences.
- Strictly no trapping, hunting or poaching or fauna may occur. A fine system should be considered by the EAP for the illegal hunting of fauna.
- Clearance in the construction phase is to be remove in a phased approach, as and when it becomes necessary.
- The contractor should implement an alien invasive control programme, particularly in areas where soil disturbance occurs.
- Community outreach regarding poaching of fauna should be undertaken;

- Rehabilitation must occur once construction is complete in the relevant area;

9. CONCLUSION

MCA (Pty) Ltd has undertaken a desktop assessment and site verification for the aforementioned proposed construction of the Umfolozi-Mbewu (Theta) Transmission Line-

The key findings and recommendations from this assessment are as follows –

- The desktop assessment identified avian, reptile, amphibian and mammalian species of conservation importance. Species of conservation importance were noted on site, and there is potential for these species to be using the project area as a home range.
- Potential for grasshopper, millipede and mollusc species predicted by EKZNW CBA data to occur on site is there, however time and budgetary constraints limited the search for these species. A search and rescue operation will need to be done before site clearance is to occur.
- The tented camp is being built on stilts, thereby reducing the clearance footprint and the environmental impact.
- The site is being used for communal grazing. Additionally, hunting by the community with packs of dogs is occurring, which is reducing the fauna significantly on site.
- Permits for the removal and relocation of plants and animals must be in place before any construction can commence.
- A search and rescue operation, undertaken by a suitably qualified person, must be undertaken before construction commences.
- Community outreach regarding poaching of fauna should be undertaken.
- Rehabilitation of vegetation communities would improve faunal diversity across the site.
- Increased activity during construction phase will result in the small scale movement of fauna away from the construction site. It must be noted that the type of construction associated with the transmission line results in a minimal loss of habitat. Fauna will return to the area around the study area once construction is complete.
- The long term positive result of formally protecting the area through the establishment of a large game reserve, and lodges to accommodate tourists far outweighs the potential negative impact of building a stilted lodge. Additionally, the surrounding community will be benefiting from the conservation of the land through the leasing of their land to the developers, through the provision of jobs through construction phase and operation phase, and the community outreach and education that will occur.
- The development is supported by the Faunal Specialist, provided mitigation measures mentioned above are included in the Basic Assessment and EMPr.

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APPENDIX 1

VEGETATION LIST

Spreadsheet for creating species lists for describing vegetation types. It allows formatting in the paragrpaphs as contained in the book Mucina and Rutherford (2006).

VegType	Name of vegetation type. Full name, e.g. SVcb 21 Soutpansberg Mountain Bushveld
TaxonList	Important Taxa; Endemic Taxa; Biogeogrphically Important Taxa.
SubDivision	Vegetation type subdivision (optional, e.g. 'Mistbelt bush clumps', 'Open savanna sandveld' in SVcb 21 Soutpansberg Mountain Bushveld)
FamilyName	Name of family in which the taxon is classified. This is not essential, but is useful for quality control purposes.
GrowthForm	Refer to Table 2.1 (page 26 of Mucina & Rutherford (2006))
TaxonName	Name of taxon. Normally no subspecies or variety, unless they are diagnostic or endemic. Avoid sp. or spp. Do not abbreviate genus name
Superscript	Superscript. It must include an explanation of what the superscript means.
text for superscript	e.g. ([T]Cape thickets, [W]Wetlands) e.g. T for 'Cape Thickets' in FFs1, page 99 of Mucina & R
Dominant	Dominant (biomass) or prominent (e.g. conspicuous). See p. 27 of Mucina & Rutherford (2006). Other unformatted suggested text can be p
Sort	This gives the order in which the author intends the species to be listed. Not essential, but highly desirable to give the author's choice.
Qualifier	Any qualifier as it appears in the book.e.g. variant 'speciosa'; (West Coast endemic); (southernmost distribution limit)
Growth Form Sort	Refer to the tab **Growth forms and order**. The order should normally follow the order already used in the biome.

VegType	TaxonList	SubDivision	FamilyName	GrowthForm	
Gm 15 Paulpietersburg Moist Grassland	Biogeographically Important Taxa		ASPHODELACEAE	Succulent Herb	Aloe modesta
Gm 15 Paulpietersburg Moist Grassland	Biogeographically Important Taxa		FABACEAE	Low Shrubs	Lotononis amajubica
Gm 15 Paulpietersburg Moist Grassland	Biogeographically Important Taxa		LAMIACEAE	Low Shrubs	Hemizygia macrophylla
Gm 15 Paulpietersburg Moist Grassland	Biogeographically Important Taxa		SCROPHULARIACEAE	Low Shrubs	Bowkeria citrina
Gm 15 Paulpietersburg Moist Grassland	Endemic Taxon		ASPHODELACEAE	Succulent Shrub	Aloe reitzii var. vernalis

Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ACANTHACEAE	Herbs	Thunbergia atriplicifolia
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	AGAPANTHACEAE	Geophytic Herbs	Agapanthus inapertus subsp. intermedius
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	AMARYLLIDACEAE	Geophytic Herbs	Cyrtanthus tuckii var. transvaalensis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ANACARDIACEAE	Low Shrubs	Rhus discolor
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ANACARDIACEAE	Tall Shrubs	Rhus rehmanniana
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ANTHERICACEAE	Geophytic Herbs	Chlorophytum haygarthii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	APOCYNACEAE	Geophytic Herbs	Asclepias aurea
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ARACEAE	Geophytic Herbs	Zantedeschia rehmannii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASPHODELACEAE	Succulent Herbs	Aloe ecklonis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASPHODELACEAE	Succulent Herbs	Aloe maculata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASPHODELACEAE	Succulent Tree	Aloe marlothii subsp. marlothii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Acanthospermum australe
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Aster bakerianus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Berkheya setifera
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Dicoma anomala
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Dicoma zeyheri
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Euryops laxus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Euryops transvaalensis subsp. setilobus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Euryops transvaalensis subsp. transvaalensis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Helichrysum nudifolium var. nudifolium

Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Helichrysum rugulosum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Helichrysum simillimum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Senecio bupleuroides
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Senecio coronatus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Senecio inornatus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Senecio isatideus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Senecio latifolius
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Sonchus nanus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Vernonia capensis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Herbs	Vernonia natalensis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ASTERACEAE	Succulent Herbs	Lopholaena segmentata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	CONVOLVULACEAE	Herbs	Ipomoea oblongata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	DENNSTAEDTIACEAE	Geophytic Herbs	Pteridium aquilinum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	EBENACEAE	Low Shrubs	Diospyros galpinii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	EBENACEAE	Tall Shrubs	Diospyros lycioides subsp. guerkei
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	EBENACEAE	Tall Shrubs	Euclea crispa subsp. crispa
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ERICACEAE	Low Shrubs	Erica oatesii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ERICACEAE	Low Shrubs	Erica woodii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	EUPHORBIACEAE	Herbs	Acalypha glandulifolia
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	EUPHORBIACEAE	Herbs	Acalypha peduncularis

Gm 15 Paulpietersburg Moist Grassland	Important Taxa	EUPHORBIACEAE	Low Shrubs	Clutia monticola
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	EUPHORBIACEAE	Succulent Shrub	Euphorbia pulvinata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Herbaceous Climber	Rhynchosia totta
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Herbs	Argyrolobium speciosum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Herbs	Eriosema kraussianum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Herbs	Indigofera hilaris var. hilaris
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Herbs	Indigofera velutina
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Herbs	Pearsonia grandifolia
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Low Shrubs	Indigofera arrecta
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Low Shrubs	Otholobium wilmsii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Low Shrubs	Pseudarthria hookeri
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	FABACEAE	Tall Shrubs	Calpurnia sericea
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	GERANIACEAE	Herbs	Geranium wakkerstroomianum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	GERANIACEAE	Herbs	Pelargonium luridum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	HYPOXIDACEAE	Geophytic Herbs	Hypoxis colchicifolia
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	HYPOXIDACEAE	Geophytic Herbs	Hypoxis costata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	HYPOXIDACEAE	Geophytic Herbs	Hypoxis rigidula var. pilosissima
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	IRIDACEAE	Geophytic Herbs	Gladiolus aurantiacus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	IRIDACEAE	Geophytic Herbs	Moraea brevistyla
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	IRIDACEAE	Geophytic Herbs	Watsonia latifolia

Gm 15 Paulpietersburg Moist Grassland	Important Taxa	LAMIACEAE	Herbs	Becium filamentosum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	MALVACEAE	Low Shrubs	Hermannia geniculata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	MALVACEAE	Small Trees	Dombeya rotundifolia
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Alloteropsis semialata subsp. eckloniana
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Andropogon appendiculatus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Andropogon schirensis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Brachiaria serrata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Ctenium concinnum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Cymbopogon caesius
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Cynodon hirsutus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Digitaria tricholaenoides
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Diheteropogon amplectens
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Diheteropogon filifolius
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Elionurus muticus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Eragrostis chloromelas
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Eragrostis curvula
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Eragrostis plana
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Eragrostis racemosa
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Festuca scabra
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Harpochloa falx

Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Heteropogon contortus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Hyparrhenia hirta
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Loudetia simplex
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Melinis nerviglumis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Microchloa caffra
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Monocymbium ceresiiforme
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Panicum ecklonii
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Panicum natalense
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Rendlia altera
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Setaria nigrirostris
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Themeda triandra
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Trachypogon spicatus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Tristachya leucothrix
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POACEAE	Graminoids	Urelytrum agropyroides
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	POLYGALACEAE	Low Shrubs	Polygala uncinata
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	PTERIDACEAE	Geophytic Herbs	Cheilanthes hirta
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	ROSACEAE	Low Shrubs	Rubus rigidus
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	RUBIACEAE	Herbs	Kohautia amatymbica
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	RUBIACEAE	Herbs	Pentanisia prunelloides subsp. latifolia
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	RUBIACEAE	Low Shrubs	Anthospermum rigidum subsp. pumilum

Gm 15 Paulpietersburg Moist Grassland	Important Taxa	RUBIACEAE	Low Shrubs	Anthospermum rigidum subsp. rigidum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	RUBIACEAE	Small Trees	Canthium ciliatum
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	RUBIACEAE	Small Trees	Vangueria infausta
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	VELLOZIACEAE	Herbs	Xerophyta retinervis
Gm 15 Paulpietersburg Moist Grassland	Important Taxa	VITACEAE	Herbs	Cissus diversilobata

AN AGRICULTURAL IMPACT ASSESMENT

MITIGATION MEASURES AND RECOMMENDATIONS FOR THE PROPOSED NEW ESKOM TRANSMISSION GRID FROM THE NHLAZATSHE SUBSTATION TO IMBEWU (BETWEEN HEATONVILLE AND THE R34). THE ROUTR COMMENCES IN THE ULUNDI LOCAL MUNICIPALITY OF THE ZULULAND DISTRICT, PASSSS THRUOGH THE MTONJANENI LOCAL MUNICIPALITY AND TERMINATES IN THE CITY OF MHLATHUZE LOCAL MUNICIPALITY, ALL IN KING CETSHWAYO DISTRICT MUNICIPACITY, THE PROVINCE OF KWAZULU NATAL. IN EXTENT APPROXIMATELY 100 KM

10th March 2023

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1. INTRODUCTION AND BACKGROUND36

1.1 The Objective

The objective behind this assessment has been "a walk-through assessment" to determine whether the proposed new transmission grid will have any impact, positive or negative, on the soils and ecosystems associated with the route.

It should be noted that an extensive and intensive assessment had been undertaken by Aurecon, a major civil engineering and environmental assessment entity

1.2 The Locality

1.2.1. Nhlazatshe to Ulundi

Commencing at the Nhlazatshe substation which is clearly visible from the R34 between Melmoth and Vryheid the route crosses over land that is mainly hilly and broken, covered with a dense growth of unspoiled and pristine thornbush. In many places this section of the route runs parallel to or close to the Mpumalanga to Richard's Bay Transnet railway line. Similarly, it runs close to and parallel with the existing transmission grid

Features that were particularly noteworthy were the totally unspoiled indigenous bushveld with crystal clear streams with gravel beds crossing the road in the valleys often, against the background of gracefully designed Spoornet bridges. Due to the steep and broken terrain there was also a high incidence of tunnels

It was clearly evident that all the soils along this stretch were steep and shallow members of the Mispah and Glenrosa Soil Forms, with no agricultural value outside of domestic livestock and wild game

The preservation of the ambiance of this habitat far outweighs any agronomic considerations

1.2.2. The Ulundi Area

From between 10 to 15 km both West and East of the town of Ulundi the habitat changes to gently sloping open grassland and open Savanna permanently transformed by human habitation. Livestock was a mixture of cattle, goats and sheep, the latter being mainly Dorpers (Dorpers have a black head and are bred for meat, not wool)

1.2.3 Ulundi to Heatonville

The terrain again changes to large, steep hills but not as rugged and broken as the first stage. One notable feature was the presence of approximately 20 000 ha of unprotected, but still pristine bushveld that comes under the Biyela Obuka Traditional Authority. This is one of the several local authorities administering the huge tract of land given by King Shaka as a token of appreciation of support from the Biyela Clan while he was building scattered tribes into the powerful Zulu nation. This is an area that is rich in the history of the Amazulu people. In between the heavily covered bush areas there are large tracts of gentle and open residential areas, with attendant livestock etc

The last part of this section runs along a ridge of well wooded hills from north to south. West of this ridge is open land that forms and important dormitory for workers in Empangeni and Richard's Bay. Much of this land was previously beef farms that reverted to the local populations during the Land Restitution Process

1.2.4 The 8 to 10 km between Heatonville and the R34

This is the only land along the entire route where there has been any commercial scale crop production. Sugarcane is grown on good quality soils that occur west of the Spoornet railway line between the R34 and Heatonville. These fields are irrigated with water pumped from the Thukela River, 50 km away. The rest of the soils at Heatonville are poor quality shallow soils of the Mispah and Glenrosa Soil Forms

1.3 The Regulatory Framework

The most important pieces of legislation effecting land use management are: Subdivision of Agricultural Land Act 70 of 1970 (SALA)
Conservation of Agricultural Resources Act 43 of 1983 (CARA)
National Water Act 107 of 1998 (NEMA) and Government Notice 320 of 20 March 2020

Planning regulations include The National Development Plan (NDP) and the KZN Province and Provincial Spatial Economic Development Strategy (PSEDS)

The assessment and documentation procedure followed in this report is primarily based on the KZN DARD 'Natural Resources and/or Agricultural Survey Specifications, Survey Standards, Version 3, January 2018. These standards reflect the Land Capability Classes (LCCs) detailed in the Survey Specifications source document 'KwaZulu-Natal Land Categories' (Collette and Mitchell, 2012)

The KZN legislation and regulations are not only far more detailed and far more stringent than those used by the other provinces and also by the two national land use authorities, DALRRD and DFFEA,

thus giving the specialist guidelines at a high level, the effect of which is to give the regulatory authorities are far more detailed and authoritative database on which to base their findings.

In order to facilitate flow and avoid unnecessary clutter in the main report, technical data sets are included as technical addenda in the report.

1.4 Local Knowledge

John Phipson has previously conducted agricultural impact assessments for a number of new development projects that fall within the BRUs found along this route.

1.5 Technical Competence

Since 2008 John Phipson has successfully completed over 120 agricultural and agribusiness impact assessments in all 9 Provinces. These have addressed township developments, road upgrades, wind, photo-voltaic and gas to power alternate energy installations, mining and borrow pits, underground pipelines and *overhead power transmission lines.*

1.6 Terms of Reference

Site layout maps and similar data sets have been provided by the client and by the Natural Resources Directorate in the KZN

1.7 Use and Ownership of Land

Apart from the 8 to 10 km at the Heatonville end of the route, the entire route and infrastructure lie within Traditional Authority land and are part of the Ingonyama Trust land.

1.8 Approach to the Study

In order to facilitate flow and avoid unnecessary clutter in the main report, technical data sets are

included as technical addenda to the report.

The desktop assessment has relied mainly on data furnished by various organs of the Agricultural Research Council, the Council for Geo Science as well as well as own experience of the area. The Mucina and Rutherford publication"*The Vegetation of South Africa, Lesotho and Swaziland"* in addition to providing useful vegetative data but also geological and soils information for each ecosystem within the region.

This desk top study has been followed by a site verification process along the lines stipulated by the KZN Department of Agriculture (KZNDARD) Directorate of Natural Resources, Land Use Regulatory Unit and Agricultural Resource Management. The *January 2018 Standards for Agricultural Land Assessment,* published by KZNDARD, are unmatched by any other province, nor at a national level.

1.9. Summary of Findings

There is no agronomic or agribusiness reason why one route should be preferred over another.

Against this background there is no reason why choice of route should not be based on design and civil engineering considerations

The impact assessment has been carried out at two levels. Viz:

The desktop assessment has relied partly on data furnished by The Institute for Soil, Climate and Water (ISCW) and the Mucina and Rutherford publication mentioned above, but above all on Bioregion and Bio-resource Unit data provided by the KZNDALRRD Natural Resources Directorate.

This was followed by a site verification process along the stipulated by the DFFEA Government notice No. 320 of 20 March 2020.

1.10. Open Rangeland

Along the entire route there is approximately 20 to 30 km which crosses open rangeland. The topography in these open areas is level or gently sloping with a moderate distribution of residential homes

1.10.1. Food Crops

The only evidence of any the food crops was a few hectares along the route between Ulundi and Ntambanana grown on heavy Milkwood soils. These soils are the Melanic equivalent of Mispah Soils but sometimes have a deeper topsoil

1.10.2. Industrial Crops

The only industrial crop was sugarcane grown on the last 8 to 10 km between the Heatonville and the R34

1.10.3. Livestock

The open rangeland area referred to above carried large livestock, goats and sheep. The sheep were mainly of the dorper breed which is farmed for meat and not for wool

1.10.4. Water

In contrast with the very muddy Umfolozi River myriads of streams in the heavily wooded areas were crystal clear and unspoiled. These streams are feeders to the Umfolozi River which has been contaminated by dirty water further upstream.

Outside the use of these heavily wooded areas there is no indication of surface water. What is significant is that both in the open rangeland and the forested areas east of Ulundi there are a number of heavily eroded watercourses that flow through the Valsrivier Soil Form.

East of the Heatonville sugarcane railway line a combination of multiple seepages and the presence of the Swartland Soil Form indicated the strong presence of sub surface water. A farm immediately adjacent to the railway line is known as “The Million Streams Farm”.

1.10.5. Samples and Photographs

A number of photographs that illustrate soil profiles along the route constitute a Picture Gallery at the end of this report.

Unlike most projects a specified minimum number of soil profiles is required, in order to give a representative cross section of the physical properties and thus the yield potential of the soils, in this instance the terrain itself provided hundreds of visible profiles along at road banks, along erosion gullies and where the road itself had been eroded.

1.11. Report Format

For ease of readability and internal flow this report has been designed to be presented in ten chapters:

- An Introduction
- A Desktop Study
- The Site Verification Process
- Access, Infrastructure and
- Services Ecosystem Services
- An Impact Assessment and Mitigation Measures
- Conclusions and Recommendations
- Useful References

Appendices Containing Technical Data

An annotated Picture Gallery

1.12 CONCLUSION

There is no agronomic or agribusiness reason why the project should not go ahead

Similarly, there are no agronomic or agribusiness reasons for any one route being preferred over the other two. This decision can be left for resolution on design and civil engineering grounds

2. METHODOLOGY: DESKTOP STUDY

2.1. Soils Data

Available soils data was extracted from Mucina and Rutherford map no. 779 and cross reference to ISCW Landtype Survey: Broad Soil Patterns. Soil Parent Material data was obtained from the Council for GeoScience map no 2830, Richards Bay.

The following standard soil classification texts were used in order to determine site specific Soil Forms and thus obtain data on the physical properties of the Soil Forms encountered and the management thereof:

Identification and Management of the Soils of the South African Sugar Industry: SA Sugar Research Institute. (Sugar book)

Soil Classification: A Taxonomic System for South Africa: Soil Classification Working Group, 2018. Patterson et al, ISCW (Brownlue book)

Soil Classification: A Natural and Anthropogenic System for South Africa: Soil Classification Working Group, 2018. Turner, Paterson et al, ISCW (Brown book)

Soils of South Africa: Martin fey

Land Capability Class (LCC) was determined and tabled on a scale of I to VIII and Agricultural Theme Sensitivity Classification on a scale of 1 to 15.

2.2. Climatic Desktop Data; Target Site

The table below provides a useful description of the 8 Climate Capability Categories

Table 1: Description of Climate Capability Classes

Climate Capability Class	Limitation Rating	Description : Scotney et Al. UKZN 1987

C1	None to slight	Local climate is favourable for good yields for a wide range of adapted crops throughout the year.
C2	Slight	Local climate is favourable for a wide range of adapted crops and a year round growing season. Moisture stress and lower temperatures increase risk and decrease yields relative to C1.
C3	Slight to Moderate	Slightly restricted growing season due to the occurrence of low temperatures and frost. Good yield potential for a moderate range of adapted crops.
C4	Moderate	Moderately restricted growing season due to low temperatures and severe frost.
C5	Moderate to Severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Suitable crops at risk of some yield loss.
C6	Severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Limited suitable crops which frequently experience yield loss.
C7	Severe to Very Severe	Severely restricted choice of crops due to heat, cold and/or moisture stress
C8	Very Severe	Very severely restricted choice of crops due to heat, cold and/or moisture stress. Suitable crops at high risk of yield losses.

Table 2: Soils and Climatic Data for the ecosystems encountered along the route

In view of the large number of BRUs with similar climatic characteristics and soil forms the customary practice of giving detailed climatic and soil information, these ecosystem services have been summarized in the table below in order to avoid multiple repetition

Should any further detail be required for the climate and soils of any of the BRU listed, these will be provided on the request

BRU	BRG	Soils	MAP	Mean Max Temp	Mean Min Temp	Climate Capability Class	Frost
UVb2	16	Gs/Ms	765	24	14	C5	None
Tub7	22	Gs/Ms	673	25	14	C7	None
UVb1	16	Gs/Ms	750	24	14	C5	None

Wc 24	11	Hu/Sd/Oa	837	24	13	C3	None
Tb8	22	Gs/Ms	685	25	14	C7	None
Ub12	20	Gs/Ms	737	25	15	C5	None
STa1	22	Gs/Ms/Es/Sw/Va	650	27	16	C8	None
Ua4	20	Gs/Ms	739	27	16	C5	None
Ua5	20	Gs/Ms	743	26	15	C5	None
Wa3	19	Sw	836	27	15	C3	None

Table 2.1: Bioresource Units and Groups occurring along the route

BRU	BRU Name	BRG Number	BRG Description
UVb2	KwaDubula	16	Dry Lowveld Tall Grassland
Tub7	Mhlahlane	22	Lowveld
UVb1	Ndinde	16	Dry Lowveld Tall Grassland
Wc 24	Nkomjeni	11	Moist Transitional Tall Grassland
Tb8	Ulundi	22	Lowveld
Ub12	Hlepekulu	20	Dry Zululand Thornveld
STa1	Umfolozi	22	Dry Lowveld Tall Grassland
Ua4	Zilulwane	20	Dry Zululand Thornveld
Ua5	Ntambanana	20	Dry Zululand Thornveld
Wa3	Heatonville	19	Moist Zululand Thornveld

Table 2.2 Soil Forms and Descriptions

Soil Form	Soil Name	Brief Description
Gs	Glenrosa	Young soil, shallow with tongues of soil into weathering rock. Seldom arable
Ms	Mispah	Shallow soil over solid rock. Often steep. Non-arable
Mw	Milkwood	Melanic version of Mispah, but sometimes deep enough to be arable
Sw	Swartland	Arable if topsoil depth greater than 400 mm. Has wet feet which indicate subsurface seep areas
Va	Valsrivier	Melanic soil with high erosion risk. Should not be cultivated when the topsoil is less than 400 mm

2.3. Terms of Reference

Terms of reference, proposed future use of land, land portion details, land ownership details, site relevant site maps and similar data was provided by the client.

3. SITE VERIFICATION

3.1. Methodology

The site verification exercise was carried out during the weekend of 20 and 21 as well as 25 January 2023. The weather was warm and clear. The soils were dry. Due to the extensive uniformities of soils around the route the numbers of profiles examined were sufficient to be representative samples of each section of the route. In addition to the soil profiles actually examined there were many places where road banks, erosion gullies and other observation opportunities confirmed the integrity of soil profiles between the actual inspection points.

As there is no standard for the number of soil profiles for longitudinal assessments in KZN or at National level, the specialist was guided by past experience of similar assessments for new and upgraded power line transmission exercises. However, where appropriate the *'Natural Resources and/or Agricultural Survey Specifications, Survey Standards, Version 3, January 2018' was* referred to.

Due to the nature of the topography there was a profusion of exposed roadside banks and frequent eroded watercourses there was no need to use a Dutch Auger. Slope was measured using an Abne level

Soil texture was based on the ball and sausage method.

3.2. Soils Data

Table 3 overleaf provides a descriptive summary of the main features of the Soil Forms encountered at the site in layman's language. Corresponding technical details constitute Appendix 4 hereto

Table 3: Description of Site Soil Families

Soil Family	Features
Glenrosa	Glenrosa soils are frequently found in close proximity to Mispah soils where there has been more rapid weathering of subsurface rock. Topsoil, comprising of grey loamy sand to clay is typically 200mm to 400mm deep. However, tongues of soil do penetrate into a substrate of weathering rock, thus permitting some root, moisture and nutrient penetr ation to a deeper level. They carry a high erosion hazard.

Mispah	Also highly erodible, exceptionally good surface water management required. Topsoil depth is often less than 200mm, covering a stratum of densely bedded shale or solid rock. At many sites the Mispah Soil Form is in a state of transformation to the Glenrosa Soil Form
Milkwood	This is ashallow non-cracking clay over hard rock. Topsoil depth can reach 700 mm but is more frequently between 300 mm and 400 mm. It is a greyish-black blocky clay with sometimes fragments of shale in the topsoil. It is regularly found in the Coastal Lowlands, River Valley and Hinterland Soil Systems
Swartland	Grey to dark grey-brown sandy clay loam. It is usually found in midslopes and lower slopes where there is a high-water table or highly porous soil higher up the slope. An indicator of subsurface it usually has "wet feet". Non arable if the topsoil is less than 400 mm. It is typically 500 mm to 700 mm
Valsrivier	This is an interesting soil. When it has a high iron content it is red and physically very difficult to differentiate from Shortlands soils. It is highly visible in the KZN midlands and Drakensberg sub-escarpment as huge gashes of red eroded dongas on the hillsides
Not Identified	This soil has the same basic profile as Milkwood but has a high gravel content and chips of Bentonite, a mineral used for specialty bricks and pottery. This mineral is an minable quantities on a nearby farm. Due to the high gravel and Bentonite it is self parent that this soil form is highly erodible. When he next visit the ISCW he will take a sample and photographs for identification

The physical properties of the above Soil Forms were summarized from *"Identification and Management of the Soils of the South African Sugar Industry"* published by the SA Sugar Research Institute. (Sugar book)

This is an extremely useful publication as it details physical and chemical characteristics as well as soil management guidelines for all 48 of the Soil Forms that occur within the RSA Sugar Industry. This data is further refined at the Soil Series level for some 400 Soil Series that occur within the 48 Soil Forms. The soils described in the Sugar Book also occur widely in the rest of KZN as well as in the other Provinces, especially in the eastern half of RSA.

3.3. Land Capability Class Determination

Once the relevant soil profile and topographic data had been recorded, the next step was to compile and record the Land Capability Class for each soil profile assessed.

This is the fundamental step in assessing all the individual components that determine the physical capability and crop yield potential of a particular soil at a particular site.

Examination and assessment of the individual components of the determination can also give valuable insights into the management practices that will be required during the construction and rehabilitation phases of a proposed development process.

The following determinants are then applied to a Land Capability Class determination flowsheet:

Soil texture (clay content)

Slope % of surrounding area

Effective rooting depth

Moisture Intake Rate

Soil Permeability

Soil wetness

Rockiness and crusting potential are sometimes a consideration. Aspect and location on the slope (terrain units) can sometimes also provide insight.

Table 4 0verleaf defines the qualities of each of the eight nationally recognised Land Capability Classes.

The values attached to each determinant of an LCC also provide useful management guide
e.g. Texture, rooting depth, permeability etc.

Only soils complying with Land Capability Classes I to III (LCCI to LCCIII) are readily acceptable for arable crop cultivation. LCC IV soils may be cultivated under certain stringent and well managed conditions.

LCC V usually refers to wetlands and LCC VI to non arable land that can be used only for long term crops due to steepness, soil depth and so fort

LCC VI describes soils that have a moderate to good production potential but are too steep for cultivation. Long term crops such as timber and sugarcane plantations, fruit orchards and permanent pastures

LCC VII and VIII soils are limited to domestic livestock and wild game.

Table 4: Description of Land Capability Classes

In order to facilitate flow and avoid clutter, the flowsheets reflecting the key components of LCC determinations are relegated to Appendix 9.3 hereto.

3.4. Soil Properties

For the technically minded, physical and chemical properties of the soils encountered at the site are detailed in Appendix 9.4 hereto.

4. ACCESS, INFRASTRUCTURE AND SERVICES

Access to the western end of the route is from R 34 at 28˚12'34.7" S and 31˚09'55.1"E from which point the Nhlzatshe substation is clearly visible. From this point the route runs parallel to the Spoornet rail line and service road for approximately 10 km. Although rough this road is all weather drivable in a high clearance vehicle.

Exit the Spoornet road at 28˚52'27.7" S and 31˚20'12.7" E Northwards onto a good gravel road which runs parallel to the existing power line. This road can be followed westward for a few km and then eastwards to Ulundi

The proposed route crosses the R66 at 28˚15'08.9" S and 31˚26'33.7" at the northern end of Ulundi. From Ulundi a series of gravel roads can be followed along the existing railway line for approximately 15 km onto the macadamized Ulundi to Empangeni road. When these two-route separate follow the above road to the R34

To access the Heatonville end of the route turn off the R34 at 28˚43'51.7" S and 31˚49'32.4"E the only infrastructure is only the roads referred to above. There are no services

Where there is no access parallel to or adjacent to the existing Eskom power line the terrain and type of vegetation over which the line passes can still be seen

5. ECOSYSTEM SERVICES

As the footprint along the entire route is minimal the three components that determine crop yield; the soils, the rainfall and management, ecosystem services are irrelevant.

6. IMPACT ASSESSMENT AND MITIGATION MEASURES

As the footprint of the proposed route, including substations, power line foundations and power line stay cables will probably be less than 10 ha along the entire 100 km route the impact will be virtually irrelevant as the entire power line, with the exception of a few km at Heatonville passes over non arable land.

Furthermore, the disturbance to the sol caused by excavation for pylons and stay cables will be repaired at a route progresses and all signs of any disturbance will be covered by surrounding vegetation within a few years.

Table 5: Impact Assessment: Eskom Routes

The numerical values used in the table below are derived from the following formula

Ranking scales

	Duration:	**Probability:**
	5 – Permanent	5 – Definite/don't know
	4 - Long-term (ceases with the operational life)	4 – Highly probable
	3 - Medium-term (5-15 years)	3 – Medium probability
	2 - Short-term (0-5 years)	2 – Low probability
	1 – Immediate	1 – Improbable
		0 – None
	Extent/scale:	**Magnitude:**
	5 – International	10 - Very high/uncertain
	4 – National	8 – High
	3 – Regional	6 – Moderate
	2 – Local	4 – Low
	1 – Site only	2 – Minor

The significance of each impact is calculated using the following formula:

S=(E+D+M)P

The environmental significance of each identified potential impact is then rated as follows:

Significance Rating	Score
High	>60–100
Moderate	30–60
Low	<30-0

The Nature of the Impact

The nature of the impact will be short term, moderate and reversible. It is further mitigated is mitigated by the fact that the land on which these activities take place is on the low ranking of LCC VII on a scale of LCC I to LCC VIII, limiting land usage to livestock and wild game only

In terms of agricultural theme sensitivity as defined in Government Notice 320 of 20 March 2020. The agricultural theme sensitivity is correspondingly 3-4 on a scale of 1-15.

Where arable soils were found along the route, they were invariably too far from sources of irrigation water

Defining the Impact	**Without Mitigation**	**With Mitigation**
Extent	1	1
Duration	2	2
Magnitude	2	2
Probability	4	4
Significance	20 (low)	20 (low)
Status	Positive	Positive

Reversibility	Any impact caused by the dealing and back feeling of foundation will be reversed by growth of adjoining plant species onto disturbed soil. It is assumed that access roads during the construction phase will follow the existing power line service road, many of which had become eroded and overgrown due to neglect. The rehabilitation of these roads will be over poor quality non arable land with the exception of the route from Heatonville to the R34. This last section passes over good quality agricultural land and can be serviced existing farm roads	Any impact caused by the dealing and back feeling of foundation will be reversed by growth of adjoining plant species onto disturbed soil. It is assumed that access roads during the construction phase will follow the existing power line service road, many of which had become eroded and overgrown due to neglect. The rehabilitation of these roads will be over poor quality non arable land with the exception of the route from Heatonville to the R34. This last section passes over good quality agricultural land and can be serviced existing farm roads
Irreplaceable Loss of Resources?	There will be no irreplaceable loss of resources	There will be no irreplaceable loss of resources
Can Impacts be Mitigated?	Only as indicated above	Only as indicated above
Mitigation: The only mitigation that is practical is the removal and storage of topsoil at each foundation. The mitigation of impact of upgraded or new service roads is a civil engineering matter and not an agricultural matter		
Residual Impacts: it is anticipated that there will be no residual impacts once the area around foundations is tidy up. There is a risk of soil erosion occurring along the service road, but again this is an engineering matter not an agricultural matter		

Table 5.1: Cumulative Impact Assessment: Eskom Route

The Nature of the Cumulative Impact From an agricultural and agribusiness perspective there is no cumulative impact apart from the marginal items mentioned above		
Defining the Impact	**Cumulative Impact of the Proposed Project Considered in Isolation**	**Cumulative Impact of the Project on other Projects in the Area**
Extent	1	1
Duration	1	1
Magnitude	0	0
Probability	1	1
Significance	3 (very low)	3 (very low)
Status	Neutral	Neutral
Reversibility	Provided for	N/A
Irreplaceable Loss of Resources?	No	N/A
Can Impacts be Mitigated?	Marginally	N/A
Mitigation: As there are no impacts on the surrounding area, there is nothing to mitigate		
Residual Impacts: There are no residual impacts on the surrounding area		

7. CONCLUSIONS AND RECOMMENDATION

7.1. Conclusion:

As the impact of power line and stay cable foundations as well as new substations will occupy less than 10 ha of non arable land the inevitable conclusion is that the impact is insignificance from an agribusiness or agronomic perspective

The only concern of any consequence is the design, construction and maintenance of service roads. This aspect is outside of realm of responsibility of the specialist

It was further noted that there was no evidence of the existing power line having had any negative impact whatsoever on the soils and vegetation along the entire route. However, existing service roads were in part undrivable due to erosion of the road surface itself. It was apparent that this was due lack of maintenance and drainage of storm water from the road onto the surrounding veld

7.2. Recommendation:

As any negative impacts are temporary or marginal it is recommended the project be approved for implementation along anyone of the three proposed routes.

8. USEFUL REFERENCE PUBLICATIONS

The following reference material was utilized during the assessment and verification process:

Development and Application of a Land Capability Classification System for South Africa: J L Schoeman et al, ARC-ISCW, 2002

Identification and Management of the Soils of the South African Sugar Industry: SA Sugar Research Institute. (Sugar book)

KwaZulu-Natal Agricultural Land Categories: Collett A (DAFF) and Mitchell FJ (KZN DALRRD), Version 1, 2012 and its Appendix:

KZN Natural Resources Soil Profile Data Sheets

Land Assessment in KwaZulu-Natal: Botha et al, Natural Resources Directorate, KZN DALRRD; Cedara

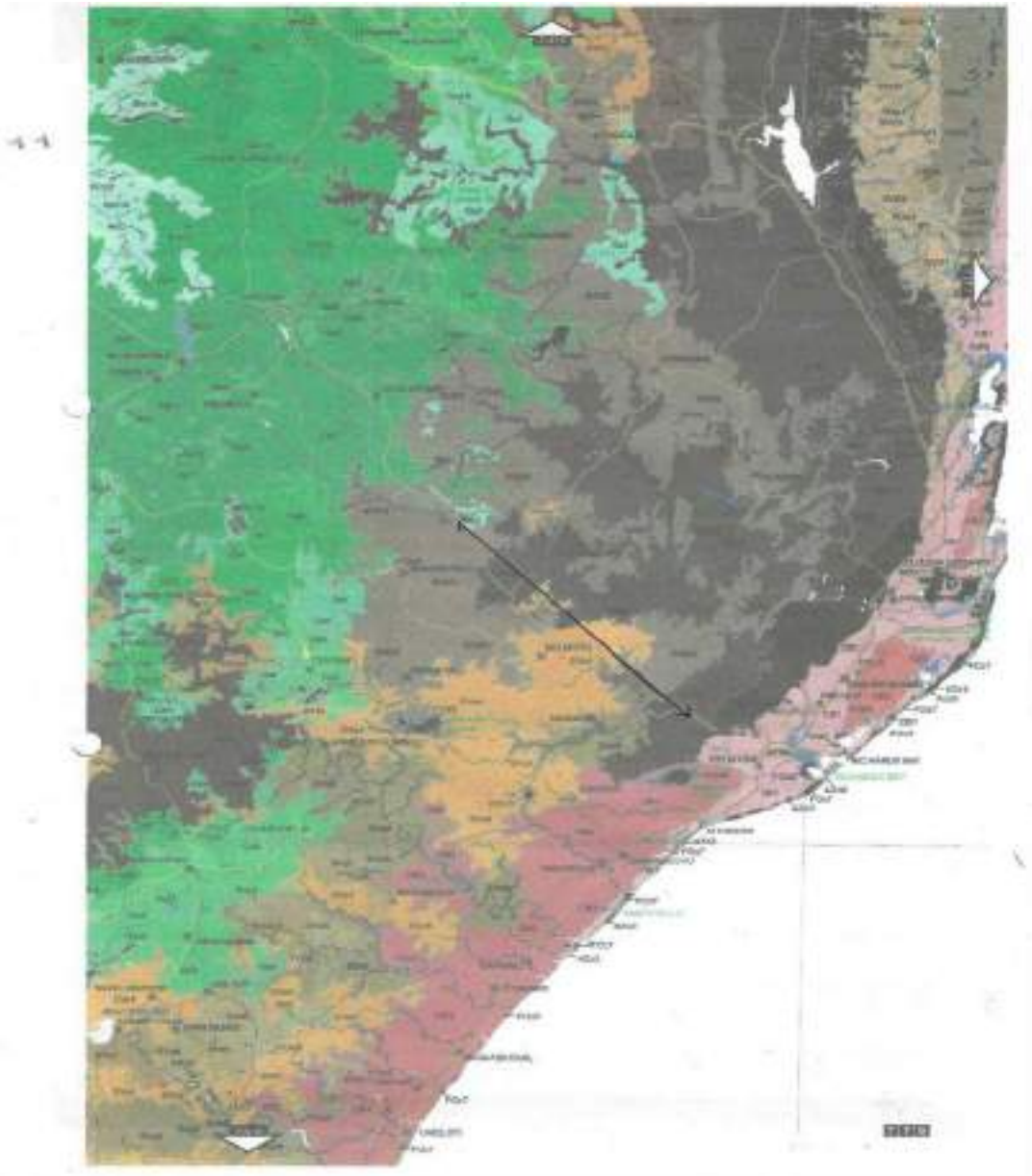
Natural Resources and/or Agricultural Survey Specifications, Version 2 May 2015: KZN DARD Natural Resources Directorate, Cedara

Soil Classification: A Taxonomic System for South Africa: CN MacVicar et Al, SIRI 1991 (Blue Book). This publication was produced by a working group of 30 scientists, written primarily for scientists

Soils of South Africa: Martin Fey, Cambridge University Press

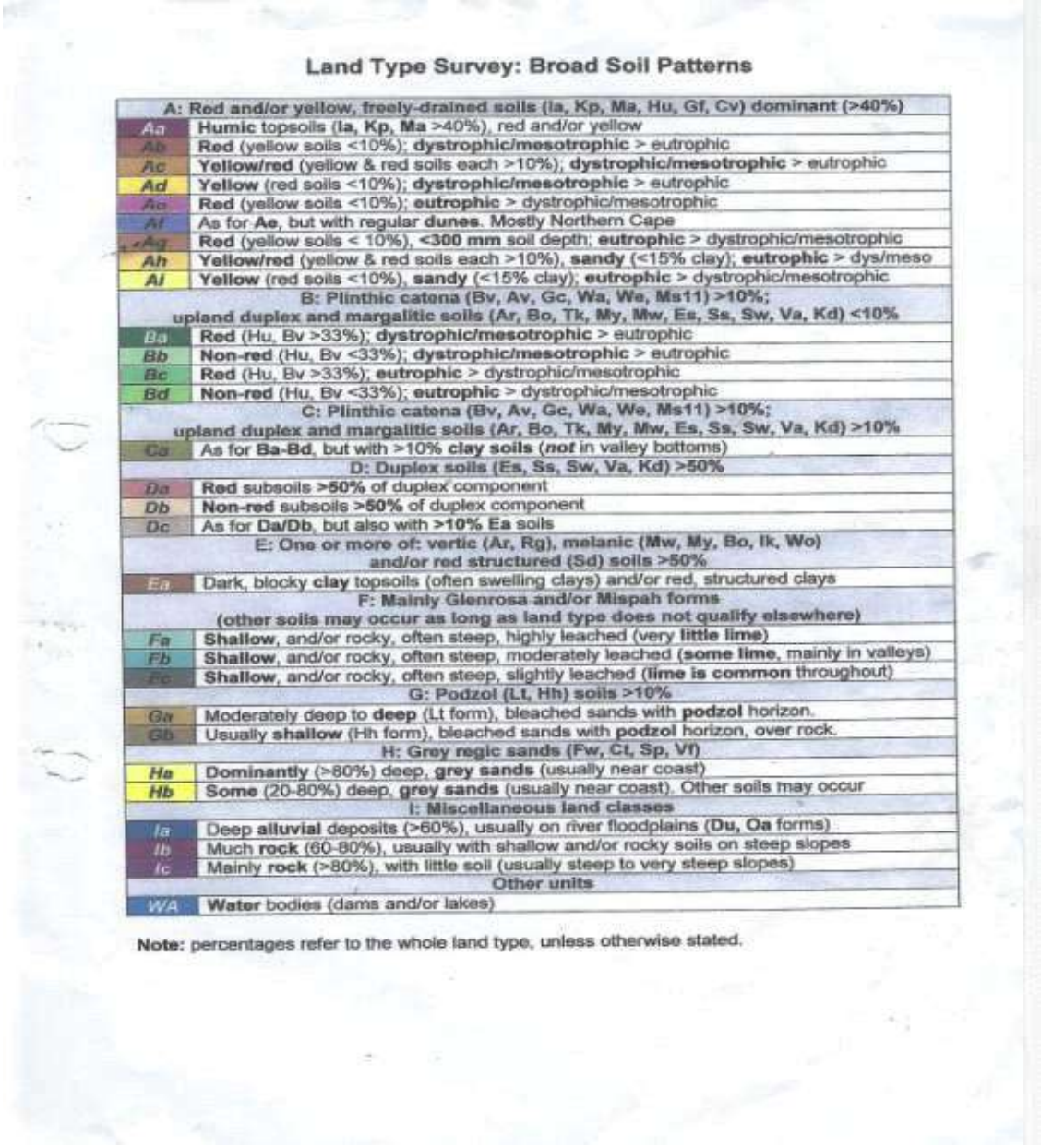
9. APPENDICES

Appendix 9.1 Mucina and Rutherford Veg Map 786



Appendix 9.2: Broad Soil Patterns Map (ISCW)

The soils in this ecosystem are partly category Ae but mainly category Ea.



Land Type Survey: Broad Soil Patterns

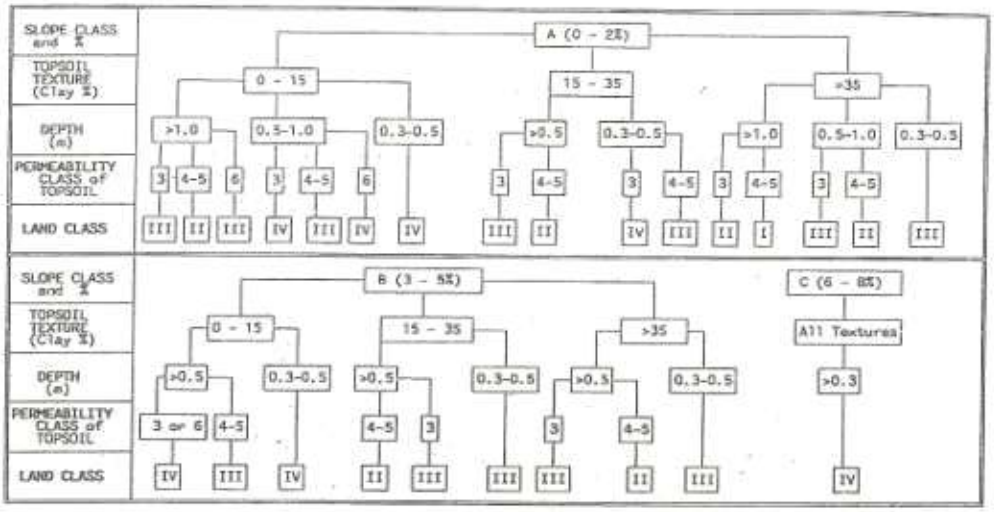
	A: Red and/or yellow, freely-drained soils (Ia, Kp, Ma, Hu, Gf, Cv) dominant (>40%)
Aa	**Humic** topsoils (**Ia, Kp, Ma** >40%), red and/or yellow
Ab	**Red** (yellow soils <10%); **dystrophic/mesotrophic** > eutrophic
Ac	**Yellow/red** (yellow & red soils each >10%); **dystrophic/mesotrophic** > eutrophic
Ad	**Yellow** (red soils <10%); **dystrophic/mesotrophic** > eutrophic
Ae	**Red** (yellow soils <10%); **eutrophic** > dystrophic/mesotrophic
Af	As for **Ae**, but with regular **dunes**. Mostly Northern Cape
Ag	**Red** (yellow soils < 10%), **<300 mm** soil depth; **eutrophic** > dystrophic/mesotrophic
Ah	**Yellow/red** (yellow & red soils each >10%), **sandy** (<15% clay); **eutrophic** > dys/meso
Ai	**Yellow** (red soils <10%), **sandy** (<15% clay); **eutrophic** > dystrophic/mesotrophic
	B: Plinthic catena (Bv, Av, Gc, Wa, We, Ms11) >10%; upland duplex and margalitic soils (Ar, Bo, Tk, My, Mw, Es, Ss, Sw, Va, Kd) <10%
Ba	**Red** (Hu, Bv >33%); **dystrophic/mesotrophic** > eutrophic
Bb	**Non-red** (Hu, Bv <33%); **dystrophic/mesotrophic** > eutrophic
Bc	**Red** (Hu, Bv >33%); **eutrophic** > dystrophic/mesotrophic
Bd	**Non-red** (Hu, Bv <33%); **eutrophic** > dystrophic/mesotrophic
	C: Plinthic catena (Bv, Av, Gc, Wa, We, Ms11) >10%; upland duplex and margalitic soils (Ar, Bo, Tk, My, Mw, Es, Ss, Sw, Va, Kd) >10%
Ca	As for **Ba-Bd**, but with >10% **clay soils** (***not*** in valley bottoms)
	D: Duplex soils (Es, Ss, Sw, Va, Kd) >50%
Da	**Red** subsoils **>50%** of duplex component
Db	**Non-red** subsoils **>50%** of duplex component
Dc	As for **Da/Db**, but also with **>10% Ea** soils
	E: One or more of: vertic (Ar, Rg), melanic (Mw, My, Bo, Ik, Wo) and/or red structured (Sd) soils >50%
Ea	Dark, blocky **clay** topsoils (often swelling clays) and/or red, structured clays
	F: Mainly Glenrosa and/or Mispah forms (other soils may occur as long as land type does not qualify elsewhere)
Fa	**Shallow**, and/or rocky, often steep, highly leached (very **little lime**)
Fb	**Shallow**, and/or rocky, often steep, moderately leached (**some lime**, mainly in valleys)
Fc	**Shallow**, and/or rocky, often steep, slightly leached (**lime is common** throughout)
	G: Podzol (Lt, Hh) soils >10%
Ga	Moderately deep to **deep** (Lt form), bleached sands with **podzol** horizon.
Gb	Usually **shallow** (Hh form), bleached sands with **podzol** horizon, over rock.
	H: Grey regic sands (Fw, Ct, Sp, Vf)
Ha	**Dominantly** (>80%) deep, **grey sands** (usually near coast)
Hb	**Some** (20-80%) deep, **grey sands** (usually near coast). Other soils may occur
	I: Miscellaneous land classes
Ia	Deep **alluvial** deposits (>60%), usually on river floodplains (**Du, Oa** forms)
Ib	Much **rock** (60-80%), usually with shallow and/or rocky soils on steep slopes
Ic	Mainly **rock** (>80%), with little soil (usually steep to very steep slopes)
	Other units
WA	**Water** bodies (dams and/or lakes)

Note: percentages refer to the whole land type, unless otherwise stated.

Appendix 9.3: Definition and Determination of Land Capability Classes

The flowsheets below and overleaf detail the procedures used to determine Land Class Capability. This capability is closely allied to soil yield potential.

CAPABILITY CLASS DETERMINATION GUIDELINE for BRGs:
Dry Zululand Thornveld (20), Valley Bushveld (21), Lowveld (22), Sandy Bushveld (23) (Average annual rainfall 587-838 mm)
Use the following flow chart to determine the land capability classes for land to be cropped in the above Bioresource Groups.



PERMEABILITY CLASS DESCRIPTION*			
Class	Rate (seconds)	Description	Texture
7	<1	Extremely rapid	Gravel and Coarse Sand. 0 to 10 % clay.
6	1-3	Rapid	5% to 10% clay.
5	4-8	Good	> 10% clay.
4	9-20	Slightly restricted	
3	21-40	Restricted	Strong structure, grey colours, mottles. > 35% clay.
2	41-60	Severely restricted	Strong structure, weathered rock. > 35% clay.
1	>60	Impermeable	Rock and very strong structure. > 35% clay.

* If roots can penetrate the subsoil, test permeability of upper subsoil.
If roots cannot penetrate the subsoil, test the permeability of the mid-topsoil.
Dark structured clay topsoil (vertic & melanic) with a Class 2 permeability should be assessed in the chart as if it has a Class 3 permeability. If permeability is Class 7, downgrade to Land Class IV.

Now refer to the opposite page to make adjustments for wetness, rockiness, crusting or permeability.

USE THE FOLLOWING LAND CHARACTERISTICS TO MODIFY THE LAND CLASS OBTAINED OPPOSITE, IF NECESSARY: The land capability class determined using the "flow chart" cannot be upgraded through consideration of wetness, rockiness, surface crusting or permeability classes given below, but it may be downgraded as indicated.

WETNESS		
Class	Definition	Land Class
W0	Well drained - no grey colour with mottling within 1.5 m of the surface. Grey colour without mottling is acceptable.	No change
W1	There is no evidence of wetness within the top 0.5 m. Occasionally wet - grey colours and mottling begin between 0.5 m and 1.5 m from the surface.	Downgrade Class I to Class II, otherwise no change
W2	Temporarily wet during the wet season. No mottling in the top 0.2 m but grey colours and mottling occur between 0.2 m and 0.5 m from the surface. Included are: soils with G horizons (highly gleyed and often clayey) at depths deeper than 0.5 m; soils with an E horizon overlying a B horizon with a strong structure; soils with an E horizon over G horizons where the depth to the G horizon is more than 0.5 m.	Downgrade to Class IV
W3	Periodically wet. Mottling occurs in the top 0.2 m, and includes soils with a heavily gleyed or G horizon at a depth of less than 0.5 m. Found in bottomlands.	Downgrade to Class Vs
W4	Semi-permanently / permanently wet at or above soil surface throughout the wet season. Usually an organic topsoil or an undrained vlei. Found in bottomlands.	Downgrade to Class Vh

PERMEABILITY	
Permeability Class	Adjustment to be made
1 - 2	If in sub-soil, rooting is likely to be limited: Use the permeability of the topsoil in the flow chart. If this is the permeability of the topsoil, then the topsoil is probably a dark structured clay, in which case a permeability Class 3 can be used in the flow chart.
3 - 5	Classify as indicated in the flow chart.
6	Topsoil should have < 15% clay - use the flow chart.
7	Downgrade Land Classes I to III to Land Class IV.

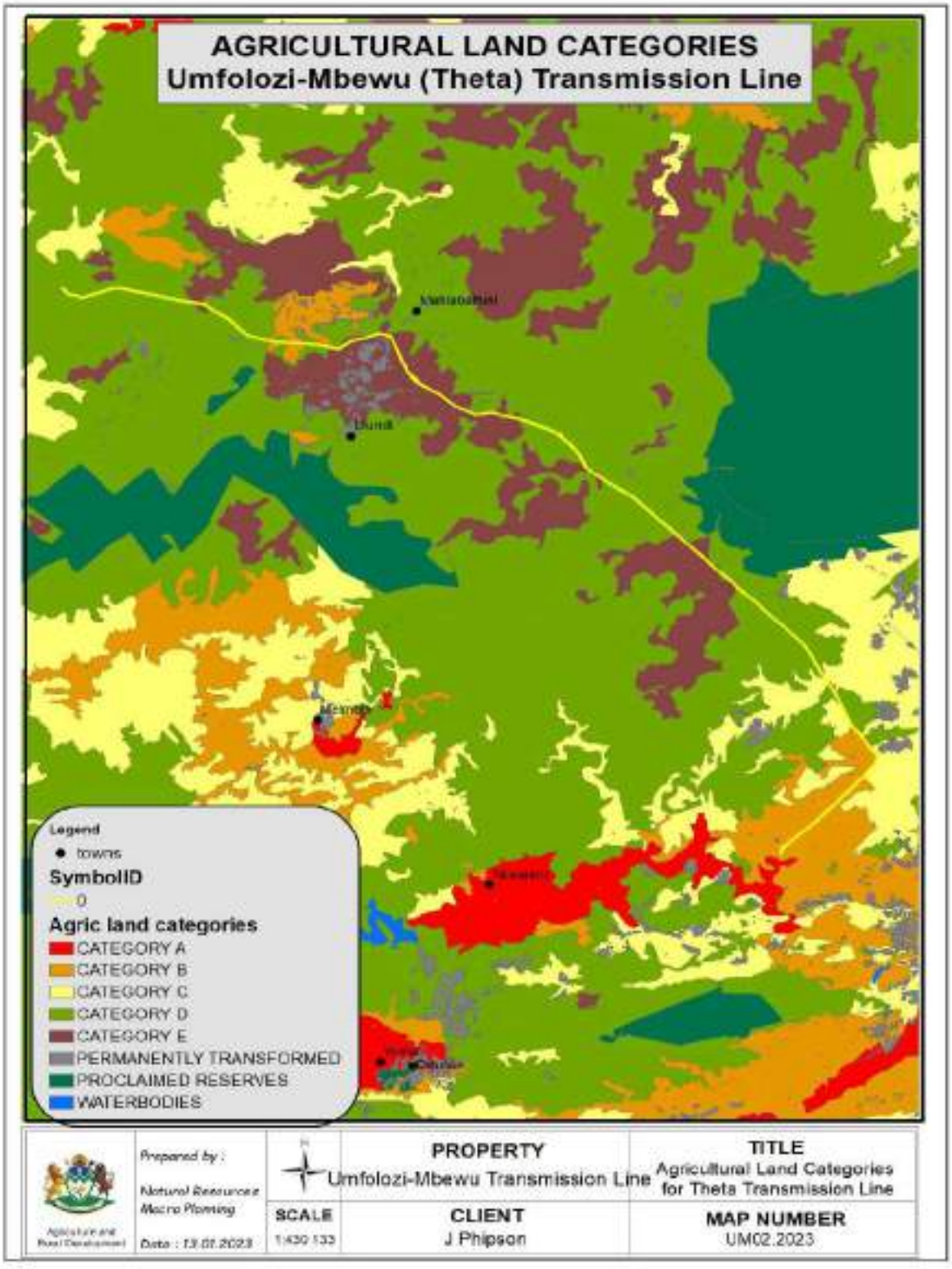
ROCKINESS		
Class	Definition	Land Class
R0	No rockiness	No change
R1	2 - 10% rockiness	Downgrade Classes I to II, otherwise no change
R2	10 - 20% rockiness	Downgrade Classes I to II, otherwise no change
R3	20 - 30% rockiness	Downgrade to Class IV
R4	> 30% rockiness	Downgrade Classes I, II, III & IV to Class VI

SOIL SURFACE CRUSTING		
Class	Definition	Land Class
t0	No surface crusting when dry	No change
t1	Slight surface crusting when dry	Downgrade Class I to Class II, otherwise no change
t2	Unfavourable surface crusting when dry	Downgrade Classes I & II to Class III, otherwise no change

NB Any land not meeting the minimum requirements shown is considered non-arable (Class V, VI, VII or VIII).
Non-arable land in BRGs 2, 4, 6, 9, 12, 14, 15, 16, 17, 18 & 19 includes:
- all land with W3, W4 or R4,
- all land with slope exceeding 20%,
- land with slope 13-20%, if clay < 15% or depth < 0.4m,
- land with slope 8-12% and clay > 15%, if depth < 0.25m,
- land with slope 8-12% and clay < 15%, if depth < 0.5m, and
- land with slope 0-7%, if depth < 0.25m.

20 March 1996

Appendix 9.4. Land Categories Map Eskom Roads



Appendix 9.5 Soil Properties Eskom Roads

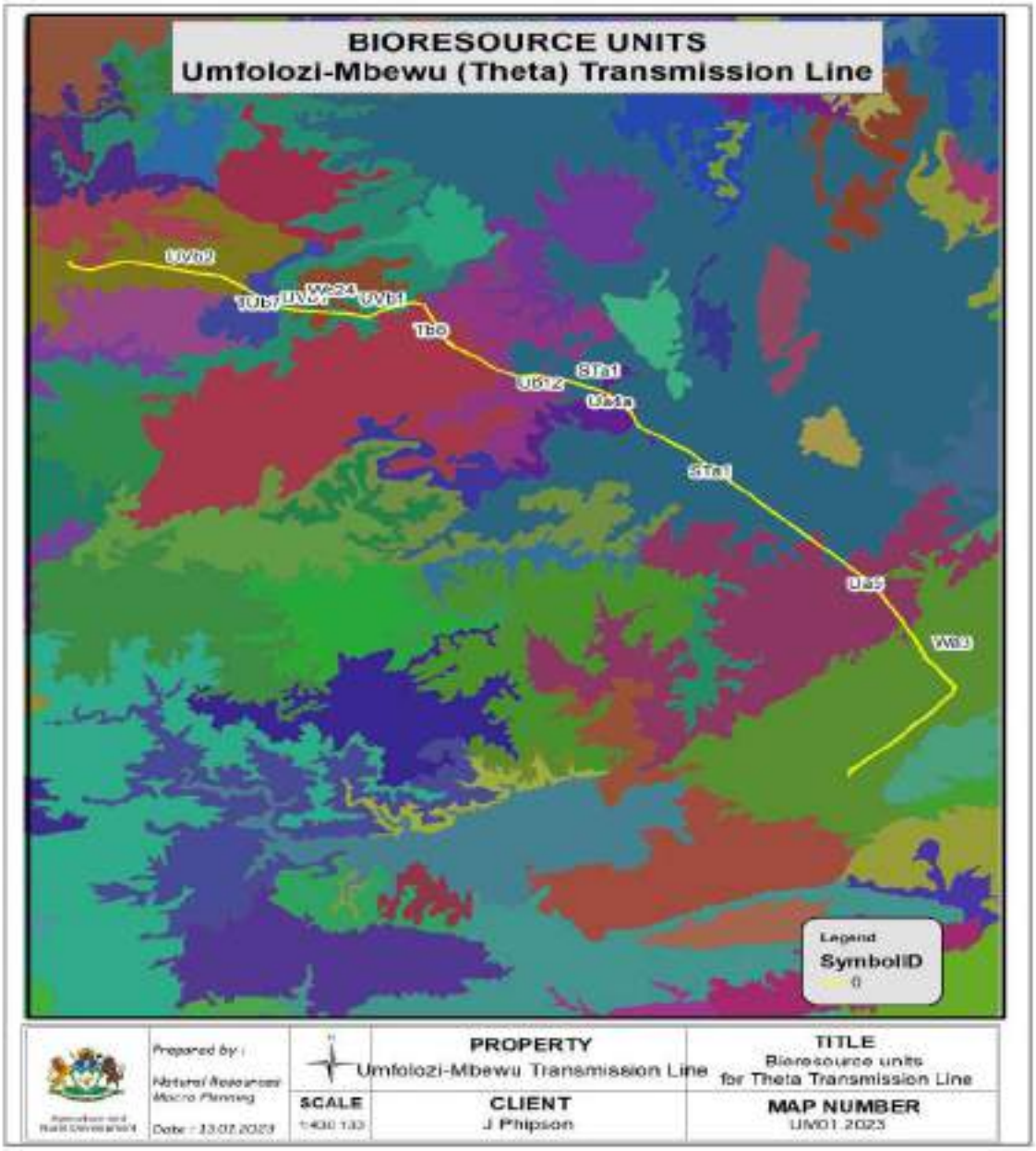
Physical Properties

Soil Form / Family	Clay % of Topsoil	Water Holding Capacity (mm/m)	Water Intake Rate	Drainage Capacity	Erosion Hazard	Tillage Constraints
Glenrosa	6 to 15	80 to 100	Good	Good	High	Cr, co, mw, sh
Milkwood	>35	100 to 140	Medium	Moderate	Moderate to low	Cl,sh
Mispah	5 to 10	< 80	Medium	Moderate	Moderate to high	Cr, co, mw, sh
Swartland	35 to 55	100 to 140	Medium	Moderate	Moderate	Cl, mw

Chemical Properties

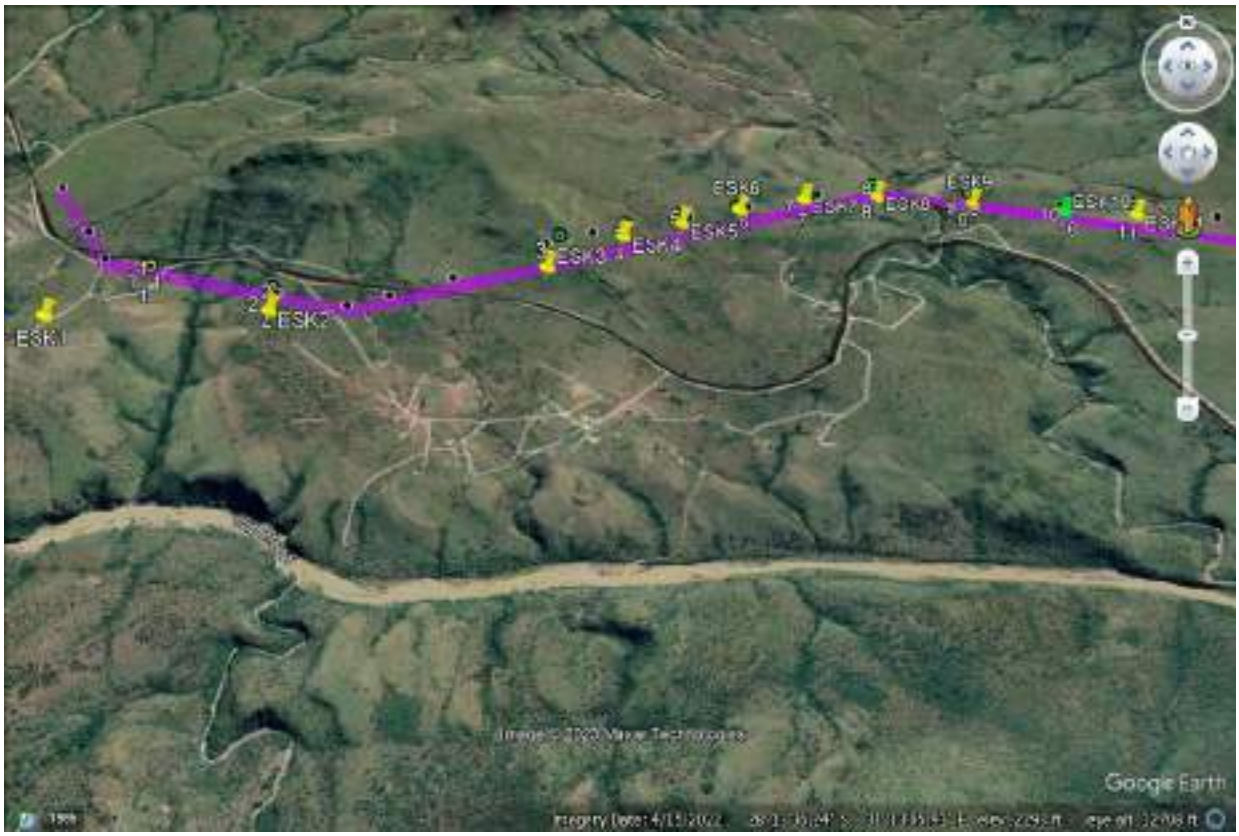
Soil Form / Family	Base Status	Organic matter Content	N&S Mineralisa tion Capacity	K Reserves	Zn Reserves	Salinity / Sodicity Hazard
Milkwood	High	Moderate	Moderate	Moderate to high	Moderate to high	Low
Mispah	Low to Moderate	Low to moderate	Low	Low	Low	Low to moderate
Swartland	Moderate to high	Low to moderate	Modera te	Moderate to high	Moderate to high	Low

APPENDIX 9.6: BIORESOURCE MAP ESKOM



APPENDIX 9.7. LAND CAPABILITY CLASS DETERMINATION MAPS AND TABLES

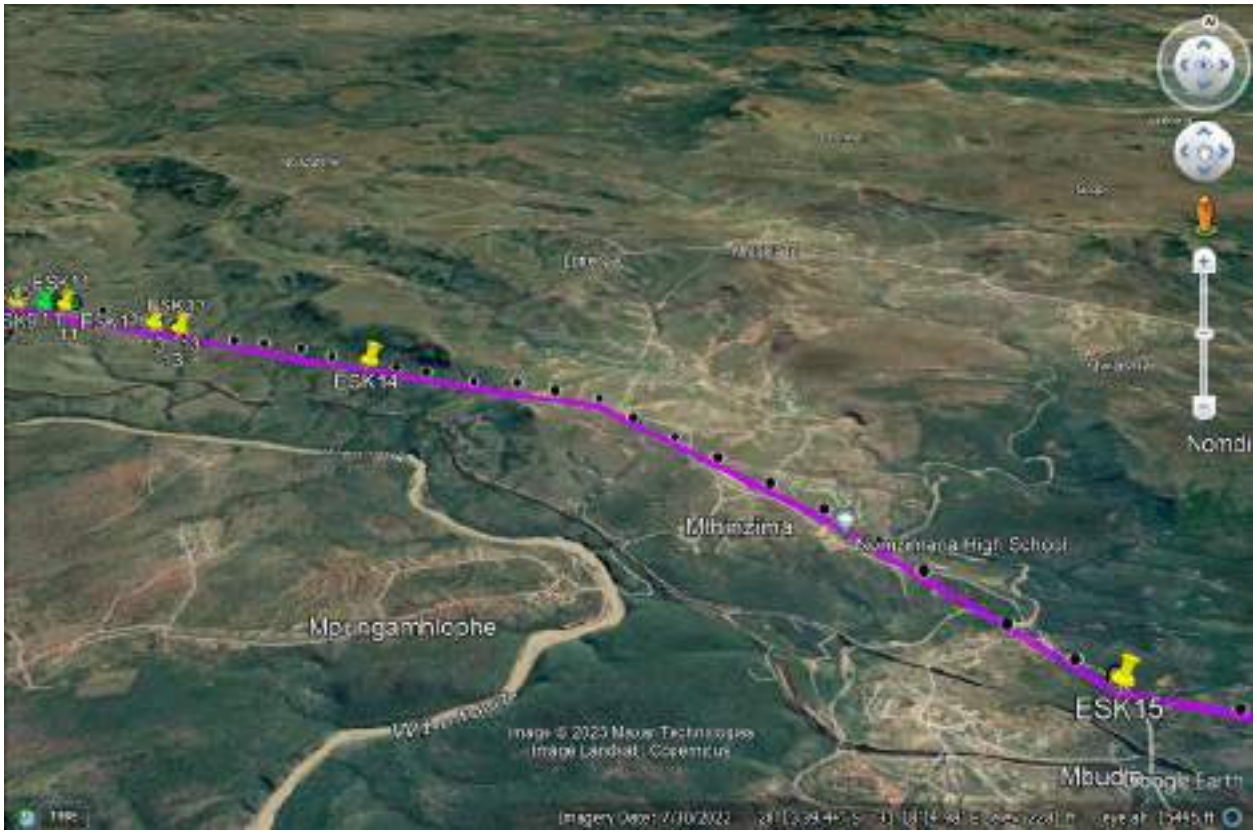
9.7.1 LCC Map at ESK 1 to ESK 10



LCC Determination Map and Table: Soil forms profiles at ESK1 to ESK10

REF	Co-ordinates	Soil Form	Slope %	Clay%	Depth mm	Permeability	Wetness	LCC	Aspect
ESK1	28˚12'51.3"S 31˚11'09.2"E	Glenrosa /Mispah	0--2	15-25	+100	1	0	VII	NW
ESK2	28˚13'12.1"S 31˚11'45.3"E	Glenrosa /Mispah	>25	15-25	100	1	0	VII	N
ESK3	28˚12'59.2"S 31˚11'25.1"E	Glenrosa /Mispah	3-5	15-25	150	1	0	VII	SE
ESK4	28˚13'11.9"S 31˚12'34.0"E	Mispah	16-20	15-25	50	1	0	VII	SE
ESK5	28˚13'24.8"S 31˚13'35.9"E	Glenrosa /Mispah	16-20	10-15	50	1	0	VII	SE
ESK6	28˚13'36.8"S 31˚16'34.4"E	Glenrosa	0-2	10-15	0-100	1	0	VII	SW
ESK7	28˚14'00.5"S 31˚17'30.8"E	Mispah shale	>25	15-25	75	1	0	V	SW
ESK8	28˚14'35.9"S 31˚18'23.5"E	Glenrosa /Mispah	0-2	15-25	100	1	0	VII	E
ESK9	28˚14'13.0"S 31˚18'51.8"E	Glenrosa /Mispah	0-2	15-25	100	1	0	VII	E
ESK 10	28˚13'34.9"S 31˚18'11.8"E	Va	3-5	25-35	>1m	3	W0	II	E

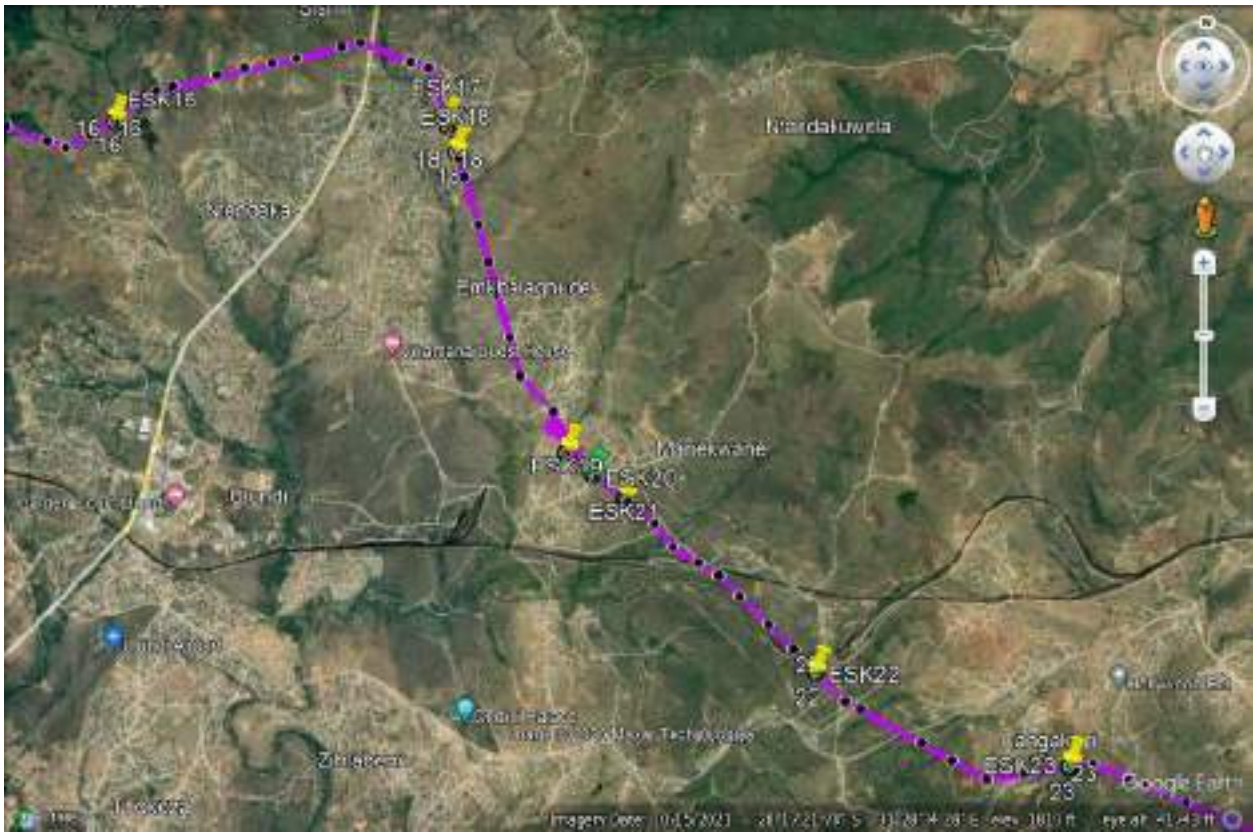
9.7.2 LCC Map at ESK 11 to ESK 15



LCC Determination Map and Table: Soil forms profiles at ESK11 to ESK15

REF	Co-ordinates	Soil Form	Slope %	Clay%	Depth mm	Permeability	Wetness	LCC	Aspect
ESK 11	28˚14'38.4"S 31˚19'33.9"E	Glenrosa	6—11	15-25	200	1	0	VII	N
ESK 1 2	28˚15'06.6"S 31˚20'07.4"E	Glenrosa /Mispah	6-11	15-25	100	1	0	VII	W
ESK 13	28˚16'39.5"S 31˚20'50.4"E	Mispah	>25	15-25	50	1	0	VII	S
ESK 14	28˚17'36.0"S 31˚21'01.3"E	Glenrosa	>25	15-25	<50	1	0	VII	NW
ESK 15	28˚17'39.7"S 31˚28'31.9"E	Glenrosa	3-5	15-25	150	1	0	VII	S

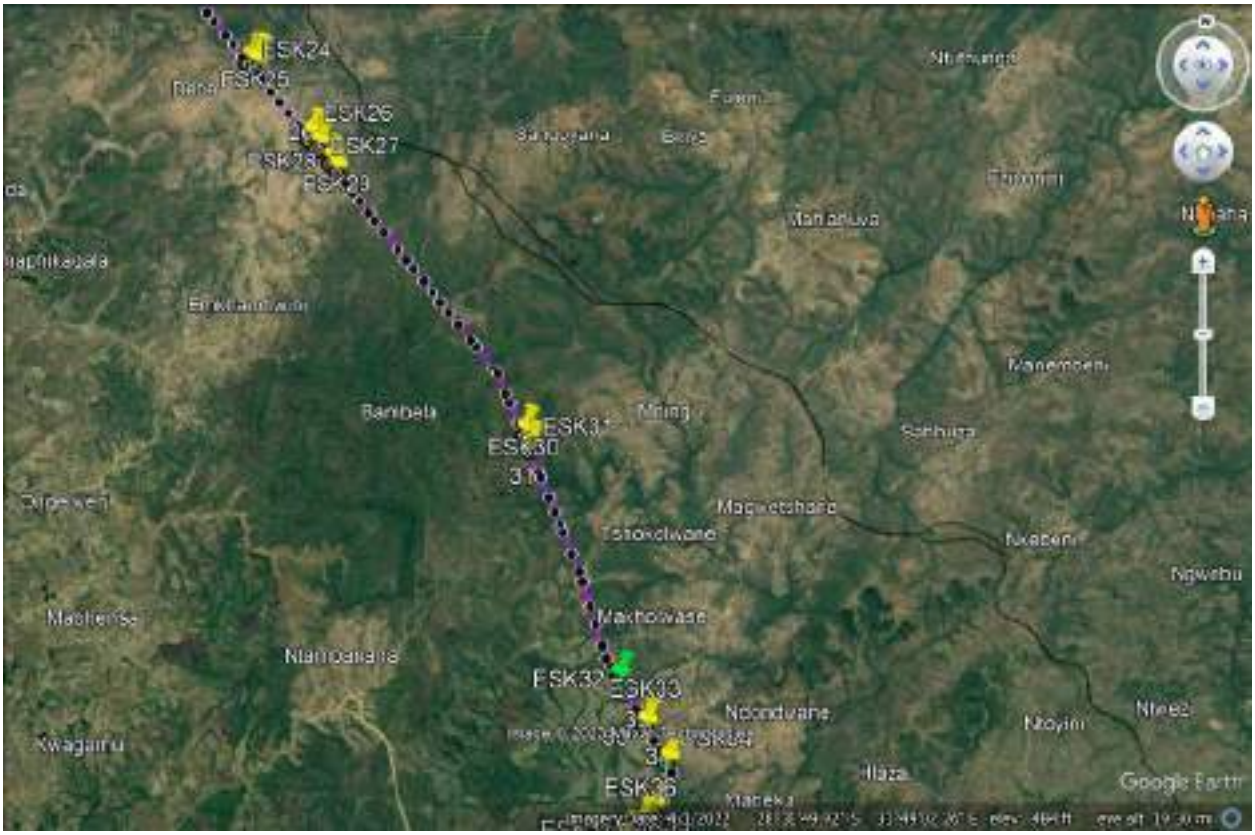
9.7.3 LCC Map for ESK 16 to ESK 23



LCC Determination Map and Table: Soil forms profiles at ESK 16 to ESK23

REF	Co-ordinates	Soil Form	Slope %	Clay%	Depth mm	Permeability	Wetness	LCC	Aspect
ESK 16	28˚17'45.2"S 31˚28'40.0"E	Glenrosa	6—11	15-25	150	1	0	VII	W
ESK 1 7	28˚17'56.7"S 31˚28'48.8"E	Glenrosa	3-5	15-25	50	1	0	VII	SE
ESK 18	28˚18'13.0"S 31˚29'76.8"E	Mispah/ Glenrosa	6-11	15-25	250	1	0	VII	E
ESK 19	28˚18'54.8"S 31˚30'06.5"E	Mispah	>25	15-25	50	1	0	VII	SW
ESK 20	28˚19'05.1"S 31˚30'37.8"E	Va red	3-5	>35	1>m	1	0	VII	NE
ESK 21	28˚19'08.2"S 31˚31'26.6"E	Glenrosa	5-11	15-25	50	1	0	VII	E
ESK 22	28˚18'57.5"S 31˚33'05.2"E	Mispah	6-10	15-25	200	1	0	VII	N
ESK 23	28˚19'21.3"S 31˚33'25.8"E	Mispah/ Glenrosa	3-5	15-25	300	1	0	VII	S

9.7.4 LCC Map at ESK 24 to ESK 36

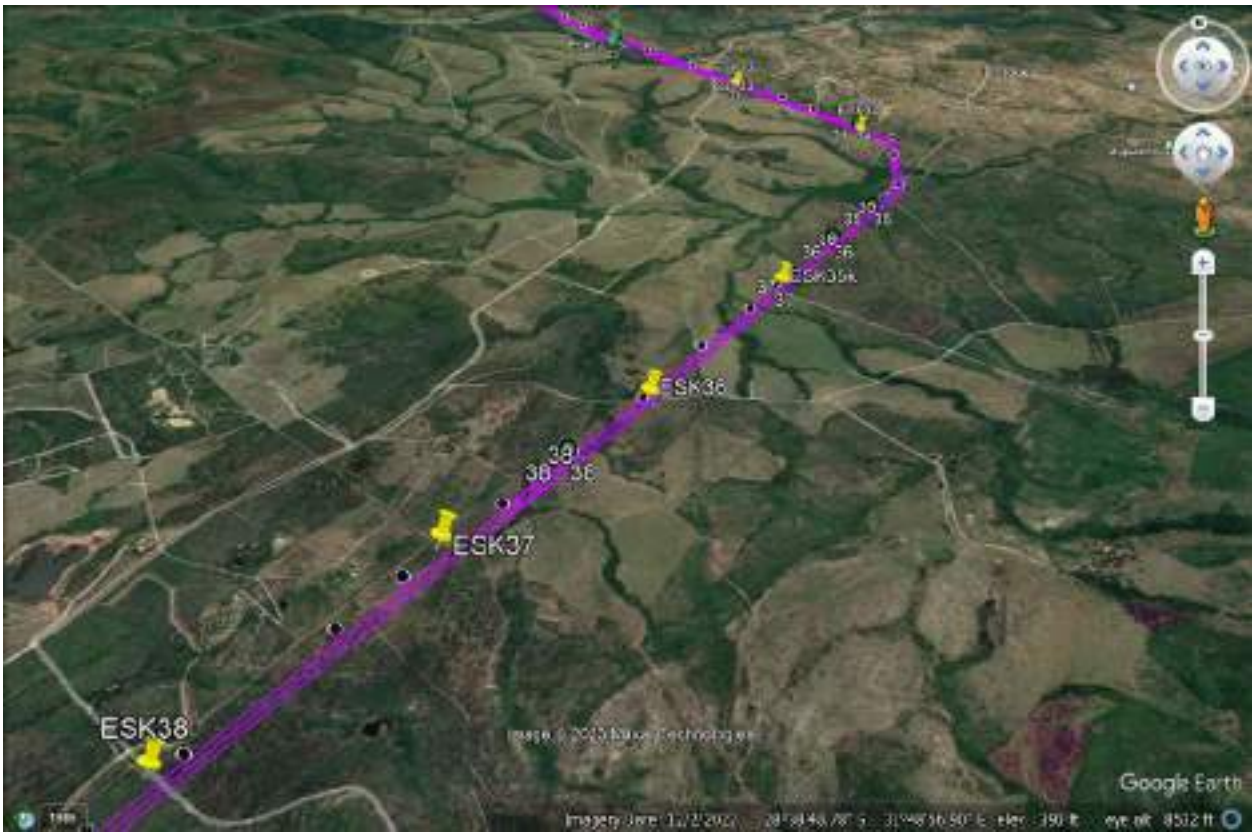


LCC Determination Map and Table: Soil forms profiles at 24 to 36

REF	Co-ordinates	Soil Form	Slope %	Clay%	Depth mm	Permeability	Wetness	LCC	Aspect
ESK 24	28˚20'06.1"S 31˚35'16.1"E	Glenrosa	3—5	15-25	50	1	0	VII	N
ESK 25	28˚25'52.4"S 31˚42'22.2"E	Glenrosa	0-2	15-25	150	1	0	VII	E
ESK 26	28˚27'26.6"S 31˚42'39.6"E	Mispah/Glenrosa	3-5	15-25	250	1	0	VII	S
ESK 27	28˚42'00.2"S 31˚45'17.7"E	Mispah	0-2	15-25	50	1	0	VII	N
ESK 28	28˚36'11.4"S 31˚49'35.6"E	Va red	0-2	>75	400	1	0	VII	NW
ESK 29	28˚35'55.0"S 31˚49'22.1"E	Glenrosa	3-5	15-25	150	1	0	VII	S
ESK 30	28˚35'38.2"S 31˚49'08.2"E	Mispah	3-5	15-25	50	1	0	VII	N
ESK 31	28˚31'30.6"S 31˚47'18.1"E	Mispah/Glenrosa	3-5	15-25	300	3	0	VII	S
ESK 32	28˚35'53.1"S 31˚49'08.6"E	Mispah	>25	15-25	50	4	0	VII	N
ESK 33	28˚36'32.5"S 31˚42'39.1"E	Milkwood	3-5	>35	300	3	0	VII	E
ESK 34	28˚37'02.9"S 31˚50'04.3"E	Milkwood	6-11	>35	200	1	0	VII	E
ESK 35	28˚37'45.3"S 31˚49'54.0"E	Milkwood	3-5	>35	300	1	0	VII	SE

ESK 36	28˚37’59.7”S 31˚49’41.4”E	Mispah/Glenrosa	3-5	15-25	300	1	0	VII	S

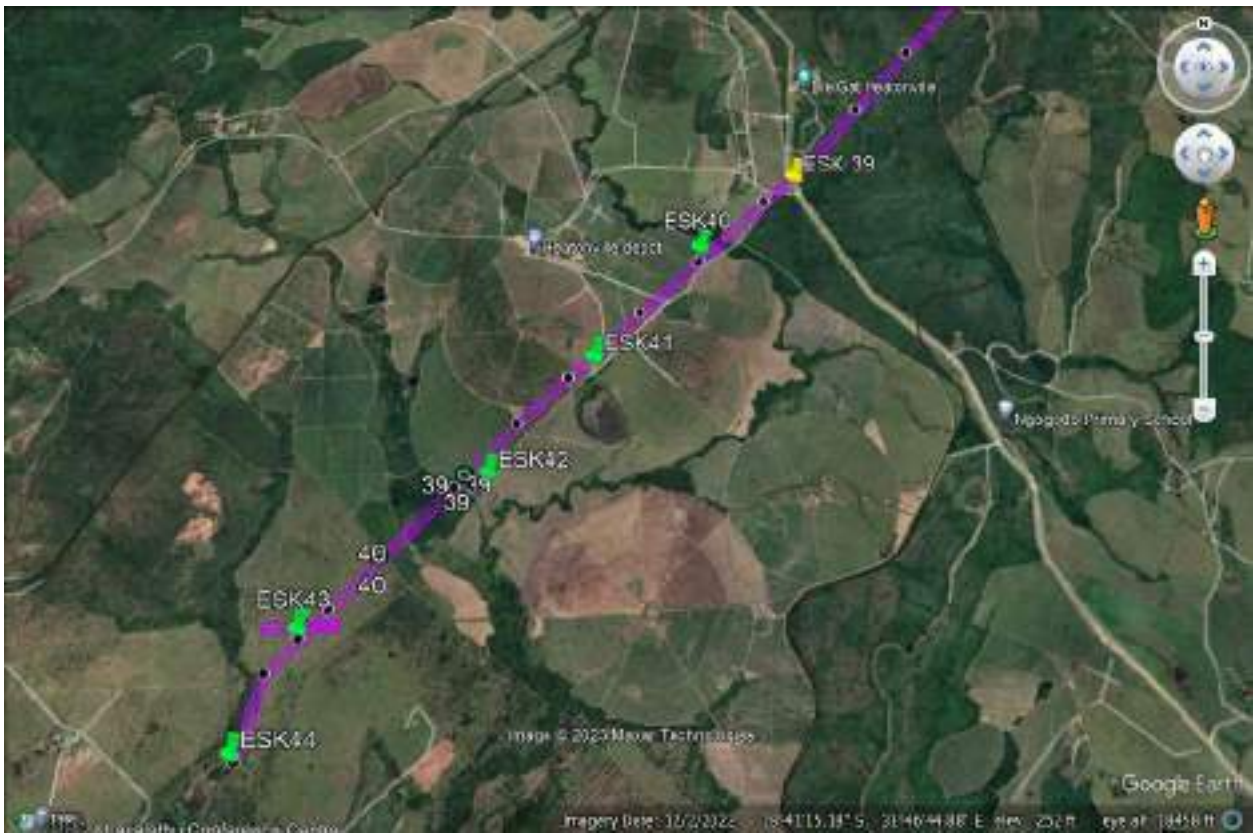
9.7.5 LCC Map at ESK 33 to ESK 38



LCC Determination Map and Table: Soil forms profiles at ESK 33 to ESK 38

REF	Co-ordinates	Soil Form	Slope %	Clay%	Depth mm	Permeability	Wetness	LCC	Aspect
ESK 33	28˚36'32.5"S 31˚42'39.1"E	Milkwood	3-5	>35	300	3	0	VII	E
ESK 34	28˚37'02.9"S 31˚50'04.3"E	Milkwood	6-11	>35	200	1	0	VII	E
ESK 35	28˚37'45.3"S 31˚49'54.0"E	Milkwood	3-5	>35	300	1	0	VII	SE
ESK 36	28˚37'59.7"S 31˚49'41.4"E	Mispah/Glenrosa	3-5	15-25	300	1	0	VII	S
ESK 37	28˚37'45.3"S 31˚49'54.0"E	Not identified	3-5		300	1	0	VII	W
ESK 38	28˚39'43.3"S 31˚48'05.4"E	Not identified	3-5		400	3	0	VII	W

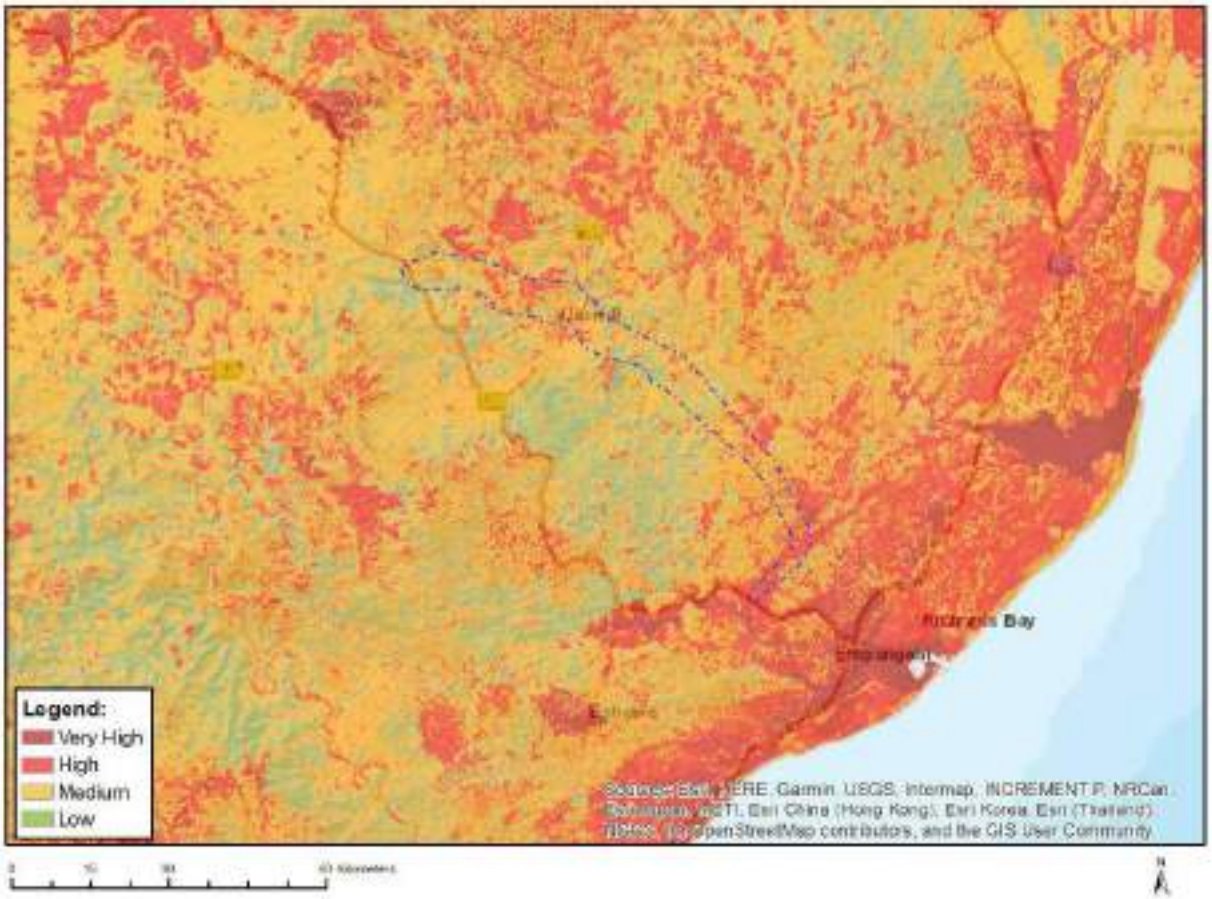
9.7.6 LCC Map at ESK 39 to ESK 44



LCC Determination Map and Table: Soil forms profiles at ESK 39 to ESK 44

REF	Co-ordinates	Soil Form	Slope %	Clay%	Depth mm	Permea Bility	Wetness	LCC	Aspect
ESK 39	28˚40'27.6"S 31˚47'22.9"E	Mispah/Glenrosa	0-2	>35	>500	3	W1	VII	NE
ESK 40	28˚40'30.5"S 31˚47'11.9"E	Mispah/Glenrosa	0-2	>35	>500	3	W1	III	W
ESK 41	28˚40'55.4"S 31˚46'46.1"E	Mispah/Glenrosa	0-2	>35	>500	3	W1	III	W
ESK 42	28˚41'24.3"S 31˚46'17.8"E	Mispah/Glenrosa	0-2	>35	>500	3	W1	III	W
ESK 43	28˚41'55.7"S 31˚45'04.6"E	Mispah/Glenrosa	0-2	>35	>500	3	W1	III	S
ESK 44	28˚47'09.9"S 31˚45'32.5"E	Mispah/Glenrosa	0-2	>35	>500	3	W1	III	N

Appendix 9.8. Agricultural Theme Sensitivity Map



A map on this scale is impossible to use for interpreting ATS at a grass roots level at site specific soil profiles. The Land Categories map (Appendix 9.4 above) and BioResource Unit data (Appendix 9.6 above), both provided by KZN DALRRD Natural Resources Division

10. PICTURE GALLERY

PG.10.1: Glenrosa and Mispah Type Soils

The photograph above illustrates the many shallow soils that were encountered at along the route. They characteristically a have shallow soil above solid rock or shale or tongues going into weathering rock. These soils should not be cultivated as they carry a moderate to high erosion hazard depending on surrounding typography and slope.

PG.10.2:

The foreground of this photograph illustrates the solid rock that occurs below the shallow topsoils in many places along this route.

PG .10.3: Typical Roadside Profile

Another typical roadside profile

PG. 10.4: Spoornet Tunnels

The numbers of tunnels along the route are a clear indication of how steep and broken the terrain is. The upper half of the photograph illustrates the vigorous and luxuriant of indigenous bushveld along the route. In the foreground is good coverage by Natal Red Grass, a pioneer on disturbed land

PG 10.5 Valsrivier Soil Form

Because of its parentage and structure this soil can erode even on gently sloping hillsides

Jp/nn/eskom umfolosi / 4 march 2023

VISUAL IMPACT REPORT

ESKOM UMFOLOZI-MBEWU
(THETA) TRANSMISSION LINE
BASIC ASSESSMENT
MARCH 2023

VISUAL IMPACT REPORT

Eskom Umfolozi-Mbewu (Theta) Transmission Line, Kwa Zulu Natal

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Report Revision No: 1
Date Issued: 1st March 2023
Prepared By: Brogan Geldenhuys
Reference: Eco Thunder Consulting and Afzelia Environmental Consultants (Pty) Ltd (2023) Visual Impact Assessment for Eskom Umfolozi-Mbewu (Theta) Transmission Line

ACRONYMS, ABBREVIATIONS AND GLOSSARY

Acronyms & Abbreviations	
BAR	Basic Assessment Report
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GYLA	Graham Young Landscape Architect
OHL	Overhead Line
SACLAP	South African Council for the Landscape Architectural Profession
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
Glossary	
Aesthetic Value	Aesthetic value is the emotional response derived from the experience of the environment with its natural and cultural attributes. The response can be either to visual or non-visual elements and can embrace sound, smell and any other factor having a strong impact on human thoughts, feelings, and attitudes (Ramsay, 1993). Thus, aesthetic value encompasses more than the seen view, visual quality, or scenery, and includes atmosphere, landscape character and sense of place (Schapper, 1993).
Aesthetically significant place	A formally designated place visited by recreationists and others for the express purpose of enjoying its beauty. For example, tens of thousands ofpeople visit Table Mountain on an annual basis. They come from around the country and even from around the world. By these measurements,one can make the case that Table Mountain (a designated National Park) is an aesthetic resource of national significance. Similarly, a resource thatis visited by large numbers who come from across the region probably has regional significance. A place visited primarily by people whose place of origin is local is generally of local significance. Unvisited places either have no significance or are "no trespass" places. (After New York, Department of Environment 2000).
Aesthetic impact	Aesthetic impact occurs when there is a detrimental effect on the perceived beauty of a place or structure. Mere visibility, even startling visibility of a Project proposal, should not be a threshold for decision making. Instead, a Project, by its visibility, must clearly interfere with or reduce (i.e., visual impact) the public's enjoyment and/or appreciation of the appearance of a valued resource e.g., cooling tower blocks a view from a National Park overlook (after New York, Department of Environment 2000).
Cumulative Effects	The summation of effects that result from changes caused by a development in conjunction with the other past, present, or reasonably foreseeable actions.
Glare	The sensation produced by luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance and visibility. *See* Glint. (USDI 2013:314)
Glint	A momentary flash of light resulting from a spatially localized reflection of sunlight. *See* Glare. (USDI 2013:314)
Landscape Character	The individual elements that make up the landscape, including prominent or eye-catching features such as hills, valleys, woods, trees, water bodies, buildings, and roads. They are generally quantifiable and can be easily described.

Landscape Impact	Landscape effects derive from changes in the physical landscape, whichmay give rise to changes in its character and how this is experienced (Institute of Environmental Assessment & The Landscape Institute 1996).
Study area	For the purposes of this report this Project the study area refers to the proposed Project footprint / Project site as well as the 'zone of potential influence' (the area defined as the radius about the centre point of the Project beyond which the visual impact of the most visible features will be insignificant) which is a 5,0km radius surrounding the proposed Project footprint / site.
Project Footprint / Site	For the purposes of this report the Project *site* / *footprint* refers to theactual layout of the Project as described.
Sense of Place (Genius loci)	Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. *A genius locus literally means* 'spirit of the place'.
Sensitive Receptors	Sensitivity of visual receptors (viewers) to a proposed development.
Viewshed analysis	The two-dimensional spatial pattern created by an analysis that defines areas, which contain all possible observation sites from which an object would be visible. The basic assumption for preparing a viewshed analysis is that the observer eye height is 1,8m above ground level.
Visibility	The area from which Project components would potentially be visible.Visibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation, and distance.
Visual Exposure	Visibility and visual intrusion qualified with a distance rating to indicate the degree of intrusion and visual acuity, which is also influenced by weatherand light conditions.
Visual Impact	Visual effects relate to the changes that arise in the composition of available views because of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity available views because of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visualamenity.
Visual Intrusion	The nature of intrusion of an object on the visual quality of the environment resulting in its compatibility (absorbed into the landscape elements) or discord (contrasts with the landscape elements) with the landscape and surrounding land uses.
Visual absorption capacity	Visual absorption capacity is defined as the landscape's ability to absorb physical changes without transformation in its visual character and quality. The landscape's ability to absorb change ranges from low- capacity areas, in which the location of an activity is likely to cause visual change in the character of the area, to high-capacity areas, in which the visual impact of development will be minimal (Amir & Gidalizon 1990).
Worst-case Scenario	Principle applied where the environmental effects may vary, for example, seasonally or collectively to ensure the most severe potential effect isassessed.
Zone of Potential Visual Influence	By determining the zone of potential visual influence, it is possible to identify the extent of potential visibility and views which could be affected by the proposed development. Its maximum extent is the radius around an object beyond which the visual impact of its most visible features will be insignificant primarily due to distance.

EXECUTIVE SUMMARY

Project Site and Study Area

As part of the KZN Strengthening - Empangeni Integration Eskom have proposed to undertake the construct of a 400 kV transmission line between the proposed new sub-station (the so-called Mbewu substation) near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and Uthungula District Municipality.

The approved route fall within five local municipalities: uMhlatuze Local Municipality, uMlalazi Local Municipality, Mthonjaneni Local Municipality, Ntambanana Local Municipality and Ulundi Local Municipality in the KwaZulu Natal Province. The urban areas consist of the town of City of uMhlathuze, Empangeni, Melmoth and Ulundi. Farming areas include farms (Tongaat Hullett sugar plantations in the north-eastern KZN)

This development aims at strengthening of the power corridor entail phased construction of 400kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that, in-order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 400kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

The scope of work is:

- Construction camps and lay-down yards.
- Access roads
- The Construction of Mbewu GIS substation
- Phased Construction of 98km Mbewu Umfolozi 400kV line Loop in and out of Invubu Umfolozi to the newly built Mbewu GIS substation.
- Construction of the Feeder Bay at Umfolozi Substation

The electricity demand in KZN is increasing at a much faster rate than was originally predicted. Studies have shown a steady 4% per annum average load growth for the area fed from Invubu, Impala and Athene substations, near Empangeni. If Eskom is to honour its mandate and commitment to meet the increasing needs of end users, it has to establish and expand its infrastructure of transmission lines and substations on an on-going basis. Due to substantial annual load growth and possible step loads it has become necessary to reinforce the existing electrical infrastructure.

Cross rope suspension towers will be used for most of the route. The tower is approximately 50m high. The average span between towers will be 450m. Self-supporting strain towers will be used at bend points along the line. Self-supporting strain (and angle) towers are more expensive than the cross-rope suspension towers due to higher steel content. They also have a higher visual impact, which is why the Tx P/l routes are planned with as few bends as possible. An 80m servitude (40m on either side of the centre line) is required to accommodate the towers on which the overhead line will be strung. In forestry areas the servitude needs to be wider so as to ensure safe construction, maintenance and operation of the line. Eskom will be entitled to unrestricted access.

The Transmission Grid Code stipulates that the Transmission network shall be N-1 compliant. That is the Transmission network will be able to supply the load under loss of any of the power lines or equipment. Several other Environmental Impact Assessments (EIAs) have been and are being undertaken for other power lines in the area. One of which is the EIA for the proposed Umfolozi-Empangeni 400kV power line and proposed Mbewu (Theta) substation. This new link will enable development along the coastal areas between the two load centres as well as provide an evacuation route for the excess power.

Approach to Study

The VIA is determined according to the nature, extent, duration, intensity or magnitude, probability, and significance of the potential visual impacts, and will propose management actions and/or monitoring programs and may include recommendations related to the proposed OHL.

The visual impact is determined for the highest impact-operating scenario (worst-case scenario) and varying climatic

conditions (i.e., different seasons, weather conditions, etc.) are not considered.

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

The determination of the potential visual impacts is undertaken in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed infrastructure.

Anticipated issues related to the potential visual impact of the proposed development include the following:

- The visibility of the facility to, and potential visual impact on, observers travelling along the major local roads traversing south and west of the proposed facility.
- The visibility of the facility to, and visual impact on, the larger built-up centres or populated places (the towns of Bronville, Verginia and Meloding) as well as the homesteads (farm residences) located within close proximity of the site.
- Potential cumulative visual impacts (or alternately, consolidation of visual impacts) with specific reference to the existing power line infrastructure adjacent to the proposed development area.
- The potential visual impact of the construction of ancillary infrastructure (i.e., the substation at the facility, associated power line and access roads) on observers in close proximity of the facility.
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in proximity of the facility.
- The visual absorption capacity of natural or planted vegetation (if applicable).
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

It is envisaged that the issues listed above may constitute a visual impact at a local scale.

Conclusion

The sensitivity of the landscape character is an indication of "the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character" (GLVIA, 2002). The uncluttered openness of the landscape is greatly responsible for the simplistic and essentially secluded landscape character. Vast uninterrupted landscapes and vistas are dominated by low growing and low stunted vegetation. The unspoilt, panoramic landscape is an amenity that greatly contributes to the pristine and remote character of the landscape.

Previous human induced activities and interventions have minimally impacted the original landscape character. In this case, mining and existing infrastructure, including power lines, roads, amongst others, can be classified as landscape disturbances and elements that cause a reduction in the condition of the affected landscape type and negatively affect the quality of the visual resource.

The focus of this study is specifically on the main project components such as the power lines, pylons and access roads and not on the ancillary infrastructure. Due to the linear nature of the proposed project it is not possible to provide an adequate descriptive analysis of visibility by plotting sections to determine the line of sight from the observer towards the project components to indicate the extent to which the elements are not screened by the intervening landforms or structures.

The servitude, if cleared of vegetation, and the construction access road will be visible, especially where the vegetation is diverse, for an extended distance beyond the 5 000 m zone, if viewed from an elevated position. This scar will be visible until rehabilitation is complete. Fortunately, much of the vegetation is grassland and will not need to be cleared.

Due to the linear nature of the proposed route specific viewpoints for the transmission line were not selected. However, areas with high volumes of traffic, areas with tourism potential and undeveloped rural areas with high scenic value

were regarded as critical view zones against which the visual impact would be evaluated.

The significance of visual impact is based on the worst-case scenario. This scenario assumes that all facilities along with the associated grid infrastructure and sub-stations would be constructed at the same time. At the time of writing there was no evidence to the contrary. This assumption is also based on the nature of the visual impact and the fact that receptors would experience all facilities in the same visual envelope from their respective locations or as they travel along adjacent roads.

The anticipated visual impact is not considered to be a fatal flaw from a visual perspective, considering the low incidence of visual receptors occurring within the region.

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1. INTRODUCTION

1.1. Project Overview and Background

Eco-Thunder Consulting was commissioned by Afzelia Environmental Consultants (Pty) Ltd to carry out a Visual Impact Assessment (VIA) of the proposed.
The VIA focuses on the potential impact of the physical aspects of the proposed developments (i.e., form, scale, and bulk), and their potential impact within the local landscape and receptor context.

As part of the KZN Strengthening - Empangeni Integration Eskom have proposed to undertake the construct of a 400 kV transmission line between the proposed new sub-station (the so-called Mbewu substation) near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and Uthungula District Municipality.

The approved route fall within five local municipalities: uMhlatuze Local Municipality, uMlalazi Local Municipality, Mthonjaneni Local Municipality, Ntambanana Local Municipality and Ulundi Local Municipality in the KwaZulu Natal Province. The urban areas consist of the town of City of uMhlathuze, Empangeni, Melmoth and Ulundi. Farming areas include farms (Tongaat Hullett sugar plantations in the north eastern KZN)

This development aims at strengthening of the power corridor entail phased construction of 400kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that, in-order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 400kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

The scope of work is:

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- Phased Construction of 98km Mbewu Umfolozi 400kV line Loop in and out of Invubu Umfolozi and Athene Umfolozi 400kV lines (Mbewu Loop ins) to the newly built Mbewu GIS substation.
- Construction of the Feeder Bay at Umfolozi Substation

The electricity demand in KZN is increasing at a much faster rate than was originally predicted. Studies have shown a steady 4% per annum average load growth for the area fed from Invubu, Impala and Athene substations, near Empangeni. If Eskom is to honour its mandate and commitment to meet the increasing needs of end users, it has to establish and expand its infrastructure of transmission lines and substations on an on-going basis. Due to substantial annual load growth and possible step loads it has become necessary to reinforce the existing electrical infrastructure.

Cross rope suspension towers will be used for most of the route. The tower is approximately 50m high. The average span between towers will be 450m. Self-supporting strain towers will be used at bend points along the line. Self-supporting strain (and angle) towers are more expensive than the cross-rope suspension towers due to higher steel content. They also have a higher visual impact, which is why the Tx P/l routes are planned with as few bends as possible. An 80m servitude (40m on either side of the center line) is required to accommodate the towers on which the overhead line will be strung. In forestry areas the servitude needs to be wider so as to ensure safe construction, maintenance and operation of the line. Eskom will be entitled to unrestricted access.

The Transmission Grid Code stipulates that the Transmission network shall be N-1 compliant. That is the Transmission network will be able to supply the load under loss of any of the power lines or equipment. Several other Environmental Impact Assessments (EIAs) have been and are being undertaken for other power lines in the area. One of which is the EIA for the proposed Umfolozi-Empangeni 400kV power line and proposed Mbewu (Theta) substation. This new link will enable development along the coastal areas between the two load centres as well as provide an evacuation route for the excess power.

1.2. Project site and study area

The Umfolozi – Mbewu transmission line study area falls within the KwaZulu-Natal province of South Africa and covers the Zululand and Uthungulu District Municipalities and their Local Municipalities. The main towns in the area include Ulundi, Melmoth and Empangeni. Figure 1 depicts the general layout of the Umfolozi – Mbewu transmission line.

The study area consists of vacant and uninterrupted land as well as cultivated, residential, subsistence farming, and game farms. Subsistence farming activities are concentrated around the small towns. Human settlements are scattered throughout the study area and the landscape are degraded around these settlements. The landscape character changes through the study area. The study area is divided into distinct landscape types which are areas within the study area that are relatively homogenous in character (Swanwick, 2002). Landscape types are distinguished by differences in topographical features, vegetation communities and patterns, land use and human settlement patterns. The assessment is done on a macro-scale and discusses the predominant landscape conditions and visual characteristics found in a particular landscape type.

1.3. Objective of the Specialist Study

The main aim of the study is to document the baseline and to ensure that the visual/aesthetic consequences of the proposed Project are understood. The report therefore aims to identify scenic resources, and visually sensitive areas or receptors. It also aims to identify key concerns or issues relating to potential visual impacts arising from the Project, and which must be addressed in the assessment phase.

1.4. Terms and Reference

A specialist study is required to establish the visual baseline and to identify and potential visual impacts arising from the proposed development based on the general requirements for a comprehensive VIA. The following terms of reference were established:

- Data collected allows for a description and characterization of the receiving environment.
- Describe the landscape character, quality and assess the visual resource of the study area.
- Describe the visual characteristics of the components of the Project.
- Identify issues that must be addressed in the impact assessment phase.
- Propose mitigation options to reduce the potential impact of the Project.

1.5. Specialist Details

Eco-Thunder Consulting (ETC) is a 100% woman-owned, private company that specializes in a range of specialist studies, such as Visual Impact Assessments socio-economic research, economic development planning, development programme design and implementation as well as community trust management.

Eco-Thunder Consulting is registered with ECSA and landscape architects with interest and experience in landscape architecture, urban design, and environmental planning. The company has carried out visual impact assessments throughout Africa and specialize in project optimization in the environmental space. Aspects of this work also include landscape characterization studies, end-use studies for quarries, and computer modelling and visualization.

Based in Johannesburg, South Africa, Eco-Thunder has established itself as an expert on the conditions, needs and assets of communities that are linked to independent power generation facilities.

ETC also implements development programmes in energy communities, which ensures a comprehensive understanding of the how to drive positive social impact.

1.6. Level of Confidence

Level of confidence[1] is determined as a function of:

- The information available, and understanding of the study area by the practitioner:
    - 3: A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.
    - 2: A moderate level of information is available of the study area and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.
    - 1: Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.

- The information available, understanding of the study area and experience of this type of project by the practitioner:
    - 3: A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
    - 2: A moderate level of information and knowledge is available of the project and/or the visual impact assessor is moderately experienced in this type of project and level of assessment.
    - 1: Limited information and knowledge is available of the project and/or the visual impact assessor has a low experience level in this type of project and level of assessment.

The level of confidence for this assessment is determined to be **9** and indicates that the author's confidence in the accuracy of the findings is high:

- The information available, and understanding of the study area by the practitioner is rated as **3** and
- The information available, understanding and experience of this type of project by the practitioner is rated as **3**.

1.7. Assumptions, Uncertainties, and Limitations

The following assumptions and limitations have been made in the study:

- The assessment has been based on the requirements of the Western Cape Guidelines.
- Whilst the majority of homesteads and housing areas were visited during the site visit in order to confirm their nature and likely visibility of the development, it was not possible to visit all homesteads and housing areas.
- The description of project components is limited to what has been supplied to the author before the date of completion of this report.
- The Project report uses the concept of 'worst case scenario' to identify issues and rate visual impacts. This scenario assumes that all facilities along with the associated grid infrastructure and sub-stations would be constructed at the same time. At the time of writing there was no evidence to the contrary. This assumption is also based on the nature of visual impact and the fact that receptors would experience all facilities with in the same visual envelope from their respective locations or as they travel along adjacent roads.
- The assessment of cumulative impacts is partly based on information provided by the DFFE Website

[1] Adapted from Oberholzer (2005).

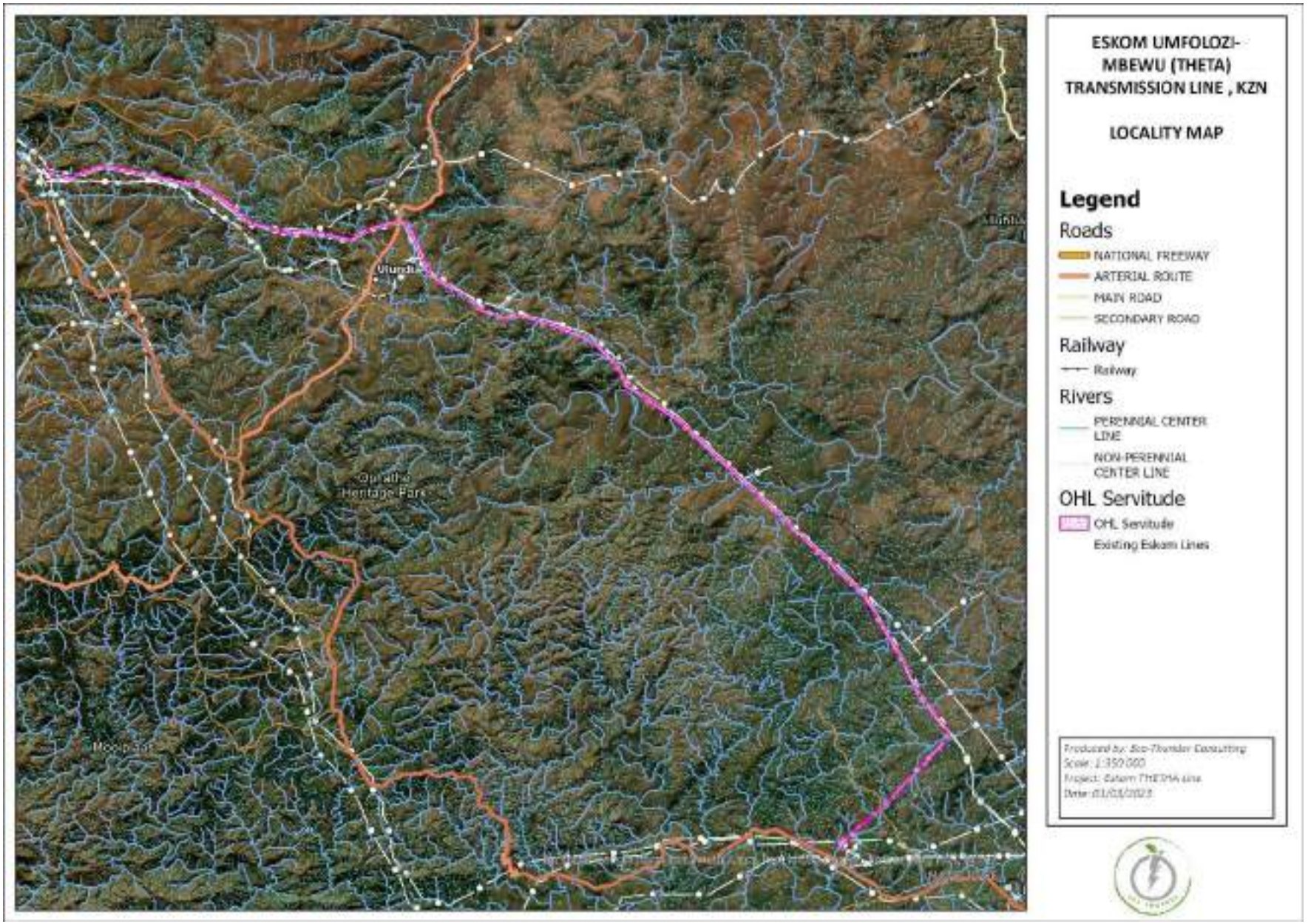

Figure 1: Proposed Development location map.

2. LEGAL REQUIREMENTS AND GUIDELINES

This report adheres to the following legal requirements and guideline documents.

2.1. National Legislation and Guidelines

National Environmental Management Act (Act 107 of 1998), EIA Regulations

The specialist report is in accordance with the specification on conducting specialist studies as per Government Gazette (GN) R 982 of the National Environmental Management Act (NEMA) Act 107 of 1998. The mitigation measures as stipulated in the specialist report can be used as part of the Environmental Management Programme (EMPr) and will be in support of the Environmental Impact Assessment (EIA) and Appendix 6 of the EIA Regulations 2014, as amended on 7 April 2017.

Specialist Screening Protocols are also required by the 2014 EIA Regulations. These were taken into consideration for each of the five projects. However, the Landscape Theme Sensitivity was referenced as there is no specific 'visual' protocol.

Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)

Although the guidelines were specifically compiled for the Province of the Western Cape[4], they provide guidance that is appropriate for any EIA process. The Guideline document also seeks to clarify instances when a visual specialist should get involved in the EIA process.

[4] The Western Cape Guidelines are the only official guidelines for visual impact assessment reports in South Africa and can be regarded as best practice throughout the country.

3. APPROACH AND METHODOLOGY

3.1. Approach

The effects of the development on a landscape resource and visual amenity are complex since it is determined through a combination of quantitative and qualitative evaluations. When assessing visual impact,the worst-case scenario is considered. Landscape and visual assessments are separate, although linked, procedures. The landscape, its analysis, and the assessment of impacts on the landscape all contribute to the baseline for visual impact assessment studies. The assessment of the potential impact on the landscape is carried out as an impact on an environmental resource, i.e., the physical landscape. Visual impacts, on the other hand, are assessed as one of the interrelated effects on people (i.e., the viewers and the impact of an introduced object into a view or scene).

The study was undertaken using Geographical Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed infrastructure. A detailed Digital Terrain Model (DTM) for the study area was created from topographical data provided by the Japan Aerospace Exploration Agency (JAXA), Earth Observation Research Centre, in the form of the ALOS Global Digital Surface Model "ALOS World 3D - 30m" (AW3D30) elevation model.

The scope of work for this report includes:

- Identify potentially sensitive visual receptors within the receiving environment.
- Determine the Visual Absorption Capacity of the landscape.
- Determine Visual Distance/Observer Proximity to the facility.
- Determine Viewer Incidence/Viewer Perception.
- Determine Significance of identified impacts.
- Propose mitigation to reduce or alleviate potential adverse visual impacts (to be structured as an EMPr).
- Conclude with an Impact Statement of Significance and a project recommendation.

3.2. Factors

It is necessary to explore some generic aspects of visual impact associated with developments and structures before exploring the site-specific impacts.

The larger a structural feature, the more it is likely to be visible. Spatial footprint is also an important factor, as the larger the spatial footprint of a development, the more it will be likely to occupy a large portion of a landscape, thus having a greater potential to alter the visual character of the landscape.

3.2.1. Viewing distance:

The distance of the viewer / receptor location away from an object is the most important factor in the context of the experiencing of visual impacts. Beyond a certain distance, even large structural features tend to be much less visible and are difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially with increasing distance away from the object, with maximum impact being exerted on receptors at a distance of 500m or less. The impact decreases exponentially as one moves away from the source of impact, with the impact at 1000m being a quarter of the impact at 500m away At 5000m away or more, the impact would be negligible.

3.2.2. Presence of receptors

It is important to note that visual impacts are only experienced when there are receptors present to experience the impact; thus, in a context where there are no human receptors or viewers present there are not likely to be any visual impacts experienced.

3.2.3. Viewer perception

Value can be placed in a landscape in terms of its aesthetic quality, or in terms of its sense of identity or sense of place

with which it is associated. If no such values are held with respect to a landscape, there is less likely to a perception of visual impact if the landscape is visually altered. On the opposite side of the scale, development within a landscape may not be perceived negatively at all if the development is associated with progress or upliftment of the human condition. The perception of visual impacts is thus highly subjective and thus involves 'value judgements' on behalf of the receptor.

The context of the landscape character, the scenic / aesthetic value of an area, and the types of land use practiced tend to affect the perception of whether new developments are considered to be an unwelcome intrusion into that landscape. Sensitivity to visual impacts is typically most pronounced in areas set aside for the conservation of the natural environment (such as protected natural areas or conservancies), or in areas in which the natural character or scenic beauty of the area acts as a draw card for visitors (tourists) to visit an area, and accordingly where amenity and utilitarian ecological values are associated with the landscape. When landscapes have a highly natural or scenic character, amenity values are typically associated with such a landscape. Structural features such as high voltage power lines are not a feature of the natural environment, but are rather representative of human (anthropogenic) change to a landscape. Thus when placed in a largely natural landscape, such structural features can be perceived to be highly incongruous in the context of the setting, especially if they affect or change the visual quality of a landscape. It is in this context of incongruity with a natural setting that new developments are often perceived to be a source of visual impact.

3.2.4. Landform (topographical) and micro-topographical context

The landform context of the environment in which the object is placed is an important factor. The location of the feature within the landform setting – i.e. in a valley bottom or on a ridge top is important in determining the relative visibility of the feature. In the latter case, the feature would be much more visible and would 'break' the horizon, if a viewer was located 'inferior' to the object in the topographical context. Similarly the landform context in which the viewer is located is important in that topography can inherently block views towards an object if the viewer is located in a setting such as a steep-sided valley or on an aspect facing away from the object. The morphological character of a slope is important in determining visibility of objects from other parts of the slope; typically where a slope is concave topography does not screen objects from view, but convex slopes reduce the visibility of the objects on the same slope. The micro-topography within the landscape setting in which the viewer and object are located is also important; the presence of micro-topographical features and objects such as buildings or vegetation that would screen views from a receptor position to an object can remove any visual impact factor associated with it.

3.2.5. Landscape development context

The presence / existence of other anthropogenic objects associated with the built environment may influence the perception of whether a new development is associated with a visual impact. Where buildings and other infrastructure exists, the visual environment could be considered to be already altered from a natural context and thus the introduction of a feature into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible.

3.2.6. Receptor type and nature of the view

Visual impacts can be experienced by different types of receptors, such as people driving along roads, or people living / working in the area in which the structural feature is visible. The receptor type in turn affects the nature of the typical 'view' of a potential source of visual impact, with views being permanent in the case of a residence or other place of human habitation, or transient in the case of vehicles moving along a road. The nature of the view experienced affects the intensity of the visual impact experienced.

3.2.7. Weather and visibility

Meteorological factors, such as weather conditions (presence of haze, or heavy mist) which would affect visibility can impact the nature and intensity of a potential visual impact associated with a structural feature.

The VIA is determined according to the nature, extent, duration, intensity or magnitude, probability, and significance of the potential visual impacts, and will propose management actions and/or monitoring programs and may include recommendations related to the proposed OHL.

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

The determination of the potential visual impacts is undertaken in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed infrastructure.

Anticipated issues related to the potential visual impact of the proposed development include the following:

- The visibility of the facility to, and potential visual impact on, observers travelling along the major local roads
- The visibility of the OHL to, and visual impact on, the larger built-up centres or populated places as well as the homesteads (farm residences) located within close proximity of the site.
- Potential cumulative visual impacts (or alternately, consolidation of visual impacts) with specific reference to the existing power line infrastructure adjacent to the proposed development area.
- The potential visual impact of the construction of ancillary infrastructure (i.e., the substation at the facility, associated power line and access roads) on observers in close proximity of the development servitude.
- The visual absorption capacity of natural or planted vegetation (if applicable).
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

It is envisaged that the issues listed above may constitute a visual impact at a local scale.

3.2.8. Significance of Visual Impact

A combined quantitative and qualitative methodology, as supplied by the Environmental Practitioner, was used to describe the significance of impacts. Significance of impact is rated as *consequence* of impact multiplied by the *probability* of the impact occurring. Consequence is determined using intensity, spatial scale, and duration criteria. A summary of each of the qualitative descriptions along with the equivalent quantitative rating scale is given in Annexure C.

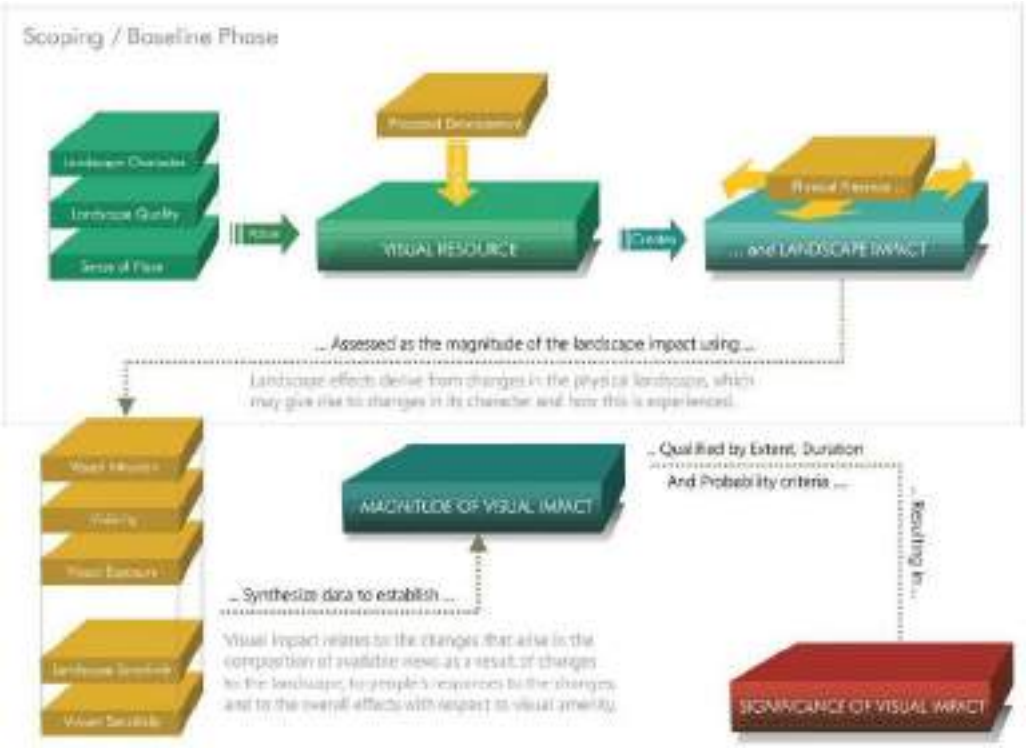

Figure 2: VIA Process

3.3. Methodology

The following method was used:

- Site visit: A field survey was undertaken so the extent of the receiving environment could be documented and adequately described. The climate conditions were mostly sunny with some cloud cover.
- Project components: The physical characteristics of the Project components were described and illustrated based on information supplied by Afzelia Environmental Consultants.
- General landscape characterization: The visual resource (i.e., receiving environment) was mapped using the field survey, Google Earth imagery, and Mucina and Rutherford's (2006) reference book, The Vegetation of South Africa, Lesotho, and Swaziland. The description of the landscape focused on the nature of the land rather than the response of a viewer (refer to Appendix A).
- The character of the landscape was described and rated in terms of its aesthetic appeal using recognized contemporary research in perceptual psychology as the basis, and its sensitivity as a landscape receptor.
- The sense of place of the study area was described as to its uniqueness and distinctiveness. The primary informant of these qualities was the spatial form and character of the natural landscape together with the cultural transformations associated with the historic/current use of the land.
- The creation of viewshed analyses from the proposed Project site in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses consider the dimensions of the proposed structures and activities
- The potential impact on the visual environment of the proposed Projects were identified; and rated according to Afzelia's significance rating criteria.
- Measures to mitigate the negative impacts of the proposed Project were recommended.

4. DESCRIPTION OF THE PROJECT

4.1. Project Facilities

In South Africa, thousands of kilometers of high voltage transmission lines (i.e., 400 kV, 400 kV or 220 kV transmission lines) transmit electricity generated at power stations to Eskom's major substations. At these major substations, the voltage is reduced, and the electricity is distributed to smaller substations all over the country through sub-transmission lines (i.e., 132 kV, 88 kV or 66 kV lines). At the smaller substations the voltage is further reduced, and the power is distributed to local users via numerous small power lines (i.e. 22 kV and 11 kV lines) referred to as reticulation lines. The power generated by Eskom can only be utilised from those points of supply, which transform the power into a usable voltage.

As part of the KZN 400 kV Strengthening - Empangeni Integration Eskom have proposed to undertake the construct of a 400 kV transmission line between the proposed new sub-station (the so-called Mbewu substation) near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and Uthungula District Municipality.

This development aims at strengthening of the power corridor entail phased construction of 400kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that, in-order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 400kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

The scope of work is:

- Construction camps and lay-down yards.
- Access roads
- the Construction of Mbewu GIS substation
- Phased Construction of 98km Mbewu Umfolozi 400kV line Loop in and out of Invubu Umfolozi and Athene Umfolozi 400kV lines (Mbewu Loop ins) to the newly built Mbewu GIS substation.
- Construction of the Feeder Bay at Umfolozi Substation

4.1.1. Phased Construction of 98km Mbewu Umfolozi 400kV line Loop in and out of Invubu Umfolozi and Athene Umfolozi 400kV lines

It is the operational phase that presents the most significant visual long term impact. This is due primarily to the scale and form of the transmission towers. Refer to Figure 4, Typical Transmission Line Tower and to a lesser extent the transmission cables. These invariably recede at distances perpendicular from the line.

Apart from the physical structure of the towers and the cables are the ancillary requirements to ensure maintenance of uninterrupted electricity transmission. These include access roads, cleared servitudes and substations. These have greater visual intrusions in the landscape the more vegetated and hillier the terrain. This route will traverse a flat landform and therefore the extent of servitude clearance of tall vegetation is not a significant visual impact element and therefore is not addressed in detail.

TOWER PARAMETERS

- Tower spacing: 450 m (Average)
- Tower height: 45 m (Average)
- Conductor attachment height : 36 m (Average)
- Conductor type : _____
- Minimum ground clearance: 10.4 m

TOWER DESIGN

The following types of towers are used on this project:

- Cross rope suspension tower (preference).
- Compact cross rope suspension tower.

- Self-Supporting Towers

Cross rope suspension towers (Figure 3) will be used for most of the route. The tower is approximately 45 m high. The average span between towers will be 450 m.

Self-supporting strain towers (Figure 4) will only be used at bend points of greater than 3° along the line, and where the ground is unstable or the terrain is too steep to accommodate the cross-rope suspension structure, or where space.

Self-supporting strain (and angle) towers are more expensive than the cross rope suspension towers due to higher steel content. They also have a higher visual impact. Transmission line routes are therefore planned with as few bends as possible.

The galvanising of pylons will be allowed to weather to a matt grey finish and will not be painted.

The following referes to the types of towers considered for the development:

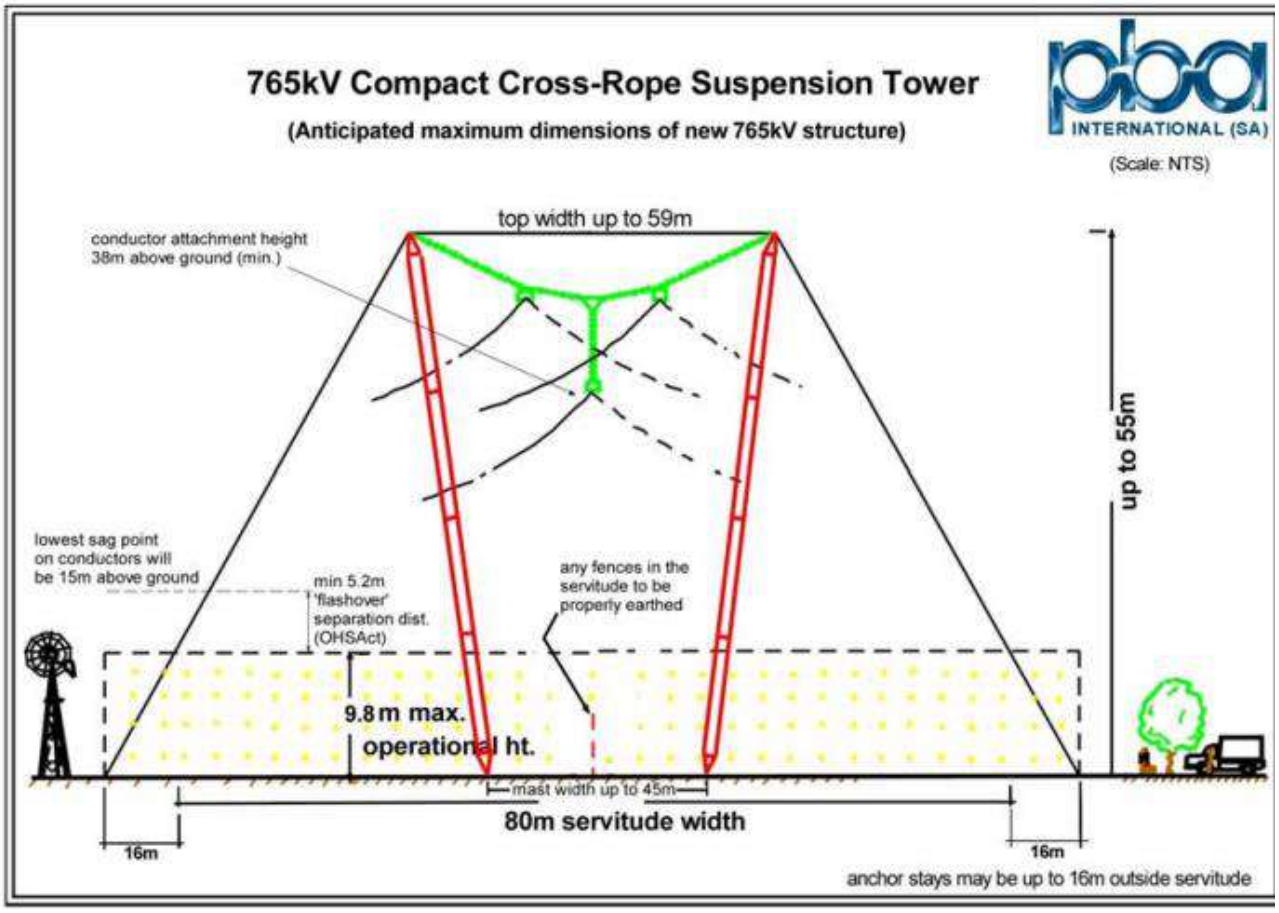

Figure 3: Compact Cross suspension tower

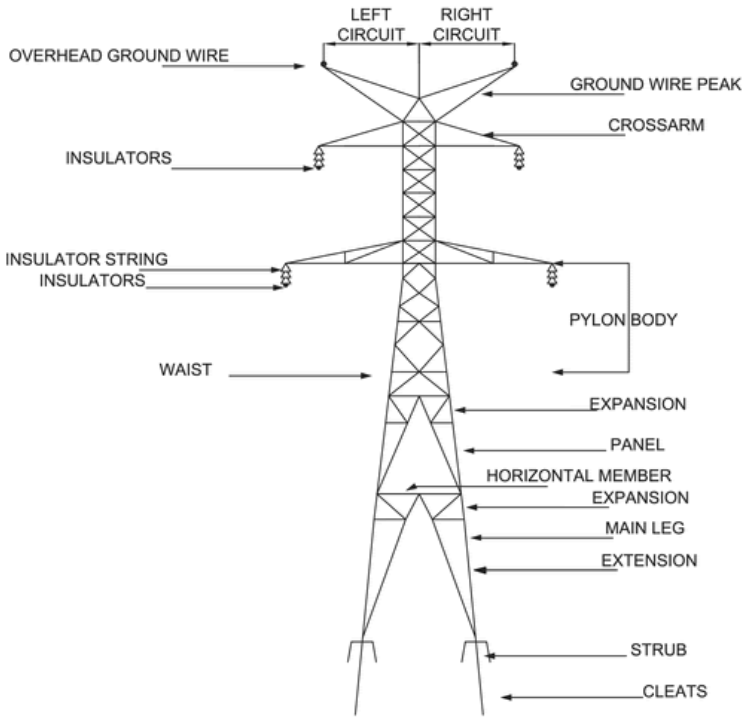

Figure 4: Strain tower design

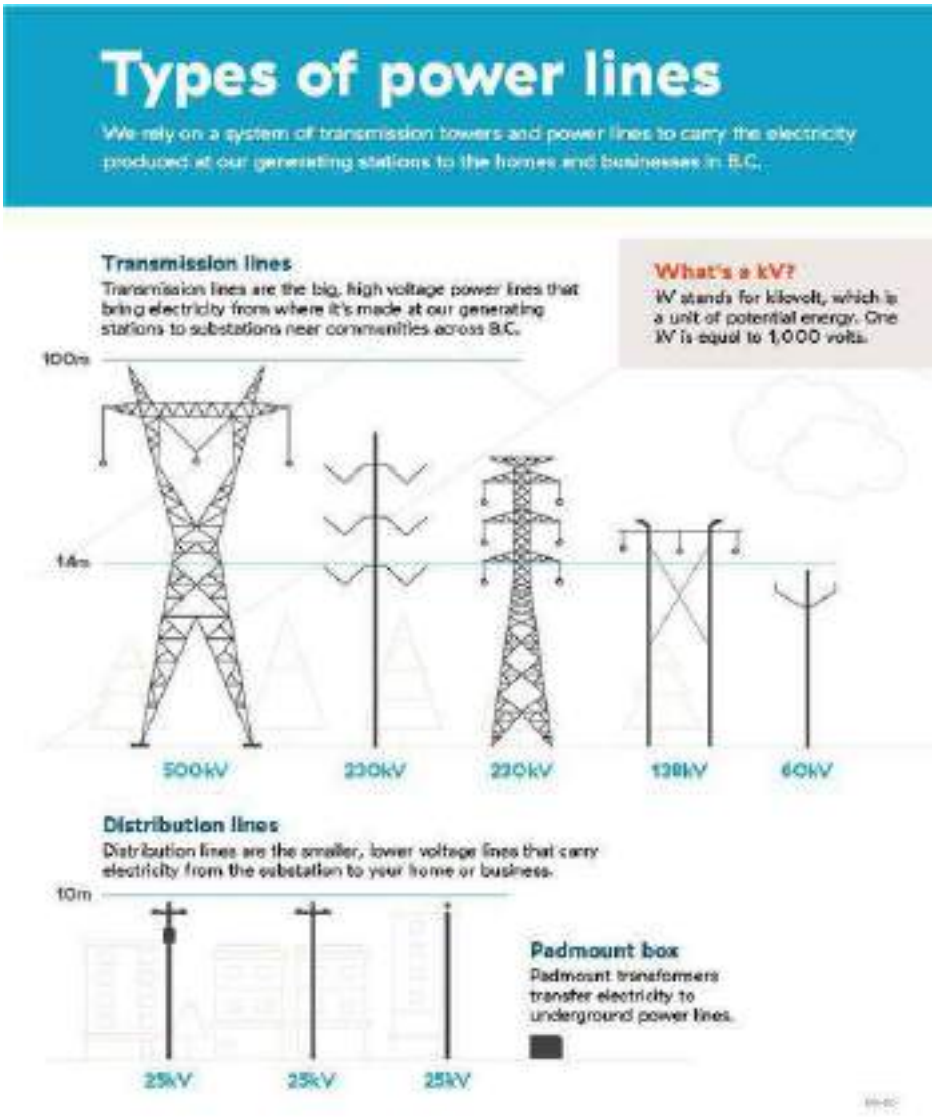

*Figure 5: **Descriptions of types of other powerlines***

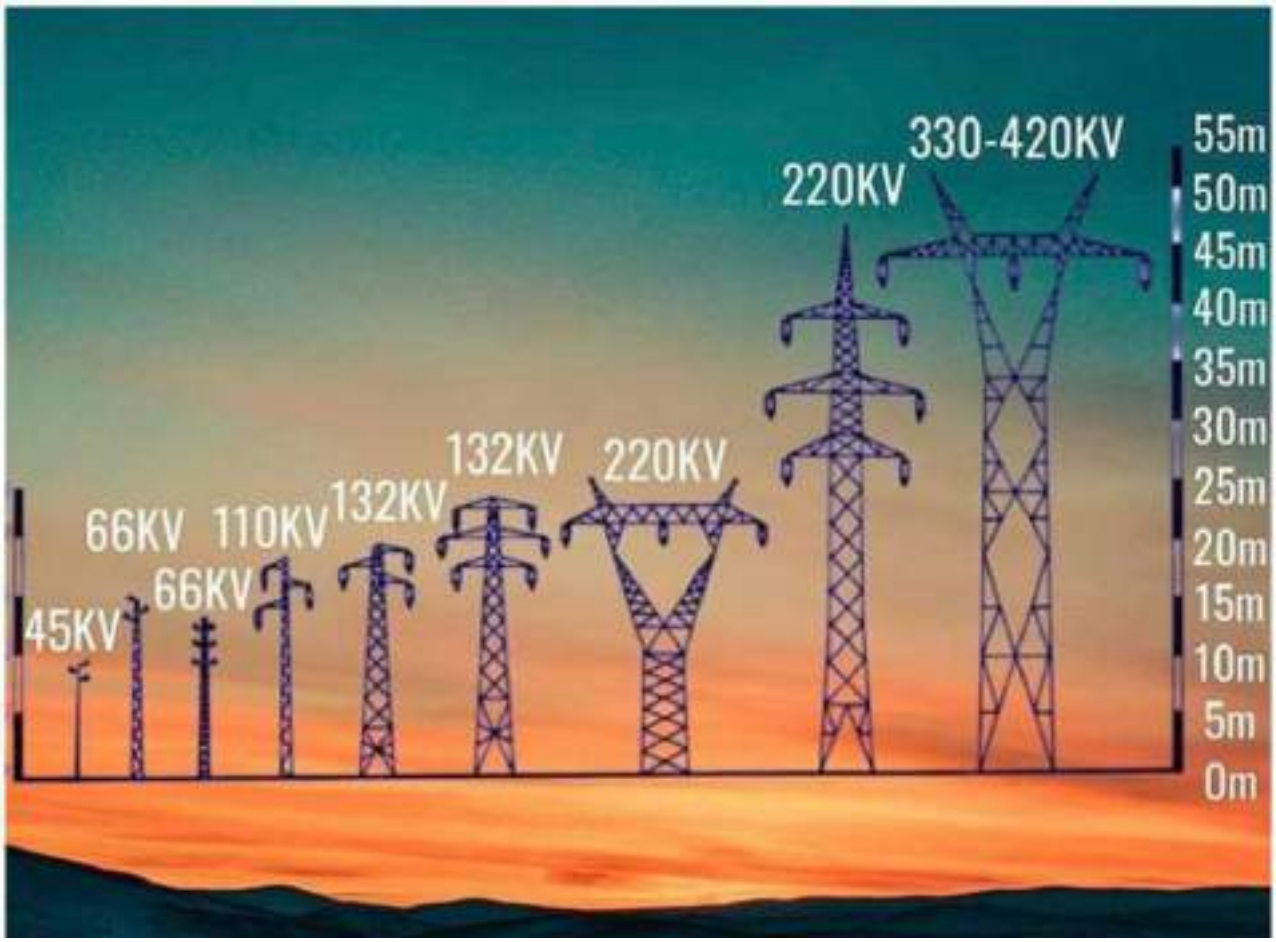

Figure 6: ***Descriptions of types of other powerlines***

4.1.2. The Umfolozi Substation

The 400kV Umfolozi Substation is situated just northwest of Ulundi in KwaZulu-Natal (28º12' 52" S, 31°11'13"E). No additional land acquisition is anticipated at the Umfolozi substation to receive the proposed line, as there is a vacant bay (Figure 7). When the line is energised to 400kV, another sub- station closer to Richards Bay will be identified for 400kV integration and will be extended to accommodate the 400kV integration.

Figure 7: Overview of the substation

4.1.3. The Mbewu GIS substation

The project plans to construct a 400 kV power transmission line from a substation proposed near the Camden coal-fired power station, in Ermelo, eastern Mpumalanga, to the Mbewu (Theta) substation, which will be built near Empangeni, north of KZN.

In addition, where required, the project proposes to construct and maintain access roads adjacent to the power line.

To link the new power line into the grid, other electrical infrastructure is needed at the takeoff (Camden substation) and end point (Mbewu substation). These infrastructure requirements will take place within the footprint of both substations.

4.1.4. Servitude Requirements

An 80 m servitude (40 m on either side of the centre line) is required to accommodate the towers on which the overhead line will be strung. The servitude is required to ensure safe construction, maintenance and operation of the line, and Eskom will be entitled to unrestricted access. Where 400kV Transmission lines are constructed in parallel, a minimum separation distance of 80 m between centre points is required. The minimum vertical clearance between the line and the ground after construction is 10.4 m. The land beneath the overhead lines can continue to be used for some activities by the landowners. No dwellings or crops higher than 4 m will, however, generally be allowed in the servitude.

With the cross-rope suspension structures, anchor stays may, in some instances, be outside of the 80 m servitude.

4.1.5. Access Roads

There is an extensive network of provincial surfaced roads that form the access backbone to the study area. Secondary district gravel roads provide access to farms through which the proposed Transmission Power Lines will pass. Access roads to the proposed line may therefore only need to be constructed for short distances on private and tribal land in the south of the study area where there are no existing roads.

4.1.6. Road crossing

Where the Transmission power line crosses a road, it will be at as close to 90° as possible. This has been taken into consideration in identifying a recommended corridor.

4.2. Project Phases and Activities

Activities to be undertaken during each of the phases are described in the following sections:

The construction process is expected to take approximately 36 months and is planned to commence in early 2024.

The co-ordinates of the centreline of the route and position of the towers will be determined by surveyors after a final route corridor has been approved by the environmental authorities.

The construction process consists of the following phases:

- Contractor site establishment.
- Survey and pegging of tower positions.
- Access road negotiation and construction.
- Gate installation and vegetation clearing.
- Foundation excavation and installation.
- Tower assembly and erection.
- Conductor stringing and tensioning; and
- Servitude clean-up and rehabilitation.

The establishment of two construction camps along the route to accommodate approximately 100 people each will be required for the construction of the Transmission power line. The exact position of the construction camps will be negotiated with the relevant landowners. Strict conditions, including the approval of the location of the construction camp by the Environmental Control Officer (ECO), as well as for the use and management of resources are set out in the Construction Environmental Management Plan Construction (EMP) and will have to be adhered to.

An 8 m wide strip directly under the position of the power lines will be cleared of all vegetation for construction purposes. Any plants that could interfere with the construction, maintenance or operation of the power line, will be removed or trimmed. Standards to be adhered to for vegetation clearing and protected species management have been specified in the EMP (Appendix I). Once the centre line has been cleared, the tower positions will be pegged.

Vehicle access is usually required along the entire route for construction, maintenance and operation purposes. Existing roads will be used as far as possible and the construction of roads and bridges will be kept to the minimum. Any roads within the servitude are considered to be included in this authorisation. If an access road falls outside of the servitude, authorisation from the provincial authorities will be necessary. Any additional authorisations (from DWAF, MDALA or DAEA) is a condition of the EMP and must be obtained during the implementation phase of the project. Gates will be installed on all fences that the line crosses. Any existing infrastructure will be maintained in its existing condition. Access points and roads will be negotiated with the relevant landowners.

The type of foundation required for each tower is dependent on the geotechnical conditions. The minimum working area required for the erection of a self-supporting strain tower is 40 m by 40 m, and for a cross-rope suspension tower is 50 m by 50 m. bushy areas will be cleared, but grasslands will just be trampled by activities.

Foundations may be drilled, mechanically excavated, or dug by hand. No blasting will take place. Concrete is then placed. Helicopters may be used to transport equipment and materials if tower positions are inaccessible. Due to the costs involved, this is not the standard method of accessing the towers and line and access roads will still be used for the majority of the route.

Any incomplete excavations will be protected to prevent animals and people from injury. All foundations are back-filled and stabilised through compaction and capped with concrete at ground level. Towers are lifted into position by cranes or helicopters.

The conductor is then strung between towers by first passing a guide wire through the desired position. Cable drums (containing 2.5km of cable, can be steel or wooded approximately 2.5 to 3m in size) are placed at 5km intervals in the cleared section of the servitude, and passed 2.5km in each direction.

Ongoing maintenance of the Transmission power line will be required throughout its lifespan. Line inspections are usually undertaken once or twice a year. This may be done via the access routes, or by helicopter. A Maintenance Environmental Management Plan (separate from the construction one) will specify these requirements.

5. ENVIROMENTAL SETTING

5.1. Landscape Character

The study area is characterised by a series of tall north-south aligned ridges and associated enclosed valleys. From a macro-geomorphological perspective, the incised terrain of valleys surrounded by hills reflects landscape-level erosional processes that have resulted in faster erosion of the softer shales, with the harder quartzites forming the ridges. Three such longitudinal valleys are present within the wider study area.

The study area is rural in nature, and rural land uses largely predominate. The nature of the mountainous topography (and as a result, very shallow, rocky soils) prohibits the practising of cultivation over much of the study area, and as such livestock raising or game farming occurs as the predominant rural land use. This has allowed the natural vegetation to be retained over large parts of the study area. Cultivation only occurs in spatially limited areas but is intensive where it occurs.

An important component of the land use in the study area is conservation. In such areas conservation land use has allowed the natural vegetation to be retained and there is limited (low density) or no development apart from the creation of ecotourism facilities. Vegetation cover is intrinsically related to land use as described above; vegetation in that is highly effective in screening even large objects from view.

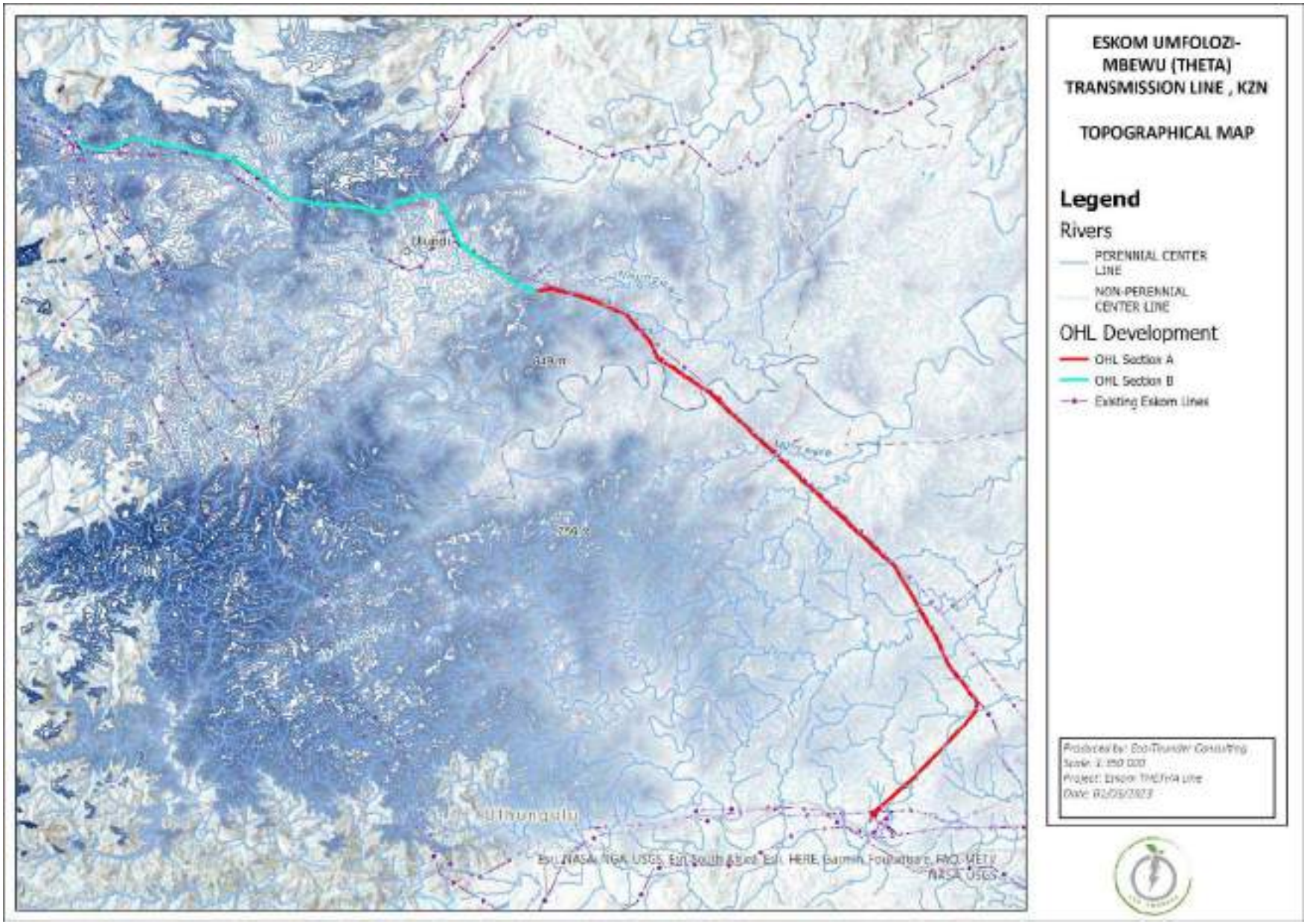

Figure 8: Topographical Map

Agriculture is one of the most important economic activities in the study area and accounts for a significant proportion of land use.

The proposed power line is aligned through a wide variety of landscapes, from grazed plains to mountains and the rolling hills of KwaZulu Natal and the sugar cane plantations of the lowlands. The bulk of the study area is utilised for agriculture with a varying topography.

A number of other existing power lines are found throughout the area including high voltage transmission lines similar to the new lines proposed. However due to the mainly agricultural nature of the land any linear infrastructure like existing power lines and roads featuring prominently in the landscape.

Topography: The terrain of the study area cannot be too steep (angle must be less 20 degrees). Additionally a 400kV power line can span an average distance of 500 metres between two pylons. Therefore, large valleys and channels are considered fatally flawed areas. Obstructions / deviations: The power line is required to travel in a straight path as far as possible. Should the power line route be required to change direction at an angle of more than 3 degrees a self-supporting pylon is required which is extremely costly. Length of route: The shorter the route the more cost effective.

Rainfall: The study area is located in the south-eastern portion of South Africa. This area receives summer rainfall between October and March. The northern portions of the study area receive between 600 – 1000mm of rainfall per annum, whilst the southern portions of the study area receive between 1000 – 1600mm.

Temperature: The study area has various temperature ranges and becomes warmer towards the south due to the coastal environment. Mean annual temperatures range from 10 - 15ºC in the northern portions of the area to 15-25ºC in the southern coastal areas. It must be noted that under extreme heat conditions powerlines tend to heat and become more flexible and may sag slightly. This may be important in terms of visual impact as well as prevention of impact on game farms.

Wind: For the entire study area there is a daily swing between berg and onshore air movement. The main direction of air movement is from the south-west alternating with winds from the north-east. The south-westerly winds are often associated with cold fronts that are preceded by warm fronts. The hot air ahead of cold fronts is often the cause of veld fires in winter when the veld is dry. Lightning Strikes The study area is subjected to lightning strikes in wide bands lying parallel to the coastline increasing from 7 to 10 strikes per year per square kilometre along the coast to 10 to 14 strikes per year per square kilometre towards the western boundary of the study area.

Due to the nature of the geology in the study area there is no potential seismic sensitivities. Additionally, the proposed footings for the power line towers do not require deep excavations and consequently there are no potential impacts or sensitivities in terms of geology.

The study area ranges from 957 mamsl (metres above mean sea level) to less than 68 mamsl. The highest parts of the study area are in the northern portions (past Ulundi) and the lowest portions are in the south portions of the study area (Empangeni).

Due to the size of the study area the topography varies from flat plains to deeply incised valleys. Figure 7 is an illustration of the topography of the site. As it can be seen from the map the routes start near Vryheid and finally ending the route in the lowveld (Empangeni).

The development spans over several rivers in the study area. The various river crossings are listed below. It is important to note that Eskom should not place pylon footings within water bodies (or associated areas such as wetlands) and therefore the power lines should be designed to span across these sensitive habitats.

List of River crossings traversed by the development.

- Ncemana
- Ntambanana

- Gigizana
- Makholwasi
- Mpukutwani
- Mayayeni
- Munywana
- Wit-umfolozi
- Shamanzi
- Mfaze
- Ntukwini
- Kwanovoco
- Mbilane
- Siza
- Mhlahlane
- Tholeni
- Nsileni
- #014:78518
- #014:78631
- #014:78241
- #014:77991
- #015:66598
- #015:67206
- #015:66754
- #015:90317
- #015:90338
- #015:90291
- #015:90276
- #015:90497
- #015:83068
- #015:83111

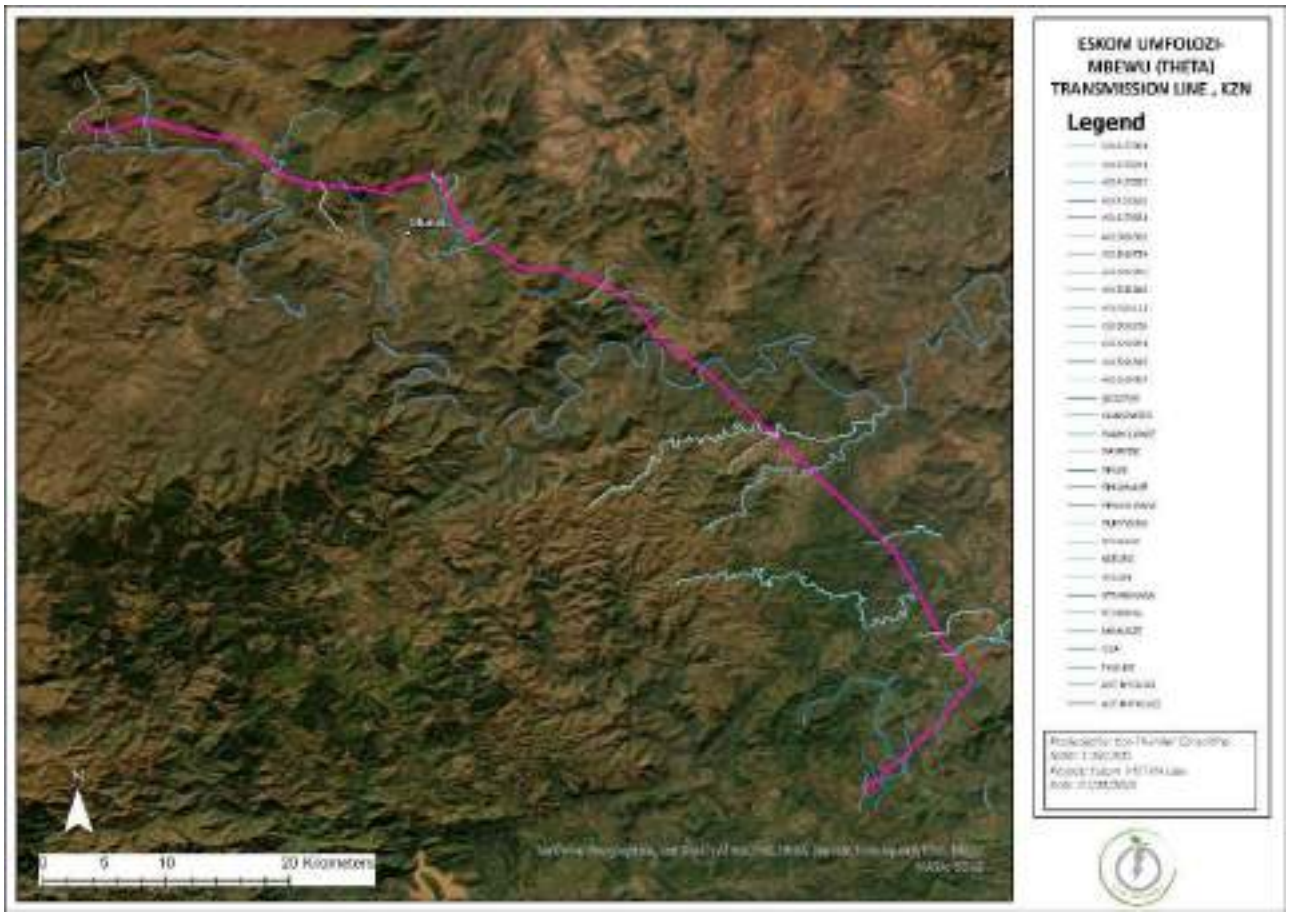

Figure 9: Rivers Traversing the study area.

5.2. Land Use

Permanent buildings: These dwelling consist of a mix of modern and traditional structures made out of a mix of materials. As a mitigation measure, Eskom should appoint an independent social monitoring specialist to ensure that any dwelling which are relocated or impacted by the development should improve the lives of Individuals by providing access to services, a continuation of way of living, sense of place, support structures, etc.

Land: The majority of the affected properties (inclusive of the buffer zone) falls on areas where households are engaged in crop and small-scale livestock farming. It is advised that the applicable legislation regarding relocation of livestock is reviewed to identify regulatory requirements that may need to be applied and that all livestock of affected households are transferred to the new location.

The following farm settlements or residences are located within the study area:

- Feessaal
- Nhlazatshe
- Ntabamhlophe
- Mthinzima
- Mbudle
- Vezunyawo
- Cisholo
- Ncwane
- Sishile
- Ntendeka
- Ulundi
- Emkhalaqhude
- Manekwane
- oNdini

- Langakazi
- Nkonjani
- Dindi
- Debe
- Mvazane
- Tshokolwane
- Makholwase
- Ndondwane
- Mabeka
- Ellingham
- Thulu Thulu
- Empangeni

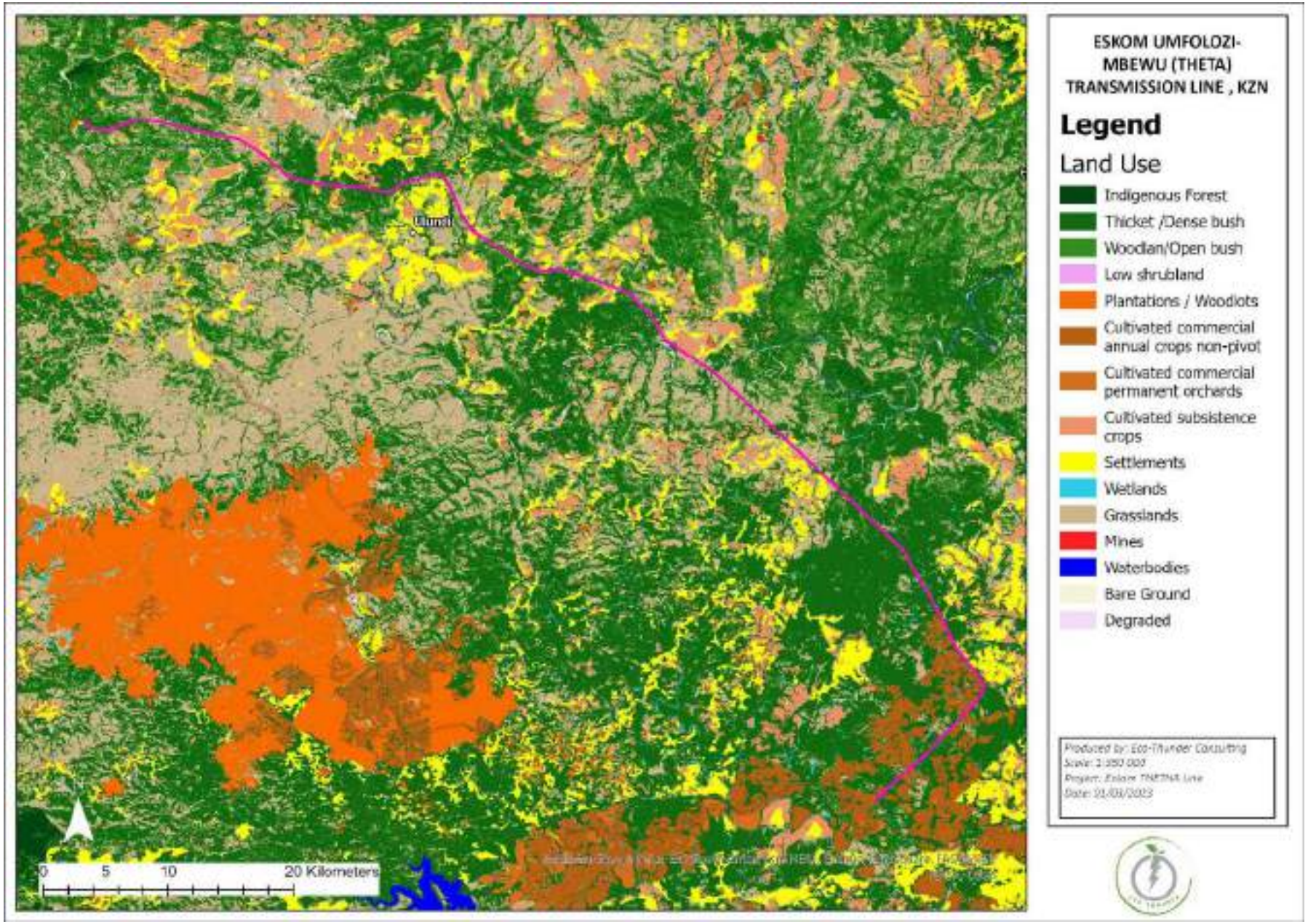

Figure 10: Land Use Map

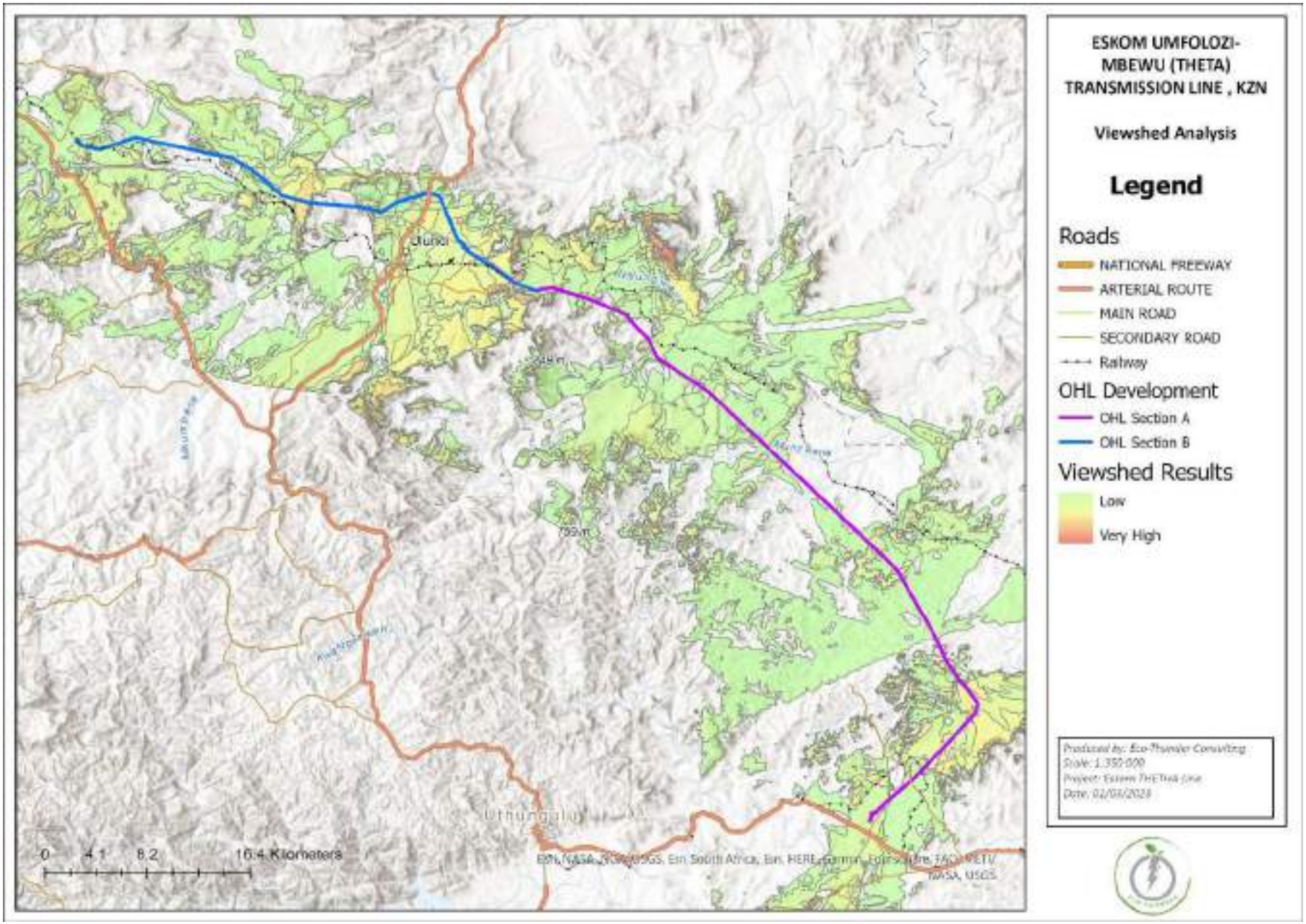

Figure 11: Proposed Development topographic map with view shed.

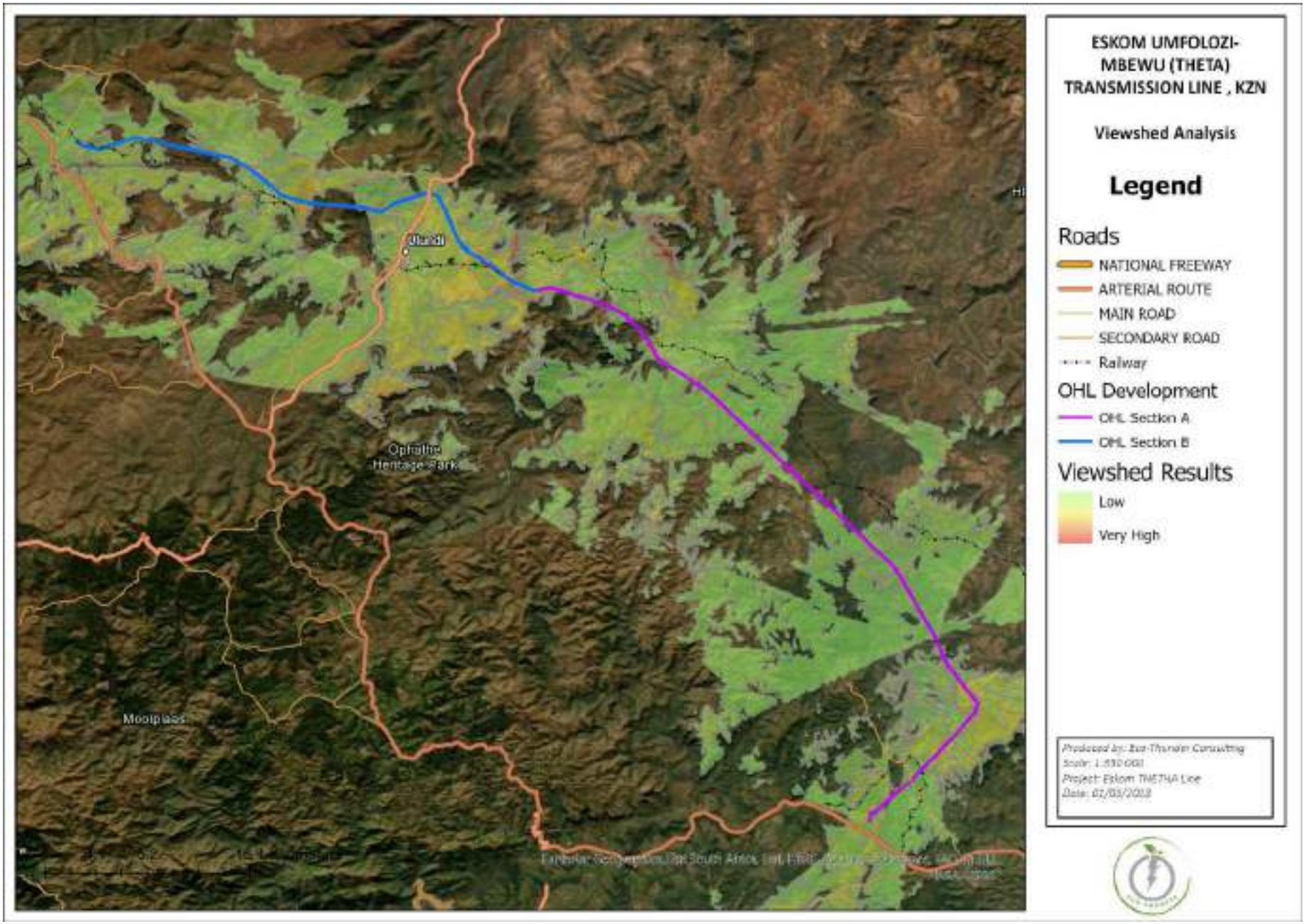

Figure 12: Viewshed analysis of the proposed development

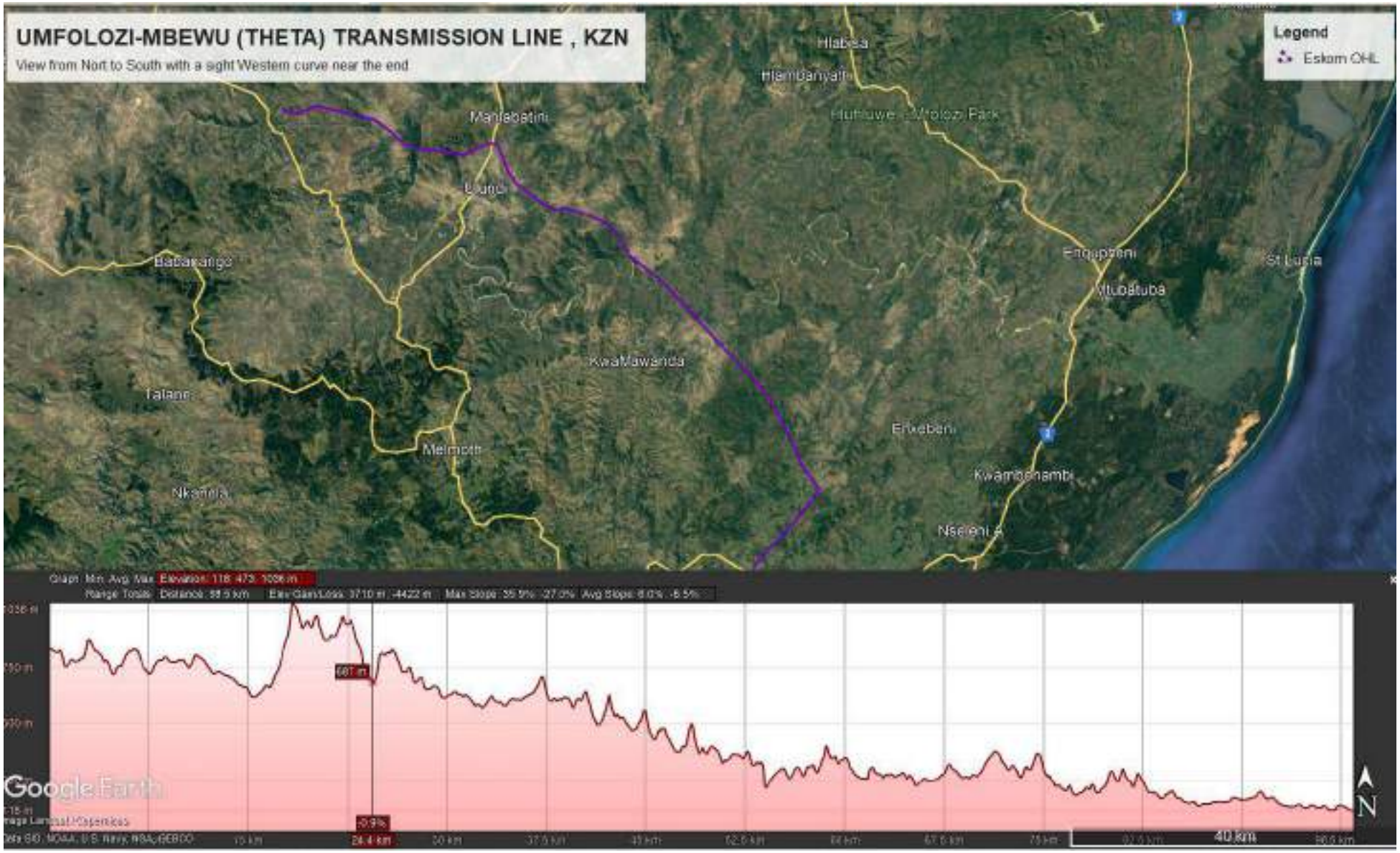

Figure 13. Elevation profile of the OHL

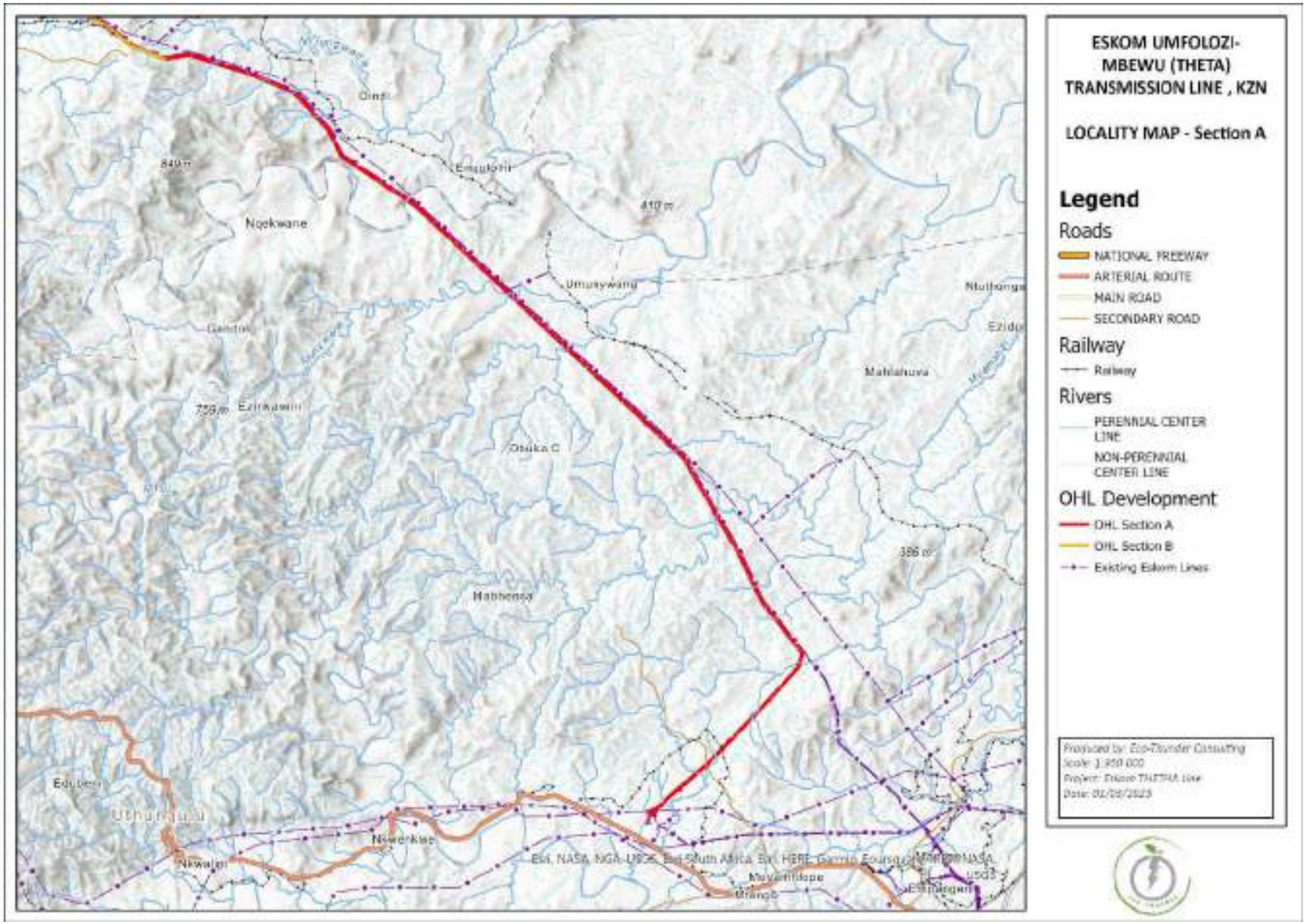

Figure 14. Locality Map

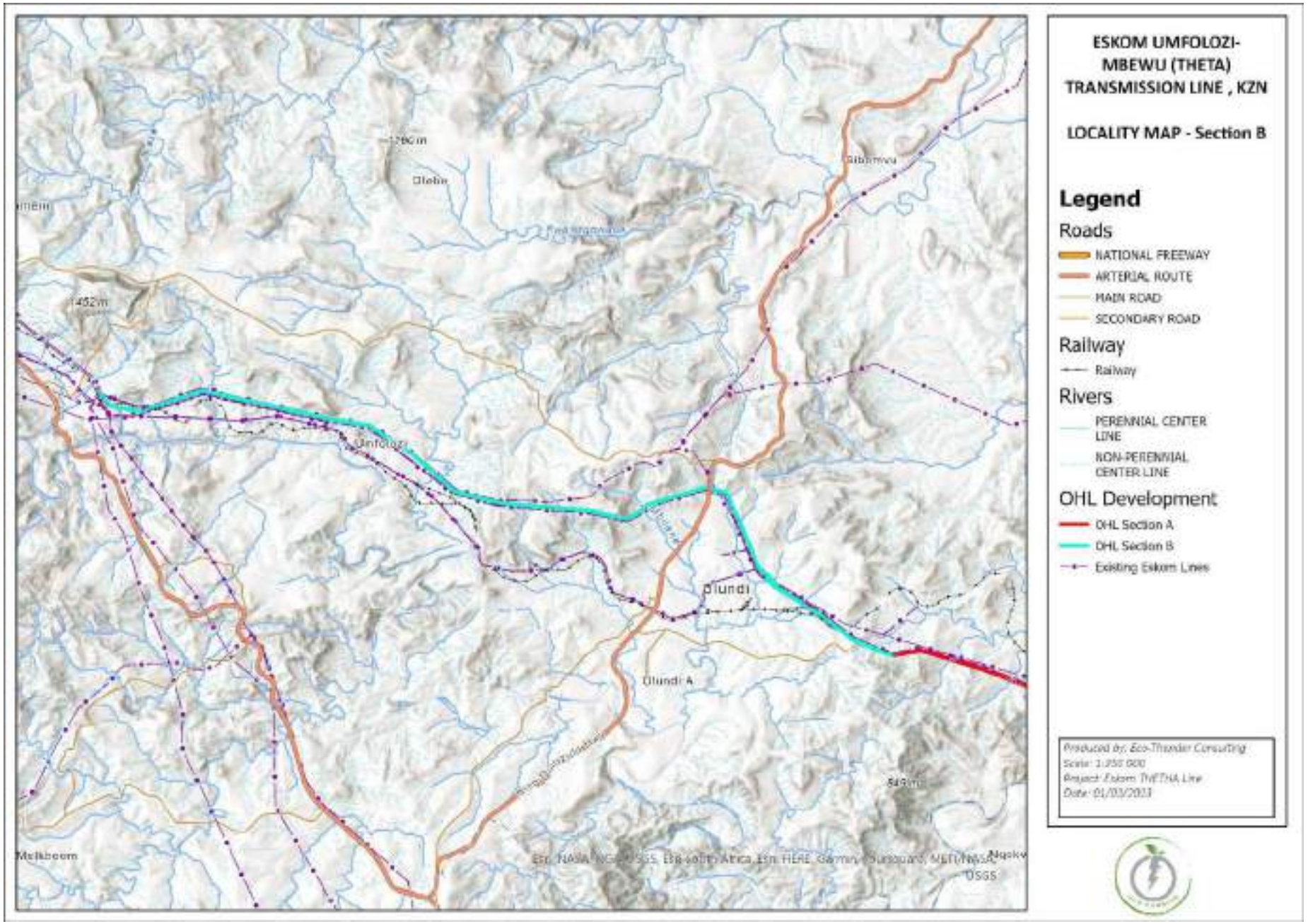

Figure 15: Locality Map B

Figure 16 -80 Site Photos

6. VISUAL RESOURCE

6.1. Visual Resource Value, Scenic Quality and Landscape Sensitivity

The size of the transmission line tower (45 m high) and the length of the route (96 km) will alter the visual character and quality of the landscape over which it traverses. The visual impact study is intended to assess the extent of the visual intrusion on the existing landscape and to identify alternatives that will have the least visual impact. In addition, visual impact mitigation guidelines will be presented. Preferred route alternatives will be identified based on the severity of the assessed visual impact.

The assessment of tourism and eco-tourism issues take place within the context of "sense of place." The concept of sense of place is applicable to tourist areas. People go on holiday for various and different reasons, e.g., to escape, to be entertained, to enjoy nature, to socialise, etc. In choosing a destination the image of the place is being considered, e.g. its authenticity, its offering, and/or its status.

The way in which these landscapes are managed are important to maintain the image (e.g. signs of erosion), and badly managed interference (e.g. not rehabilitating the land once a Transmission power line has been erected) could negatively affect the image of a tourist destination. In essence, expectations of an area have to be met. For example, people will not be accepting of a pylon in the middle of an area marketed as "pristine."

Experience has shown that it is possible to cultivate land around pylons, but it does complicate the process, and land for cultivation is lost. This is because the use of implements, equipment and centre pivots around/underneath pylons prove problematic. Centre pivots are chosen based on fertility of soil and availability of water. The capital investment made to get production in such a piece of land is high. Although the 400kV line can cross centre pivot irrigation without affecting the operations system, it is preferred that centre pivots are avoided.

Pylons and lines on grazing land pose fewer problems, as cattle move around these. During the construction and operational phase it has happened that construction/maintenance teams leave gates open, don't follow access roads, and cut through fences. The effect could be less land available for cultivation and grazing, cross breeding of cattle, erosion, and loss of cattle and sheep.

In the servitude, crops higher than 4m are not allowed. This means that forestry land will be lost permanently. This situation is further exacerbated by the fact that no more licenses for forestry will be approved. The fire risk in forestry areas also increases.

Because of the cost and regulations applicable to forestry, the proposed Transmission power line should avoid forestry areas.

The visual impact of the project and associated structures will reduce exponentially as the viewer moves further away from the proposed structures (Hull and Bishop, 1988).

The pylons will exert a high visual impact within the 500 m and 1 000 m zone. The viewshed analysis, based on the field experience, has indicated that the proposed Transmission line will be visible for much of the Blue Corridor beyond the 5 000 m zone and be visible in the flatter areas below the escarpment for up to at least 10 to 20 kilometres. The viewing distance is reduced by the mountainous topography along the Green and Yellow Corridors.

The servitude, if cleared of vegetation, and the construction access road will be visible, especially where the vegetation is diverse, for an extended distance beyond the 5 000 m zone, if viewed from an elevated position. This scar will be visible until rehabilitation is complete. Fortunately, much of the vegetation is grassland and will not need to be cleared.

Due to the linear nature of the proposed route specific viewpoints for the transmission line were not selected. However, areas with high volumes of traffic, areas with tourism potential and undeveloped rural areas with high scenic value were regarded as critical view zones against which the visual impact would be evaluated.

Critical views were determined during the field trip, land cover maps and from the 1:50 000 topographical maps. The major critical viewing area is the area identified as having a medium to high visual sensitivity.

6.2. Visual Character

Visual character is based on human perception and the observer's response to the relationships between and composition of the landscape, the land uses and identifiable elements in the landscape. The description of the visual character includes an assessment of the scenic attractiveness regarding those landscape attributes that have aesthetic value and contribute significantly to the visual quality of the views, vistas and / or viewpoints of the study area (ALA, 2013).

6.3. The Viewshed

The viewshed represents the area from which the proposed site would potentially be visible. The extent of the viewshed is influenced primarily by the combination of topography and vegetation, which determine the extent to which the site would be visible from surrounding areas. The viewshed was determined by Eco Thunder through the following steps and presumptions: The likely viewshed was determined by desktop study (ArcGIS) using contour plans (20 m interval); and an offset of 2 m (maximum) for the observer and an offset of 52 m (maximum) for the proposed power lines were utilized during the spatial analysis.

Site visibility is an assessment of the extent to which the proposed power lines would potentially be visible from surrounding areas. It takes account of the context of the view, the relative number of viewers, duration of view and view distance. The underlying rationale for this assessment is that if the proposed power lines are not visible from surrounding areas, then the development will not produce a visual impact. On the other hand if one or more power lines are highly visible to a large number of people in surrounding areas then the potential visual impact is likely to be high. Based on a combination of all these factors an overall rating of visibility was applied to each observation point. For the purpose of this report, categories of visibility have been defined as high (H), moderate (M) or low (L).

The visibility of the proposed power lines will vary between static and dynamic view types. In the case of static views, such as views from a farmhouse or homestead, the visual relationship between the proposed power lines and the landscape will not change.

The cone of vision is relatively wide and the viewer tends to scan back and forth across the landscape. In contrast views from a moving vehicle are dynamic as the visual relationship between the proposed power line infrastructure is constantly changing as well as the visual relationship between the proposed power line and the landscape in which they it is seen. The view cone for motorists, particularly drivers, is generally narrower than for static views.

The elevation of the viewer relative to the object observed significantly influences the visibility of the object by changing the background and therefore the visual contrast. In situations where the viewer is at a higher elevation than the building/structure it will be seen against a background of landscape. The level of visual contrast between the proposed power line and the background will determine the level of visibility. A white/bright coloured structure seen against a background of dark/pale coloured tree-covered slopes will be highly visible compared to a background of light coloured slopes covered by yellow/brown dry vegetation.

In situations where the viewer is located at a lower elevation than the proposed power lines it will mostly be viewed against the sky. The degree of visual contrast between white coloured structures will depend on the colour of the sky. Dark grey clouds will create a significantly greater level of contrast than for a background of white clouds. The photos below illustrate this effect, where the view from above is far less visible.

The visibility of structures will increase with the period over which they are seen. The longer the period of view the higher the level of visibility. However, it is presumed that over an extended period the level of visibility declines as people become accustomed to the new element in the landscape.

Long term views of the proposed power line will generally be associated with farm houses, informal settlements and a couple of towns located within the viewshed. Short term and moderate term views will generally relate to commuters moving through the viewshed mostly by vehicle.

Potential views to the proposed power line are likely to be blocked in some localised situations by buildings, vegetation or local landform features at specific locations within the viewshed. Similarly, glimpses of the proposed power line may be available from some isolated high-elevation locations outside the plotted viewshed.

The value of the visual resource and its associated scenic quality are primarily derived from the combination of land-uses described above overlaid onto an open rolling topography. These are the primary features that give the area its general characteristics and a sense of place.

The sensitivity of the study area's landscape can be defined as high, medium, or low , and is dependent on the Character – does it contribute to the area's sense of place and distinctiveness; Quality – in what condition is the existing landscape; Value – is the landscape valued by people, local community, visitors, and is the landscape recognised, locally, regionally, or nationally; and Capacity – what scope is there for change (either negative or positive) in the existing landscape character?

When the criteria are considered and understood within the context of the sub-region, a visual resource value of low (power utility and mining areas), moderate (drainage lines, open farmland, and urban recreation development), and high (bush-covered low hills), is allocated.

Table 1: Value of the Visual Resource

(After: LiEMA 2013)

High	Moderate	Low
This landscape type is considered to have a *high* value because it is a: Distinct landscape that exhibits an extremely positive character with valued features that combine to give the experience of unity, richness, and harmony. It is a landscape that may be of particular importance to conserve, and which has a strong sense of place. Sensitivity: It is sensitive to change in general and will be detrimentally affected if change is inappropriately dealt. with.	This landscape type is considered to have a *moderate* value because it is a: Common landscape that exhibits some positive character, but which has evidence of alteration / degradation / erosion of features resulting in areas of more mixed character. Sensitivity: It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with.	This landscape type is considered to have a *low* value because it is a: Minimal landscape generally negative in character with few, if any, valued features. Sensitivity: It is not sensitive to change in general and change may be detrimental if inappropriately dealt with.

6.4. Sense of Place

According to Lynch (1992), a sense of place is the extent to which a person can recognize or recall a place as being distinct from other places - as having a vivid, unique, or at least particular character of its own. The sense of place for the study area derives from a combination of the local landscape types described above, their relative 'intactness', and their impact on the senses.

Sense of place goes hand in hand with place attachment, which is the sense of connectedness a person/community feels towards certain places. Place attachment may be evident at different geographic levels, e.g. site specific (e.g. a house, burial site, or tree where religious gatherings take place), area specific (e.g. Zululand), and physiography specific (e.g. wetlands). Territorial behaviour is viewed as a set of behaviours and cognition a group exhibits based on perceived

ownership. The concept of sense of place attempts to integrate the character of a setting with the personal emotions and memories associated with it.

Much of what is valuable in a culture is embedded in place, which cannot be measured in monetary terms. It is because of a sense of place and belonging that people are loath to be moved from their dwelling place, despite the fact that they will be compensated for the inconvenience and impact on their lives. Places/natural resources should be assessed in terms of its cultural value by studying visiting and consumption patterns, behaviour patterns, etc.

In light of the traditional culture evident in the area, it is implied that areas of cultural value will most probably occur, especially in the Utrecht-Wakkerstroom- Paupietersburg triangle and along the densely populated Blue corridor. This will have to be substantiated prior to construction. Also, people will most probably not be willing to be resettled, should it be necessary.

The Yellow corridor will probably impact least on sense of place, followed by the Green corridor, the Blue-Green corridor and then the Blue corridor. Before construction of the line, places of importance should be identified in co-operation with communities and municipalities.

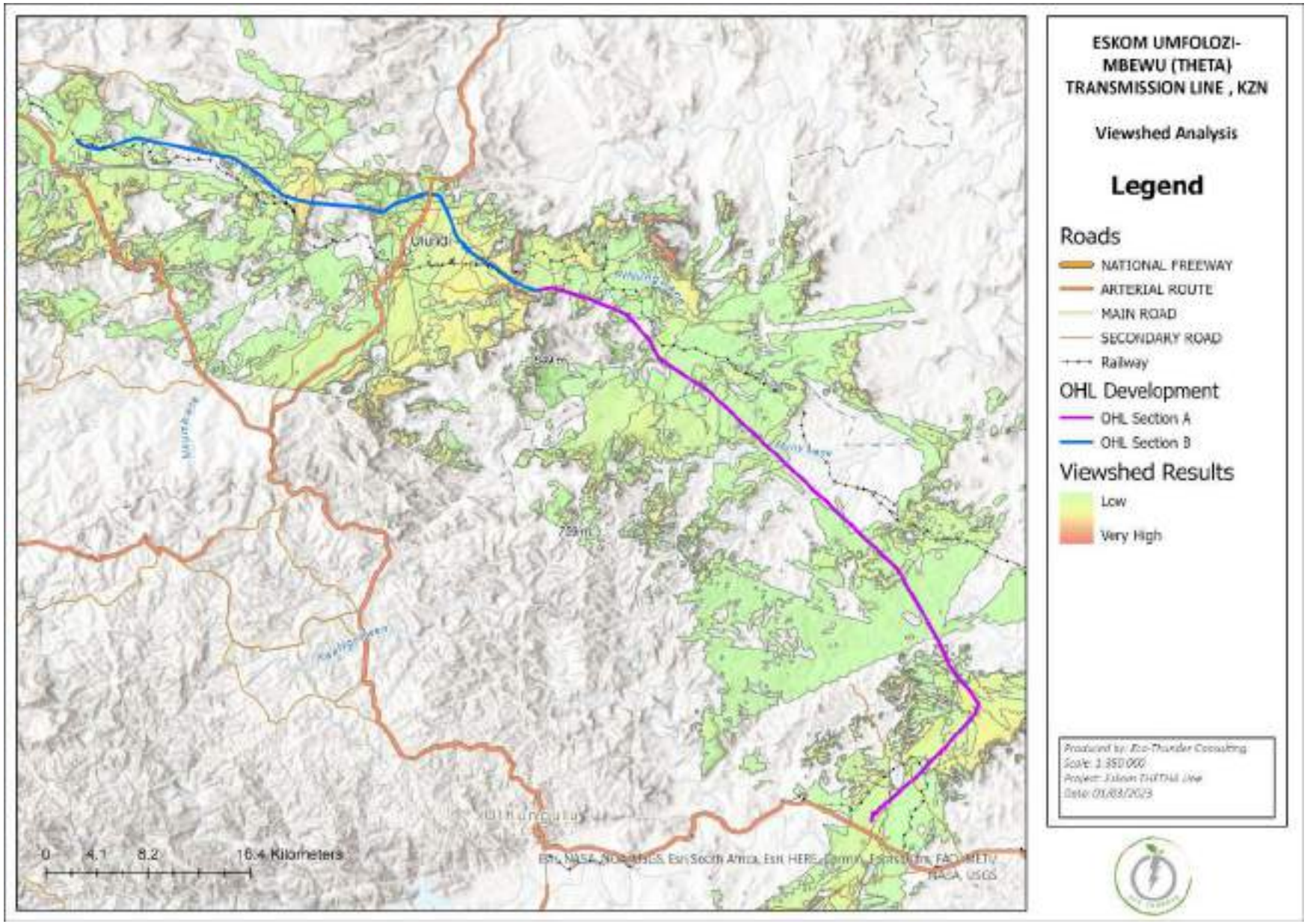

Figure 81: Viewshed analysis

7. VISUAL IMPACT ASSESSMENT

The approach to this first phase was to gain an overall impression of the terrain through which the proposed transmission route will pass. This was achieved by desktop assessments and by driving through the general areas identified for the routes.

The traversing of the route provided a broad overview of topographic and specific constraints (e.g., pans, irrigated areas) to route alignments from a visual impact viewpoint, in addition human scale interpretation of the route. Maps of land cover were used to correlate visual and mapped features.

Landscape impacts are alterations to the fabric, character, visual quality and visual value which will either positively or negatively affect the landscape character. During the construction and operational phases, the project components are expected to impact on the landscape character of the landscape types it traverses. Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed project. The visual receptors are grouped according to their similarities. The visual receptors included in this study are:

- Residents.
- Tourists; and
- Motorists.

To determine visual receptor sensitivity a, commonly used rating system is utilized (See section 7.3). This is a generic classification of visual receptors and enables the visual impact specialist to establish a logical and consistent visual receptor sensitivity rating for viewers who are involved in different activities.

The intensity of impact is assessed through a synthesis of visual intrusion, visibility, visual exposure, and viewer sensitivity criteria. Once the intensity of impact has been established this value is further qualified with spatial, duration and probability criteria to determine the significance of the visual impact.

7.1. Visual Absorption Capacity

The criteria that were used to determine the intensity of the visual impact of the proposed Transmission power line on the area includes the area from which the power line can be seen (the viewshed), the viewing distance, the capacity of the landscape to visually absorb structures and forms placed upon it (the visual absorption capacity), and the appearance of the project from important or critical viewpoints.

The spirit, or sense, of place is that quality imparted by the aspects of scale, colour, texture, landform, enclosure, and in particular, the land-use. According to K. Lynch (1992) “it is the extent to which a person can recognise or recall a place as being distinct from other places as having a vivid, or unique, or at least a particular, character of its own.”

The quality of Genius Loci is a function of attributes such as the scenic beauty or uniqueness and distinctive character of the built and cultural landscape.

The visual quality is the visual significance given to a landscape determined by cultural values and the landscape’s intrinsic physical properties (Smardon, et el, 1986), while many factors contribute to a landscape’s visual quality. They can ultimately be grouped under three headings: i.e. vividness, intactness and unity.

Visual scale is the apparent size relationship between landscape components or features and their surroundings (Smardon, et al, 1986). Landforms, vegetation and landuse, as described in Chapters 5.2, 5.3 and 5.10 were considered in the Visual Assessment.

7.2. VIA Rating Methodology

This section will attempt to quantify the potential visual impacts in their respective geographical locations and in terms of the identified issues related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g., the visual impact on users of major roads in the vicinity of the proposed power line alignment) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - long distance (very low = 1), medium to longer distance (low = 2), short distance (medium = 3) and very short distance (high = 4)[2].
- **Duration** - very short (0 – 1yrs. = 1), short (2 – 5yrs. = 2), medium (5 – 15yrs. = 3), long (>15 yrs. = 4), and permanent (= 5).
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium / moderate (= 6), high (= 8) and very high (= 10)[3].
- **Probability** – very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5).
- **Status** (positive, negative, or neutral).
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5).
- **Significance** - low, medium, or high.

The *significance* of the potential visual impact is equal to the *consequence* multiplied by the *probability* of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration, and extent (i.e., *significance = consequence (magnitude + duration + extent) x probability*).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium / moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

7.3. Visual Impact Assessment

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, inter alia: the purpose and need for the Project; views and concerns of interested and affected parties (I&APs); social and political norms, and the public's interest.

The following tables summarise the consequence and significance of the visual impact of the Project. These results are based on worst-case scenario when the impacts of all aspects of the Project are taken together. Consequence of impact is a function of intensity, duration, and spatial extent (SLR 2020). Intensity of impact is taken from the worst-case situation. These facilities are rated together, from a visual impact perspective, as the one would not exist without the other and they must be understood as the collective / cumulative.

7.3.1. Construction Phase

Table 2: Construction of a 96km long 400kV Powerline with an 80m Servitude.
The visual impact for the construction will occur on a local to regional scale due to the considerable length of servitude and the view that extends to the edge of the viewshed or beyond five kilometres. During construction, there may be an increase in heavy vehicles utilising the roads to the power line and substation that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction equipment such as cranes could be visually intrusive,

[2] Long distance = > 3km. Medium to longer distance = 1.5 – 3km. Short distance = 0.5 – 1.5km. Very short distance = < 0.5km (refer to Section 6.3. Visual distance / observer proximity to the grid connection infrastructure).
[3] This value is read from the visual impact index. Where more than one value is applicable, the higher of these will be used as a worst case scenario.

albeit for a short time period.

Site (Servitude) clearing and removal of vegetation could partially alter the landscape as viewed from the surrounds of the site, with the emergence of an exposed strip of bare soil.

During construction, the area around the individual towers will be disturbed. The construction camps and lay-down yards are anticipated to disturb a much larger area. The size and location of the construction camps will play a major role in the severity of the landscape impact. Due to a lack of technical information, two options are considered namely; the location of construction camps in remote, virgin land, or in/adjacent existing settlements.

Construction activities may potentially result in a **low** (significance rating = 28), temporary visual impact, that may be mitigated to **very low** (significance rating = 18).

	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Short (2)	Changes in the physical characteristics by changing the fabric and character of the landscape	**Low (28)**
Extent	Long distance (1)	Partial loss of features that contribute to the existing landscape by the introduction of new elements and structures	
Magnitude	Low (4)		
Probability	Highly probable (4)	If development is approved there is a high probability the landscape will be impacted	
Mitigation/Enhancement Measures			
Mitigation: • Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint. • Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible. • Plan the placement of laydown areas and temporary construction equipment camps to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. • Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent). • Restrict construction activities to daylight hours whenever possible to reduce lighting impacts. • Rehabilitate all disturbed areas (if present / if required) immediately after the completion of construction works. • Take land use into consideration when choosing pylon types, it is recommended that smaller footprint pylons be used in cultivated areas; • Avoid placement of pylon footings in clay soils. • Spread absorbent sand on areas where oil spills are likely to occur, such as the refuelling area in the hard park; Oil-contaminated soils are to be removed to a contained storage area and bioremediated or disposed of at a licensed facility;			
Post Mitigation/Enhancement Measures			
Duration	Short (2)	Changes in the physical characteristics by changing the fabric and character of the landscape	**Low (18)**
Extent	Long distance (1)	Partial loss of features that contribute to the existing landscape by the introduction of new elements and structures	
Magnitude	Minor (3)		
Probability	Probable (3)	If development is approved there is a high probability the landscape will be impacted	

Cumulative Impacts:
The construction of the gridline connection is expected to increase the cumulative visual impact within the region, considering the visual exposure of the power line infrastructure already present at this locality. Alternatively, the close proximity of the proposed site to the existing visual disturbances (power lines) allows for the effective connection with the power grid without incurring any additional expanded visual impacts.
Residual Risks:
The visual impact will be removed after decommissioning, provided the OHL infrastructure is removed and the site is rehabilitated to its original (current) status. Failing this, the visual impact will remain.

Table 3: Impact of OHL on Roads in Close Proximity

There is an extensive network of provincial tar roads that form the access backbone to the study area. Secondary district dirt roads provide access to all the more rural areas, plantations and farms through which the proposed lines will pass. Access to the proposed lines may only need to be constructed in tribal land where there are no existing roads and for the last short distances on private land serviced by the existing road network. Other roads in the area provide linkages between different rural settlements and are generally of a poor standard and poorly maintained. This prevents physical integration and encourages segregation due to physical constraints and distances between settlements.

The area has existing OHL infrastructure which will have set a level of acceptance for this type of development.

It is further expected that once the wind turbine structures are constructed, the much larger wind turbines would distract. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

The extent of the disturbances will generally affect a relatively small footprint area. Access roads to the towers are expected to be a two-track dirt road which will create the minimum disturbance.

Considering the moderately low VAC throughout most of the study area, the disturbed condition of parts of the landscape and the recovery rate of the endemic vegetation, the severity of landscape impact during the construction stage is expected to be moderate. The impact will extend over the entire length of the different alignments and may vary in degrees of severity along the linear length as it transects landscape types of varying VAC. Surface disturbances are also minimised through, for example, utilising existing roads.

	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Long term (4)	Development of the roads as well as the OHL infrastructure and servitude will be maintained and exist for the entire life cycle.	**Moderate (42)**
Extent	Local (4)	Only road users in the area will be subjected to the impact	
Magnitude	Moderate (6)		
Probability	Probable (3)	Road users, although not primary roads will most likely be able to see the OHL when traversing parts of the development.	
Mitigation/Enhancement Measures			

Mitigation:

Mitigation of this impact is not possible therefore additional specific measures as well as general "best practice" measures are recommended to reduce / mitigate the potential visual impact to **low**. The table below illustrates this impact assessment.

General mitigation / management:

Planning:

- Retain and maintain natural vegetation in all areas outside of the development footprint.

Operations:

- Maintain the general appearance of the surrounding environment as a whole.
- Crossroads, rivers and streams at right angles to limit visual intrusion of the landscape by the line to road users.
- When a new line runs parallel and close to an existing line place the transmission towers at the same spacing as the

existing line where possible.

- For access / service roads and servitudes avoid straight edges and corridors. These lines should complement the landscape through which they pass
- Avoid unnecessary removal of vegetation cover. Use existing access roads as far as possible; If a new road is constructed, ensure that some measure of erosion prevention is followed.

Post Mitigation/Enhancement Measures			
Duration	Long Term (4)	Development of the OHL will be visible for its entire lifespan	**Low (27)**
Extent	Local (3)	Only road users in the area will be subjected to the impact	
Magnitude	Low (2)		
Probability	Probable (3)	Vegetation will shield any possible visual intrusion	

Cumulative Impacts:

The construction of the OHL is expected to increase the cumulative visual impact within the region, considering the visual exposure of the power line infrastructure already present at his locality. Alternatively, the close proximity of the proposed site to the existing visual disturbances (power lines) allows for the effective connection with the power grid without incurring any additional expanded visual impacts.

Residual Risks:

The visual impact will be removed after decommissioning, provided the OHL infrastructure is removed and the site is rehabilitated to its original (current) status. Failing this, the visual impact will remain.

Table 4: Visual Impact on Residence and Homesteads in Close Proximity

The visibility of the proposed power lines will vary between static and dynamic view types. In the case of static views, such as views from a farmhouse or homestead, the visual relationship between the proposed power lines and the landscape will not change. The cone of vision is relatively wide, and the viewer tends to scan back and forth across the landscape. In contrast views from a moving vehicle are dynamic as the visual relationship between the proposed power line infrastructure is constantly changing as well as the visual relationship between the proposed power line and the landscape in which they it is seen.

Additional sensitive visual receptors are located at the farm residences (homesteads) throughout the study area. It is expected that the viewer's perception, unless the observer is associated with (or supportive of) the grid connection infrastructure, would generally be negative. Due to the very remote location of the proposed power line and the ill populated nature of the receiving environment, there are only seven potential sensitive visual receptor sites located within the study area.

Where homesteads and settlements occur, some more significant vegetation and trees may have been planted, which would contribute to the visual absorption capacity (i.e. shielding the observers from the infrastructure). As this is not a consistent occurrence, however, VAC will not be taken into account for any of the homesteads or settlements, thus assuming a worst-case scenario in the impact assessment.

	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Long term (4)	The residence surrounding the development will be able to see the powerline for the duration of its lifecycle	**Moderate (42)**
Extent	Local (4)	The development is proposed to only disrupt local visual receptors	
Magnitude	Moderate (6)		
Probability	Probable (3)	Residence will most likely be able to see the OHL especially in areas where the topography allows	

Mitigation/Enhancement Measures

Mitigation:

General mitigation/management:

Planning:

- Retain and maintain natural vegetation in all areas outside of the development footprint.

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

• Remove infrastructure not required for the post-decommissioning use of the facility. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. • Monitor rehabilitated areas post-decommissioning and implement remedial actions.			
Post Mitigation/Enhancement Measures			
Duration	Long term (4)	The OHL will be visible for its entire lifespan	**Low (24)**
Extent	Local (4)	The development is proposed to only disrupt local visual receptors	
Magnitude	Low (4)		
Probability	Probable (3)	With the correct mitigation measures in place, it is highly unlikely that there would be permanent impact on local residence	
Cumulative impacts: The construction of the OHL is expected to increase the cumulative visual impact within the region, considering the visual exposure of the power line infrastructure already present at this locality. Alternatively, the close proximity of the proposed site to the existing visual disturbances (power lines) allows for the effective connection with the power grid without incurring any additional expanded visual impacts.			
Residual Risks: None			

7.3.2. Operation Phase

Table 5: Visual Exposure

Visual exposure is determined by qualifying the visibility of an object, with a distance rating to indicate the degree of intrusion and visual acuity. As distance between the viewer and the object increases, the visual perception of the object reduces exponentially as generally changes in form, line, colour, and texture in the landscape become less perceptible with increasing distance.

It is expected that the grid connection infrastructure may theoretically be visible within their respective 3km visual corridors and potentially highly visible within a 0.5 – 1.5km radius of the structures due to the generally flat terrain it traverses. Beyond 1.5km the visibility becomes more scattered due to the undulating nature of the topography as well as the presence of hills and ridges. The grid connection structures are unlikely to be visible beyond a 3km radius of the structures. Although the majority of the exposed areas fall within vacant open space, generally devoid of observers or potential sensitive visual receptors.

	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Long term (4)	The development will be visible for its life cycle duration	**Moderate (42)**
Extent	Local (4)	Visual receptors within the local area will be subjected to this impact	
Magnitude	Moderate (6)		
Probability	Probable (3)	Without mitigation there is a high level of certainty that this impact will take place	
Mitigation/Enhancement Measures			
Mitigation: **General mitigation/management:** Planning: • Retain and maintain natural vegetation in all areas outside of the development footprint. Operations: • Maintain the general appearance of the facility as a whole. Decommissioning: • Remove infrastructure not required for the post-decommissioning use of the facility. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. • Monitor rehabilitated areas post-decommissioning and implement remedial actions. **Site specific mitigation measures:** • The mitigation measures for the transmission line during operation will need to focus on effective rehabilitation of the construction corridor and work sites. These specifications must be explicit and detailed and included in the			

contract documentation (Environmental Management Plan) so that the tasks can be costed and monitored for compliance and result.

- The galvanising of the pylon should be allowed to weather to a matt grey finish rather than be painted silver, as is often the case. This allows the structures to blend in with the existing environmental colours more readily than the silver which is highly reflective especially early morning and late afternoon.
- Should it be necessary to paint, it is recommended that a neutral matt finish be used.
- Sculpturing or shaping the cut and fill slopes of access roads to angles and forms that are reflected in the adjacent landscape can reduce the visual impact. By blending the edges with the existing landforms the visual impression made, is that the project component has followed a natural route provided by the landscape, rather than been 'engineered' through the landscape.

Post Mitigation/Enhancement Measures			
Duration	Long term (4)	The development will be visible for its life cycle duration	**Low (24)**
Extent	Local (4)	Visual receptors within the local area will be subjected to this impact	
Magnitude	Low (4)		
Probability	Improbable (2)	With Mitigation this impact is likely to be significantly reduced	

Cumulative Impacts:

The construction of the OHL is expected to increase the cumulative visual impact within the region, considering the visual exposure of the power line infrastructure already present at this locality. Alternatively, the close proximity of the proposed site to the existing visual disturbances (power lines) allows for the effective connection with the power grid without incurring any additional expanded visual impacts.

Residual Risks:

None

Table 6: Sense of place

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), plays a significant role.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

The environment surrounding the proposed OHL has a predominantly rural and undeveloped character. These generally undeveloped landscapes are considered to have a high visual quality, except where urban development and mining/industrial activities represents existing visual disturbances.

The anticipated visual impact of the proposed OHL on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance. This is due to the relatively low viewer incidence within close proximity to the proposed development site and the presence of existing mining and industrial activities within the region.

	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Long term (4)	The development will be visible for its life cycle duration	**Low (22)**
Extent	Regional (3)	Visual receptors within the local area will be subjected to this impact	
Magnitude	Low (4)		
Probability	Improbable (2)	There is a small chance that this will impact visual receptors.	

Mitigation/Enhancement Measures

Mitigation:

- For access / service roads and servitudes avoid straight edges and corridors. These lines should complement the landscape through which they pass (Litton, 1980).
- Special attention should be focussed on the width of servitude actually required for the construction and operational phases. There is a tendency to make these servitudes wider than necessary.
- access roads built to a higher engineering specification than required for a single lane 4x4 maintenance vehicle track.

- Vegetation stripping should be done in a manner where the edges are organic (non-geometric) or curvilinear rather than straight or sharp edged as viewers tend to form positive visual impressions such as "gentleness" and "delicacy" and tend to object to negative visual impressions such as "rough", "rugged" or "violent" (Ribe, 1989).
- It is essential that all cut and fill slopes, as well as all areas disturbed by construction activity, are suitably topsoiled and vegetated as soon as is possible after final shaping. The progressive rehabilitation measures will allow the maximum growth period before the completion of the project.
- All areas affected by the construction works will need to be rehabilitated and re-vegetated. This includes the areas beyond the works area such as temporary access roads, construction campsites, workers campsites, borrow pits, laydown areas, etc.
- The special conditions of contract must include for the stripping and stockpiling of topsoil from the construction areas for later re-use. Topsoil is considered to be at least the top 300 mm of the natural soil surface and includes grass, roots and organic matter.
- The areas to be cleared of topsoil should be all areas that will be covered by structures, roads and construction camps.
- The presence of degraded and disused roads and areas left over after development that are not rehabilitated, could present a high perceptual visual impact. These areas should be topsoiled and re-vegetated.
- All existing large trees that fall outside the earthworks area must be retained.

Post Mitigation/Enhancement Measures			
Duration	N/A		
Extent	N/A		
Magnitude	N/A		
Probability	N/A		
Cumulative impacts: The combined effects of these changes will negatively affect the overall character of the landscape.			
Residual Risks:			

7.3.3. Cumulative Effects

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

Cumulative effects can also arise from the intervisibility of a range of developments and /or the combined effects of individual components of the proposed development occurring in different locations or over some time. The separate effects of such individual components or developments may not be significant, but together they may create an unacceptable degree of adverse effect on visual receptors within their combined visual envelopes. Intervisibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation, and distance as this affects visual acuity, which is also influenced by weather and light conditions (LI-IEMA (2013)).

Cumulative effect of the Project

The cumulative impact of the Project, the facilities and infrastructure taken together, is significant, along with the existing power infrastructure (ESKOM sub-station and transmission lines) that exists in the study area. Intervisibility for the proposed Project and the existing infrastructure would be evident. The VAC for the study area is relatively low, and the combined effect over time of these developments would result in the study area being impacted upon in a moderate manner beyond the anticipated negative impacts of the proposed Project alone.

Table 7: Cumulative Impact
Nature of Impact: The potential cumulative visual impact of the OHL on the visual quality of the landscape.

	Overall impact of the proposed project considered in isolation. (With mitigation)	***Cumulative impact of the project and other projects within the area (with mitigation)***
Extent	Long Distances **(1)**	Long distance **(1)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Low **(4)**
Probability	Probable **(4)**	Probable **(3)**
Significance	Moderate **(44)**	Low **(27)**
Status (positive, neutral, or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint where possible. Operations: ➢ Maintain the general appearance of the development area as a whole. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning. Failing this, the visual impact will remain.		

7.4. Impact Statement

In order to better understand the visual impacts associated with the proposed power line on receptor locations in the surrounding areas, a visual contrast assessment has been undertaken. This is done in order to quantify the degree of visual contrast or change that would be caused by the proposed ash disposal facility at certain key observation locations.

As described above, the study area has a largely natural visual character, with limited parts displaying a slightly different rural character. In the parts of the study area that have retained their natural characteristics, the nature of certain types of land use practiced and the likely value placed in the natural characteristics of such a landscape entail that emphasis would thus be likely to be on preserving the natural character of the landscape, in which human objects have spatially limited and non-intensive visual characteristics and prominence. Accordingly, the associated objective would be to create as little visual change and contrast to the landscape as possible, by limiting the degree of visual intrusion caused by a development such as the proposed power line. Put in another way, the objective would be to only allow development that did not degrade the visual context. However, it should be noted that there are parts of the study area in which a large-scale power line (i.e., a 400kv line) already exists, and which forms part of the visual baseline. The proposed power line would run alongside the existing power line. In these areas with a slightly altered visual baseline, the tolerance level for further development and visual change of the landscape could be higher due to the existing presence of a power line which is a visually dominant part of the existing landscape. The presence of an existing power line is significant in a visual context and needs to be taken into account in the assigning of a visual tolerance level for areas from which the existing power line is visible.

Empirical research indicates that the visibility of a transmission tower, and hence the severity of visual impact, decreases as the distance between the observer and the tower increases. The landscape type, through which the transmission line crosses, can be mitigated through the topographical or vegetative measures.

In some cases, the towers may dominate the view for example, silhouetted against the skyline, or in some cases be absorbed in the landscape. A complex landscape setting with a diverse land cover and topographical variation has the ability to decrease the severity of visual impact more than a mundane landscape (Bishop et al, 1985).

Visual receptors within 1 km from the alignment are most likely to experience the highest degree of visual intrusion, hence contributing to the severity of the visual impact. This is considered as the zone of highest visibility after which the degree of visual intrusion decreases rapidly at distances further away.

The majority of the major roads convey traffic in an east-west direction and the visual experience of the transmission line is reduced because the intersection of the line and the road is at approximately right angles. The visual intrusion of existing kV lines presents a bulkier visual image in the view from the road, however should help to set a baseline for the landscape. The existing 400 kV line has already intruded visually on the landscape character of its corridor.

The route section is primarily an agricultural landscape with cultivated dryland and irrigated fields. The flatness of the landform combined with the vertical scale of the transmission tower (45 m) does dominate the sense of place within a distance of 500 m either side of the servitude. This detracts from the sense of place. The intensity of visual intrusion is therefore judged to be medium because of the relatively intense cultivation.

The anticipated visual impact is not considered to be a fatal flaw from a visual perspective, considering the low incidence of visual receptors occurring within the region.

The following is a summary of impacts remaining, assuming mitigation as recommended, is exercised:

- During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction activities may potentially result in high, temporary visual impact that may be mitigated to **low**.

- The OHL is expected to have a **moderate** (to potentially **high**) visual impact on observers travelling along the secondary roads. Some homesteads and other visual receptors are found along the 96km long OHL and Servitude area. The impacts may be contained to **Low** significance if the proposed impact mitigation measures are implemented.

- The potential visual impact related to air travel hazard is expected to be of **low** significance, due to the long distance in between the proposed OHL and the airfield. No mitigation of this impact is required since the OHL facility is not expected to interfere with aircraft operations at the airfield. However, best practice measures must be implemented to ensure visibility and safety.

- The anticipated visual impact resulting from the construction of on-site ancillary infrastructure is likely to be of **low** significance both before and after mitigation.

- The anticipated visual impact of the proposed OHL on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance. This is due to the relatively low viewer incidence within close proximity to the proposed development site and the presence of existing mining and industrial activities within the region.

- The anticipated cumulative visual impact of the proposed OHL is expected to be of **low** significance.

The anticipated visual impacts listed above (i.e., post mitigation impacts) range from **moderate** to **low** significance. **Anticipated visual impacts on sensitive visual receptors (if and where present) in close proximity to the proposed facility are not considered to be fatal flaws for the proposed OHL and Facility.**

Considering all factors, it is recommended that the development of the facility as proposed be supported; subject to the implementation of the recommended mitigation measures (**Section 7.4.**) and management programme (**Section 9.**).

8. CONCLUSION

The sensitivity of the landscape character is an indication of "the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character" (GLVIA, 2002). The uncluttered openness of the landscape is greatly responsible for the simplistic and essentially secluded landscape character. Vast uninterrupted landscapes and vistas are dominated by low growing and low stunted vegetation. The unspoilt, panoramic landscape is an amenity that greatly contributes to the pristine and remote character of the landscape.

Previous human induced activities and interventions have minimally impacted the original landscape character. In this case, mining and existing infrastructure, including power lines, roads, amongst others, can be classified as landscape disturbances and elements that cause a reduction in the condition of the affected landscape type and negatively affect the quality of the visual resource.

The focus of this study is specifically on the main project components such as the power lines, pylons and access roads and not on the ancillary infrastructure. Due to the linear nature of the proposed project it is not possible to provide an adequate descriptive analysis of visibility by plotting sections to determine the line of sight from the observer towards the project components to indicate the extent to which the elements are not screened by the intervening landforms or structures.

The servitude, if cleared of vegetation, and the construction access road will be visible, especially where the vegetation is diverse, for an extended distance beyond the 5 000 m zone, if viewed from an elevated position. This scar will be visible until rehabilitation is complete. Fortunately, much of the vegetation is grassland and will not need to be cleared.

Due to the linear nature of the proposed route specific viewpoints for the transmission line were not selected. However, areas with high volumes of traffic, areas with tourism potential and undeveloped rural areas with high scenic value were regarded as critical view zones against which the visual impact would be evaluated.

The significance of visual impact is based on the worst-case scenario. This scenario assumes that all facilities along with the associated grid infrastructure and sub-stations would be constructed at the same time. At the time of writing there was no evidence to the contrary. This assumption is also based on the nature of the visual impact and the fact that receptors would experience all facilities in the same visual envelope from their respective locations or as they travel along adjacent roads.

The cause of these anticipated visual impacts would be:

Construction Phase:

- Removal of vegetation, the building of access roads, earthworks, and exposure of earth to establish the areas to be developed.
- Physical presence of construction camps and the movement of construction vehicles within the site and along local roads.
- Generation of dust by construction activities.

Operational Phase

- Reduction in the rural sense of place for the study area.
- Light pollution.

Decommissioning Phase

- Physical presence of the activities associated with removing the structures and rehabilitating the site.

9. MITIGATION AND MANAGEMENT MEASURES

In considering mitigation measures three rules are considered - the measures should be feasible (economically), effective (how long will it take to implement and what provision is made for management / maintenance), and acceptable (within the framework of the existing landscape and land use policies for the area). To address these, the following principles have been established:

- Mitigation measures should be designed to suit the existing landscape character and needs of the locality.
- They should respect and build upon landscape distinctiveness.
- It should be recognized that many mitigation measures, especially the establishment of planted screens and rehabilitation, are not immediately effective.

The primary visual impact, namely the appearance of the OHL is not possible to mitigate. The functional design of the OHL cannot be changed in order to reduce visual impacts. Mitigation is however possible if the recommended general actions are followed.

9.1. Preparatory Works and Construction Concerns

Mitigation of visual impacts associated with the construction phase, albeit temporary, would entail proper planning, management, and rehabilitation of the construction site. Recommended mitigation measures include the following:

- Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
- Reduce the construction period through careful logistical planning and productive implementation of resources.
- Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).
- Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
- Rehabilitate all disturbed areas, construction areas, roads, slopes, etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- With the preparation of the portions of land onto which activities will take place the minimum amount of existing vegetation and topsoil should be removed. Large trees should be saved were possible, specifically along the highways.
- Ensure, wherever possible, natural indigenous vegetation is retained and incorporated into the site rehabilitation.
- All topsoil that occurs within the proposed footprint of an activity must be removed and stockpiled for later use. The construction contract must include the stripping and stockpiling of topsoil. Topsoil would be used later during the rehabilitation phase of disturbed areas. The presence of degraded areas and disused construction roads, which are not rehabilitated, will increase the overall visual impact.
- Specifications with regards to the placement of construction camps, as well as a site plan of the construction camp, indicating waste areas, storage areas, and placement of ablution facilities should be included in the EMPr. These areas should either be screened or positioned in areas where they would be less visible from human settlements and main roads.
- Construction activities should be limited to between 08:00 and 17:00 or in conjunction with the ECO.
- Adopt responsible construction practices aimed at strictly containing the construction / establishment activities to specifically demarcated areas.

- Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas.

9.2. Earthworks

- Earthworks should be executed in such a way that only the footprint and a small 'construction buffer zone' around the proposed activities are exposed. In all other areas, the naturally occurring vegetation should be retained, especially along the periphery of the sites.
- All cut and fill slopes (if any) and areas affected by construction work should be progressively top soiled and re-vegetated as soon as possible.
- Any soil must be exposed for the minimum time possible once cleared of vegetation to avoid prolonged exposure to wind and water erosion and to minimise dust generation.

9.3. Landscaping and Ecological Approach

- It is recommended that the existing vegetation cover be maintained / established in all areas outside of the actual development footprint, both during construction and operation of the proposed facility. This will minimise visual impact as a result of cleared areas, power line servitudes and areas denuded of vegetation.
- Where new vegetation is proposed to be introduced to the site, an ecological approach to rehabilitation as opposed to a horticultural approach should be adopted. For example, communities of indigenous plants will enhance biodiversity, a desirable outcome for the area. This approach can significantly reduce long-term costs as less maintenance would be required over conventional landscaping methods as well as the introduced landscape being more sustainable.
- Progressive rehabilitation of all construction areas should be carried out immediately after they have been established.
- Undertake planting of screening vegetation along the eastern and southern boundaries of the Project sites.

9.4. Mounting Structures and Associated Infrastructure

- Paint the mounting structures with colours that reflect and compliment the colours of the surrounding landscape.
- Ensure the perimeter fence is of a 'see through' variety and that its colour blends with the environment.

9.5. Good housekeeping

- "Housekeeping" procedures should be developed for the Project to ensure that the Project site and lands adjacent to the Project site are kept clean of debris, garbage, graffiti, fugitive trash, or waste generated onsite; procedures should extend to control "track out" of dirt on vehicles leaving the active construction site and controlling sediment in stormwater runoff.
- During construction, temporary fences surrounding the material storage yards and laydown areas should be covered with 'shack' cloth (khaki coloured).
- Operating facilities should be actively maintained during operation.

9.6. Operation Phase

- During operation, the maintenance of the OHL and Facility, ancillary structures and infrastructure will ensure that the facility does not degrade, preventing aggravation of the visual impact. Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as and when required. Once the facility has exhausted its life span, the main facility and all associated infrastructure not required for the post rehabilitation use of the site should be removed and all disturbed areas appropriately rehabilitated. An ecologist should be consulted to give input into rehabilitation specifications. All rehabilitated areas should be monitored for at least a year following decommissioning, and remedial actions implemented as and when required. Where sensitive visual receptors are likely affected, it is recommended that the developer enter into negotiations regarding the potential screening of visual impacts, either at the receptor site or along the perimeter of the facility. This may entail the planting of vegetation or the construction of landscaped berms or screens.

9.7. Lighting

Light pollution is largely the result of bad lighting design, which allows artificial light to shine outward and upward into the sky, where it is not wanted, instead of focusing the light downward, where it is needed. Ill- designed lighting washes out the darkness of the night sky and radically alters the light levels in rural areas where light sources shine as 'beacons' against the dark sky and are generally not wanted.

Of all the pollutions faced, light pollution is perhaps the most easily remedied. Simple changes in lighting design and installation yield immediate changes in the amount of light spilled into the atmosphere. The following are measures that must be considered in the lighting design of the Project, particularly at the management and service platforms:

Mitigation measures include the following:

- Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself).
- Limiting mounting heights of lighting fixtures, or alternatively using footlights or bollard level lights.
- Making use of downward directional lighting fixtures.
- Making use of minimum lumen or wattage in fixtures.
- Making use of down-lighters, or shielded fixtures.
- Making use of Low-Pressure Sodium lighting or other types of low impact lighting.
- Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

In terms of ancillary infrastructure, it is recommended that access roads and other on-site infrastructure be planned so that the clearing of vegetation is minimised. Consolidate infrastructure as much as possible and make use of already disturbed areas rather than pristine sites, wherever possible. Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility. The correct specification and placement of lighting and light fixtures for the proposed OHL will go far to contain rather than spread the light.

9.8. Branding and Marketing

The applicants may wish to give consideration, where appropriate, to the development and installation of viewing areas, interpretation panels, visitor, or educational facilities as part of the development proposal. This may appeal to tourists visiting the area who may be curious about renewable energy projects.

9.9. Management Programme

The following management plan tables aim to summarise the key findings of the visual impact report and suggest possible management actions in order to mitigate the potential visual impacts. Refer to the tables below.

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AQUATIC ECOLOGICAL ASSESSMENT FOR THE PROPOSED POWER LINE TOWER CONSTRUCTION BETWEEN ULUNDI AND EMPANGENI, IN THE KWA-ZULU NATAL PROVINCE.

Report Compiled By:
Report Reviewed By:

UMONGO ENVIRONMENTAL SERVICES

March 2023

MANAGEMENT SUMMARY

BACKGROUND

A powerline and associated supporting infrastructure is proposed between Empangeni and Ulundi, the 765 kV Umfolozi – Mbewu powerline is approximately 98 km and will traverse through towns that include Ulundi, Dindi, Ndondwane and Empangeni in the KwaZulu Natal province, South Africa. As part of the Environmental Authorisation process, an aquatic ecological assessment was undertaken to determine sensitivity of aquatic systems in the vicinity of the powerline route and to provide recommendations requited to avoid, or minimise any impact to the aquatic systems to be crossed by the powerline. Umongo Environmental Services was appointed by Kimopax to conduct an aquatic ecological assessment and the field investigations were conducted the 17th and the 18th March 2023. At the time of the assessment due to high flow conditions on the White Umfolozi River, no fish could be sampled due to safety concerns. The assessment sites are described below:

Table A: The location and information of the aquatic assessment sites for the Umfolozi Imvewu powerline (UMP) sites assessed in March 2023.

Site Name		Site Information	Site Location	
			Latitude	Longitude
UMP 1	White Umfolozi	Located upgradient of the proposed powerline.	-28.247940°	31.305956°
UMP 2	Mhlahlane River	Tributary of the White Umfolozi River, located downgradient of the powerline.	-28.248000°	31.332412°
UMP 3	White Umfolozi	Located upgradient of the proposed powerline.	-28.393950°	31.679300°
UMP 4	Munywana River	Tributary of the White Umfolozi River, located downgradient of the powerline.	-28.442976°	31.717559°
UMP 5	Nseleni River	Tributary of the Mhlathuze River, located downgradient of the powerline. Located in a communal area.	-28.570183°	31.852921°
UMP 6	Ntambanana River	Located furthest downgradient of the proposed powerline. Located in a farming area. The site is downgradient of the proposed activities.	-28.710698°	31.755037°

AQUATIC ECOLOGICAL FINDINGS

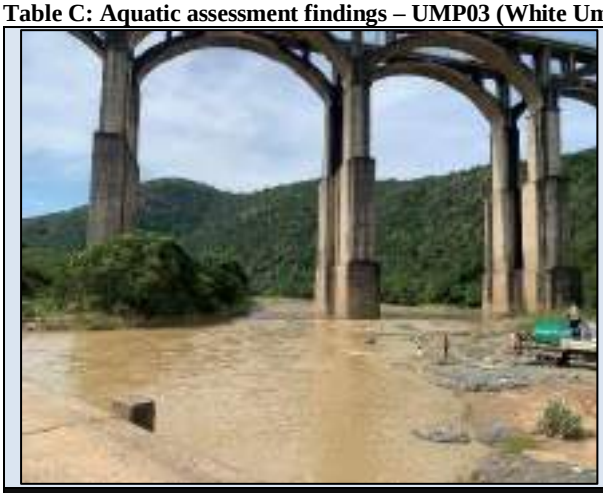
Table B: Aquatic assessment findings – UMP01 (White Umfolozi River), upstream of proposed activities.

Water Quality			
Ecoregion	North-Eastern Uplands Ecoregion	**Quaternary Catchment**	W21 H
pH	8.56	**Temperature (˚C)**	29.4
DO (%) / mg/L	72.71% / 5.3 mg/L	**Electrical Conductivity (mS/m)**	33
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	14	**ASPT Score**	4.71
SASS5 Score	66	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	44 (Poor)	**MIRAI Score**	59.9 (C/D)

Table B: Aquatic assessment findings – UMP02 (River) downstream of proposed activities.


Water Quality			
Ecoregion	North-Eastern Uplands Ecoregion	**Quaternary Catchment**	W21H
pH	8.01	**Temperature (˚C)**	Moderate
DO (%) / mg/L	64.4 % / 4.33 mg/L	**Electrical Conductivity (mS/m)**	35.1 mS/m
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	10	**ASPT Score**	6.4
SASS5 Score	64	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	55 (Fair/Adequate)	**MIRAI Score**	58.2 (C/D)

Table C: Aquatic assessment findings – UMP03 (White Umfolozi River) downstream of proposed activities.




Water Quality			
Ecoregion	Lowveld	**Quaternary Catchment**	W21K
pH	8.50	**Temperature (˚C)**	29.0
DO (%) / mg/L	75.7% / 5.52 mg/L	**Electrical Conductivity (mS/m)**	30 mS/m
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	13	**ASPT Score**	6.08
SASS5 Score	73	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	44 (Poor)	**MIRAI Score**	58.6 (C/D)

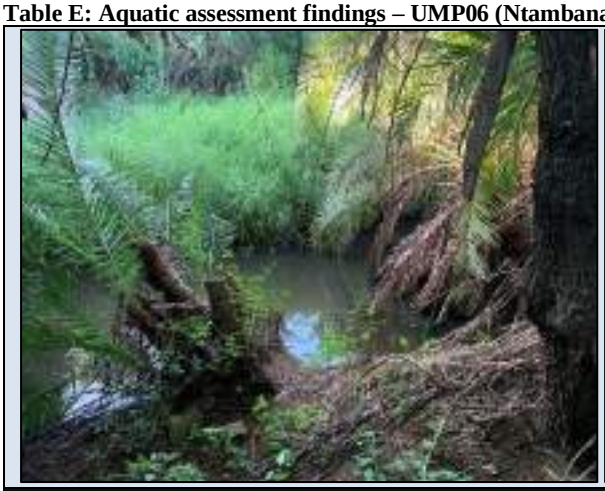
Table D: Aquatic assessment findings – UMP04 (Munywana River) downstream of proposed activities.


Water Quality			
Ecoregion	North-Eastern Uplands Ecoregion	**Quaternary Catchment**	W21L
pH	8.75	**Temperature (˚C)**	34.3
DO (%) / mg/L	59.6% / 4.1 mg/L	**Electrical Conductivity (mS/m)**	139
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	7	**ASPT Score**	3.71
SASS5 Score	26	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	30 (Poor)	**MIRAI Score**	52.70 (D)

Table E: Aquatic assessment findings – UMP05 (Nseleni River) downstream of proposed activities.


Water Quality			
Ecoregion	North-Eastern Uplands Ecoregion	**Quaternary Catchment**	W21G
pH	9.3	**Temperature (˚C)**	28.1
DO (%) / mg/L	34.1% / 2.95 mg/L	**Electrical Conductivity (mS/m)**	78 mS/m
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	9	**ASPT Score**	4.22
SASS5 Score	38	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	51 (Poor)	**MIRAI Score**	52.0 (D)

Table E: Aquatic assessment findings – UMP06 (Ntambanana River) downstream of proposed activities.




Water Quality			
Ecoregion	North-Eastern Uplands Ecoregion	**Quaternary Catchment**	W12D
pH	9.14	**Temperature (˚C)**	26.0
DO (%) / mg/L	32.1% / 2.33 mg/L	**Electrical Conductivity (mS/m)**	173 mS/m
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	7	**ASPT Score**	3.43
SASS5 Score	24	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	30 (Poor)	**MIRAI Score**	40 (D/E)

IMPACT ASSESSMENT SUMMARY

Table F: Construction Phase: Ground-breaking activities for installation of pylons/support infrastructure.

Activity and potential impact: Ground-breaking activities for installation of pylons/support infrastructure:				
Impact Significance without Mitigations				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Medium*	*Definite*	*High*	*Medium*
Impact Significance with Mitigations				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Short term*	*Unlikely*	*High*	*Low*
Essential mitigation measures:				
• Direct disturbance of the aquatic systems should be avoided by ensuring that pylons and support towers are spread adequately at crossing points and avoid any direct impact; • Where construction is to be done in the vicinity of the riverine systems, restrict construction to the drier months if possible to avoid sedimentation of the river system; • No support structures should be constructed within the wetland areas. If at all possible all support structures should be developed above the 1: 50 year flood line and above the 1:10 year flood line as a minimum; • Development of new access roads should be minimised as must as possible and the existing road infrastructure must be utilised as far as possible in order to minimise overall disturbance; • On-site stormwater management measures and sediment control devises must be established in order to limit the sediment laden runoff into the aquatic systems; • Stormwater within construction sites must be handled properly to ensure that sediment is trapped and that flow velocities are reduced in order to minimise erosion impacts.				

Table G: Construction Phase: Construction of concrete foundations and installation of support towers/pylons including substations.

Activity and potential impact: Construction of concrete foundations and installation of support towers/pylons including substations:				
Impact Significance without Mitigation				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Medium term*	*Definite*	*High*	*Medium*
Impact Significance with Mitigation				
Extent	**Duration**	**Probability**	**Reversibility**	**Impact Significance**
On site	*Short term*	*Unlikely*	*High*	*Low*

Essential mitigation measures:
• A construction camp with a temporary laydown area and the concrete batching plant would likely need to be placed within the site for the construction works; • On-site stormwater management measures and sediment control devises must be established in order to limit the sediment laden runoff into the aquatic systems; • Prevention of hydrocarbon spills from machinery and vehicles by the use of drip-trays and permanent bunded areas for overnight parking; • Domestic effluent from the construction camps should be stored temporarily in a safe manner (unlikely to leak or be breached), and should be removed by approved contractors weekly; • Appropriate engineering designs must be implemented to reduce erosion and minimise sedimentation risks, including geotextiles to trap ejected sediment (or another suitable design).

Table G: Operational Phase: Operation of the infrastructure and regular scheduled maintenance.

Activity and potential impact: Operation of the infrastructure and regular scheduled maintenance.				
Impact Significance without Mitigation				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Short term*	*Definite*	*High*	*Low*
Impact Significance with Mitigation				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Short term*	*Unlikely*	*High*	*Low*
Essential mitigation measures:				
• Management of alien and invasive species within the disturbed areas should be conducted on an ongoing basis to minimise spread and loss of indigenous vegetation; • Re-vegetation of areas where vegetation was cleared must be conducted in order to ensure that runoff velocity is slowed down, thereby minimising risk of soil erosion; • Should any erosion features develop and be observed during maintenance activities, they should be stabilised as soon as possible; • Tower footprints and rehabilitated construction areas must be inspected every six months for erosion and measures must be implemented to limit erosion; • During maintenance activities, vehicles must only be driven on existing, maintained access roads and not drive indiscriminately through natural areas; and • In any areas where disturbance of banks or vegetation occurs, bank and bed profile should be re-instated in such a way as reinstate predevelopment habitat conditions.				

CONCLUSION AND RECOMMENDATIONS

An aquatic ecological assessment was conducted for the proposed 765 kV Umfolozi – Mbewu powerline (98 km) between Empangeni and Ulundi. It should also be ensured that recommendations as outlined in the Section 5 of the report are adhered to in order to minimise any potential impacts on the riverine systems to be crossed by the infrastructure. Some essential mitigation measures and recommendations for the project are outlined below:

- No support structures should be constructed within the riverine systems areas. If at all possible, all support structures should be developed above the 1: 50 year flood line and above the 1:10 year flood line as a minimum;
- Limit the footprint area of the construction activities to what is absolutely essential in order to minimise environmental damage, especially where towers will encroach upon the riverine systems boundary. Construction vehicles must use existing roads where possible;
- Tower footprints and rehabilitated construction areas must be inspected every six months for erosion and measures must be implemented to curb erosion;
- Management of alien and invasive species within the disturbed areas should be conducted on an ongoing basis to minimise spread and loss of indigenous vegetation.

Based on the aquatic ecological assessment it is the opinion of the specialist that the proposed powerline construction project be considered.

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LIST OF ABBREVIATIONS

ASPT	Average Score Per Taxon
BA	Basic Assessment
CBA	Critical Biodiversity Area
BEST AEMC	Best Attainable Ecological Management Class
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DWA(F)	Department of Water Affairs (and Forestry)
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EI&ES	Ecological Importance and Ecological Sensitivity
EMPr	Environmental Management Program
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Area
GA	General Authorisation
GG	Government Gazette
GIS	Global Information System
GN	Government Notice
HI	Habitat Integrity
kW	kilowatt
MW	megawatt
ONA	Other Natural Areas
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Area
NWA	National Water Act
PA	Protected Area
PES	Present Ecological Status
REC	Recommended Ecological Condition
SANBI	South African National Biodiversity Institute
SEA	Strategic Environmental Assessment
WMA	Water Management Area
WUL	Water Use License
WULA	Water Use License Application

1. INTRODUCTION

A powerline and associated supporting infrastructure is proposed between Empangeni and Ulundi, the 765 kV Umfolozi – Mbewu powerline is approximately 98 km and will traverse through towns that include Ulundi, Dindi, Ndondwane and Empangeni in the KwaZulu Natal province, South Africa. As part of the Environmental Authorisation process, an aquatic ecological assessment was undertaken to determine sensitivity of aquatic systems in the vicinity of the powerline route and to provide recommendations requited to avoid, or minimise any impact to the aquatic systems to be crossed by the powerline. Umongo Environmental Services was appointed by Kimopax to conduct an aquatic ecological assessment and the field investigations were conducted during March 2023.

Table 1 describes the sites assessed during the field investigation and indicates the geographic location of the sites assessed.

Table 1: The location and information of the aquatic assessment sites for the Umfolozi Imbewu powerline (UMP) sites assessed in March 2023.

Site Name		Site Information	Site Location	
UMP 1	White Umfolozi	Located upgradient of the proposed powerline. Upstream site in relation to proposed activities.	-28.247940°	31.305956°
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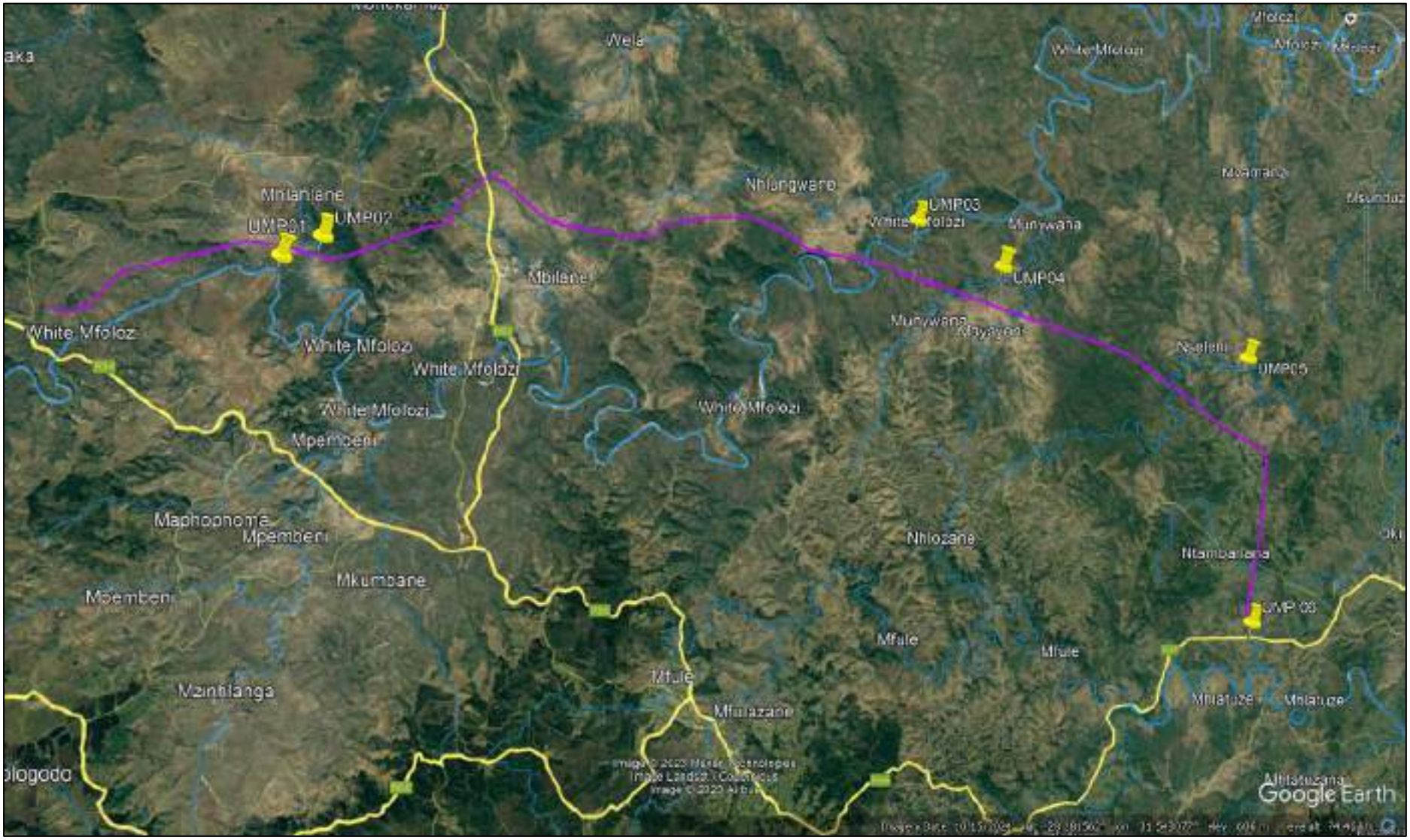

Figure 1: The location and information of the aquatic assessment sites for the Umfolozi Imbewu powerline (UMP) sites assessed in March 2023.

Figure 2: Aquatic ecoregions and assessment sites.

Figure 3: Zoomed - Aquatic ecoregions and assessment sites (UMP01 and UMP02).

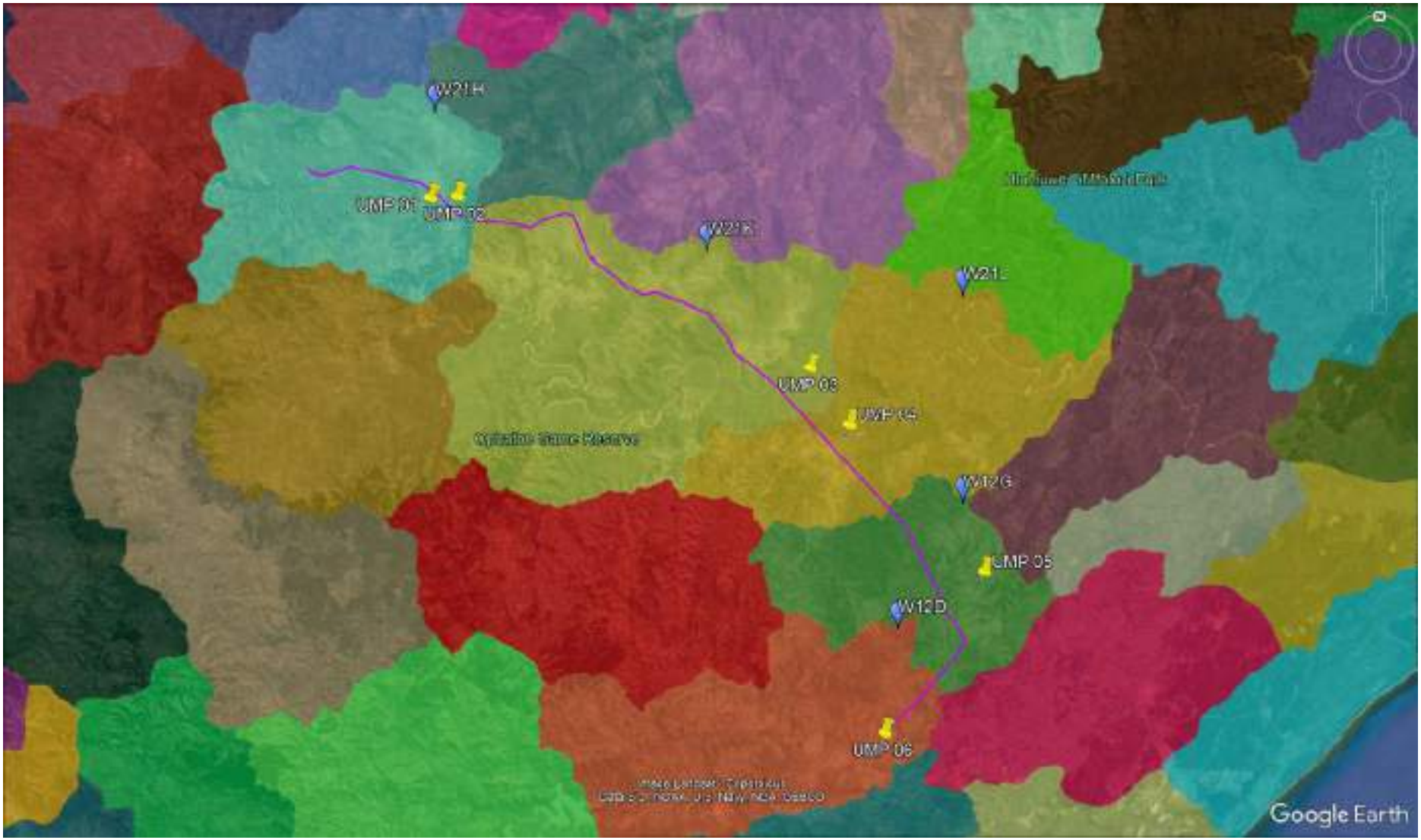

Figure 4: Quaternary catchments and sampling sites (UMP01 – W21H, UMP02 – W21H, UMP03 – W21K, UMP04 – W21L, UMP05 – W21G and UMP06 – W21D).

1.1 Terms of Reference

The purpose of the assessment was to identify aquatic systems that will be crossed by the proposed 765 kV Umfolozi – Mbewu powerline in order to provide recommendations on the proposed development plans in terms of the applicable setbacks for the construction of the powerline and the associated infrastructure such as powerline towers and pylons. The scope of the work was as follows:

- Update the report conducted in 2015 by Scientific Aquatic Services (SAS) for the 765 kV Umfolozi – Mbewu powerline. The sampling sites used were largely kept consistent with this study;
- Conduct a desktop assessment based on existing information for the assessment area;
- Undertake field assessment which includes assessment of water quality and biota within the identified aquatic systems to be crossed by the powerline;
- Provide recommendations on management of impacts associated with the proposed development; and
- Write up findings and recommendations facilitate environmental authorisation requirements that allow for informed and sustainable biodiversity decision making.

1.2 Assumptions and Limitations

The following limitations apply to the techniques and methodology utilized to undertake this study:

- Limited data is available for the aquatic systems prior to any disturbances associated with anthropogenic activities such as construction of infrastructure which potentially disturbs aquatic biota, as such reference conditions are based on some of the data that is available and professional opinion;
- Recommendations are based on professional opinion and best practice guidelines within South Africa; and
- The sites assessed were based on sites as assessed in the earlier available studies and due to personal safety concerns and access into sites, some points are not located exactly where crossing will be but are located in areas which are considered representative of the crossing sites; and
- The site assessment was conducted during a period of high flows (end of summer season) and as such, due to safety in larger rivers such as the White-Umfolozi, some limitations were experienced during the sampling assessment. Linked to this, due to safety concerns the no fish could be sampled during the assessment.

2. LEGISLATIVE CONSIDERATIONS

The following legislative requirements were considered during the assessment:

- **The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996):**
  - Section 24 of the Constitution of the Republic of South Africa, 1996 provides that everyone has the right to an environment that is not detrimental to his or her health or well-being.
- **National Environmental Management Act (107 of 1998) and the Environmental Impact Assessment Regulations (2010):**
  - In terms of undertaking an EIA process and in terms of compliance with NEMA, any proposed activity, whether serving a maintenance purpose or for development, needs to be checked for 'listed activities', as defined by NEMA (Listed activities are activities), which may have potentially detrimental impact on the environment and therefore require environmental authorisation from the relevant authorising body.
- **National Water Act, 1998 (Act No. 36 of 1998):**
  - The National Water Act guides the management of water in South Africa. The Act aims to regulate the use of water and activities that may impact on water resources through the categorisation of 'listed water uses 'encompassing water extraction and flow attenuation within catchments as well as the potential contamination of water resources, where the Department of Water Affairs (DWA) is the administering body in this regard.

    General Notice (GN) 509 under the NWA 1998 (Act No. 36 of 1998) was drafted to streamline the application for, and granting of, a Water Use Licence (WUL) in terms of Section 21(c) & (i) water uses. The water uses are associated with the; c) impeding or diverting of the flow of water within a watercourse (streams and wetlands) and i) the altering of the bed, banks, course or characteristics of a watercourse (streams and wetlands).
- **National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004):**
  - The Act provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant protection; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith.
- **Ezemvelo KZN Wildlife Biodiversity Guidelines:**
  - Ezemvelo KZN Wildlife is the provincial agency mandated to carry out biodiversity conservation and associated activities in the province of KwaZulu-Natal in the Republic of South Africa. The guideline provides developers, applicants, environmental consultants,

specialists and authorities charged with reviewing/making decisions on applications with guidance to ensure that: (i) project investigation timeframes can be more accurately determined; (ii) feasibility studies could accurately determine biodiversity related flaws; and (iii) the terms of reference for specialist studies and the summary reports allow for informed and sustainable biodiversity decisions.

3. METHOD OF INVESTIGATION

The following factors were considered during the assessment;

- A desktop assessment was undertaken for the various aquatic systems to be crossed by the powerline;
- Each assessment site was assessed visually to observe possible impacts which could contribute to changes in the aquatic ecology;
- Water quality was measured at each assessment site using hand-held probe for Electrical Conductivity, Temperature, pH and Dissolved Oxygen (DO). The water quality guideline for aquatic ecosystems (DWAF, 1996) states that DO concentrations should range between 80% and 120% of saturation. According to DWA (2011), the following limits are recommended for pH: 6.5 – 8.0 (ideal); 8.0 – 8.4 (acceptable); <6.5 & > 8.4 (unacceptable). In terms of Electrical conductivity, the following limits are recommended 0 – 30 mS/m (ideal); 30 – 50 mS/m (acceptable); 50 – 85 (tolerable); and >85 mS/m (unacceptable);
- The (DWS) Resource Quality Information Services (RQIS) PES/EIS database was used to provide information of historical data of expected taxa on site. The SASS5 (South African Scoring System version 5) by Dickens & Graham (2002) was used at each assessment site where sufficient water was present to integrity of the aquatic macro-invertebrate community. Further investigations were done using the MIRAI (Macro-Invertebrate Response Assessment Index) Ecostatus tool by Thirion (2007);

MIRAI Rating Approach: The first step in determining the Present Ecological State (PES) of the invertebrates is to complete the data sheet provided in the manual. This includes the abundance and frequency of occurrence (if possible) of the different invertebrate taxa under natural (reference) conditions, as well as the abundance and frequency of occurrence (if possible) of the invertebrate taxa present. For this index an increase in abundance and/or frequency of occurrence, as well as a decrease in abundance and/or frequency of occurrence, is seen as an impact or change compared to natural. The six-point rating system works as follows - 0 = No change from reference; 1 = Small change from reference; 2 = Moderate change from reference; 3 = Large change from reference; 4 = Serious change from reference; 5 = Extreme change from reference.

In addition to the rating of the different metrics, each metric (and metric group) is also ranked and weighted according to its importance in determining the EC of the invertebrate assemblage. Basically each metric is ranked in terms of which metric (if it changed from worst to best) would best indicate good integrity in terms of the metric group. In other words, which metric is the most important in determining the present state of the invertebrates? The ranking procedure is only used to guide the weighting and is not used in any calculation. The metric ranked 1 (most important) is weighted 100%. The other metrics are then ranked as a percentage relative to the most important metric. It is important to remember that all metrics with the same rank must have the same weight, and that a lower ranked metric - 3, say - must have a lower percentage weight than a higher ranked metric - 2, for instance.

- The IHAS (Invertebrate Habitat Assessment System) method was used to determine habitat suitability for macro-invertebrates and was applied according to the protocol of McMillan (1998). The ultimate aim of the IHAS is to summarise and numerically reflect the quantity, quality and diversity of biotopes available for habitation by macroinvertebrates at a sampling site (Ollis *et al*., 2005).

The main aim of a habitat assessment is to evaluate the template on which the invertebrates exist. An organism can only occur at a site if suitable habitat exists, and it is therefore essential to assess not only the habitat quality and quantity but also the diversity of available biotopes. IHAS is a measure of the SASS biotopes sampled. It has, however; become clear that IHAS requires validation and testing, although the basic data remains of value. As an interim measure it was decided to continue using a modified IHAS where certain parameters (Stream Characteristics) including the scoring system have been omitted (Dallas, 2005). This modified version of IHAS enables one to record details about the biotopes sampled, thus assisting in the interpretation of the invertebrate community.

To facilitate the evaluation of the impact of habitat changes on the invertebrate community, five different habitat types have been defined:

- Bedrock: Due to the small size of invertebrates, it was decided to include boulders with bedrock in the same biotope. Bedrock and boulders include all hard surfaces larger than 256 mm. It includes bedrock / boulders that are in current as well as those out-of-current.
- Cobbles: The cobbles biotope also includes pebbles. As such the cobbles biotope includes all hard surfaces within the 16-256 mm size range. As in the case of the bedrock both in-current and out-of-current cobbles are considered.
- Vegetation: The vegetation biotope includes all vegetation that can provide habitat for invertebrates. As such it includes both fringing and aquatic vegetation that might be either in-current or out-of-current and
- Gravel, Sand and Mud: This biotope is a combination of the smaller grain types.

4. DESKTOP ASSESSMENT FINDINGS

The aquatic systems associated with the powerline fall within the North-eastern uplands and Lowveld aquatic ecoregions and within the W21H, W21K, W12D and W12G quaternary catchments. The tables below outlines the main attributes of the North-eastern Uplands Ecoregion (Kleynhans *et al*., 2005).

Table 2: Main attributes of the North-eastern Uplands Ecoregion.

Main Attributes	North-eastern Uplands
Terrain Morphology	Lowlands; Hills and Mountains; Moderate and High Relief
Vegetation types	Valley Thicket; Natal Central Bushveld;
Altitude (m a.m.s.l)	0-100 (limited), 100-1500
Mean Annual Precipitation	600 to 1000
Coefficient of Variation	<20 to 30
Rainfall concentration index	15 to 65
Rainfall seasonality	Early to late summer
Mean annual temp. (°C)	14 to >22
Mean daily max. temp. (°C): February	20 to 30
Mean daily max. temp. (°C): July	16 to >24
Mean daily min. temp. (°C): February	12 to >20
Mean daily min temp. (°C): July	0 to >10
Median annual simulated runoff (mm)	40 to 250; >250 (limited)

Table 3: Main attributes of the Lowveld Ecoregion.

Main Attributes	Lowveld
Terrain Morphology	Plains; Moderate Relief
Vegetation types	Mopane Bushveld; Mixed Lowveld Bushveld
Altitude (m a.m.s.l)	0-700; 700-1300 limited
Mean Annual Precipitation	200 to 1000
Coefficient of Variation	<20 to 35
Rainfall concentration index	30 to >65
Rainfall seasonality	Early to late summer
Mean annual temp. (°C)	16 to >22
Mean daily max. temp. (°C): February	24 to 32
Mean daily max. temp. (°C): July	18 to >24
Mean daily min. temp. (°C): February	14 to >20
Mean daily min temp. (°C): July	4 to >10
Median annual simulated runoff (mm)	10 to >250

The summary of the Ecological Importance and Sensitivity Class (EIS), Default Ecological Management Classes (DEMC), Present Ecological Status Categories (PESC) and Best Attainable Ecological Management Class (BEST AEMC) for each quaternary catchment is indicated below (Kleynhans et al., 2000).

- **A - W21H**

Rivers - White Umfolozi Rooirant to Ntuzuma

EISC – Moderate

DEMC: Moderate Risk Allowed

PESC: B: Largely Natural

BEST AEMC: A: Unmodified, Natural

- **B - W21K**

Rivers - White Umfolozi Vulcan to Umfolozi GR border

EISC – Moderate

DEMC: Moderate Risk Allowed

PESC: B: Largely Natural

BEST AEMC: A: Unmodified, Natural

- **C – W12D**

Rivers - Mhlatuze Goedetrouw to w of Bashibisi

EISC – Moderate

DEMC: Moderate Risk Allowed

PESC: C: Moderately Modified

BEST AEMC: C: Moderately Modified

- **D – W12G**

Rivers - Nseleni, source to Makhaba

EISC – Moderate

DEMC: Moderate Risk Allowed

PESC: A: Unmodified, Natural

BEST AEMC: A: Unmodified, Natural

5. AQUATIC ASSESSMENT FINDINGS

Reference conditions reflect the best conditions that can be expected in rivers and streams within a specific area and also reflect natural variation over time. These reference conditions are used as a benchmark against which field data can be compared. Modelled reference conditions for the North Eastern Uplands - Upper and the Lowveld ecoregions were obtained from Dallas (2007). Due to limited data available to generate biological bands for this ecoregion, classification results should be interpreted with caution.

The perceived reference state for the site UMP03 was determined as a SASS5 score of 188 and an ASPT of 7.2 based on general conditions of streams in the Lowveld aquatic ecoregion and based on local habitat and flow conditions (Figure 5).

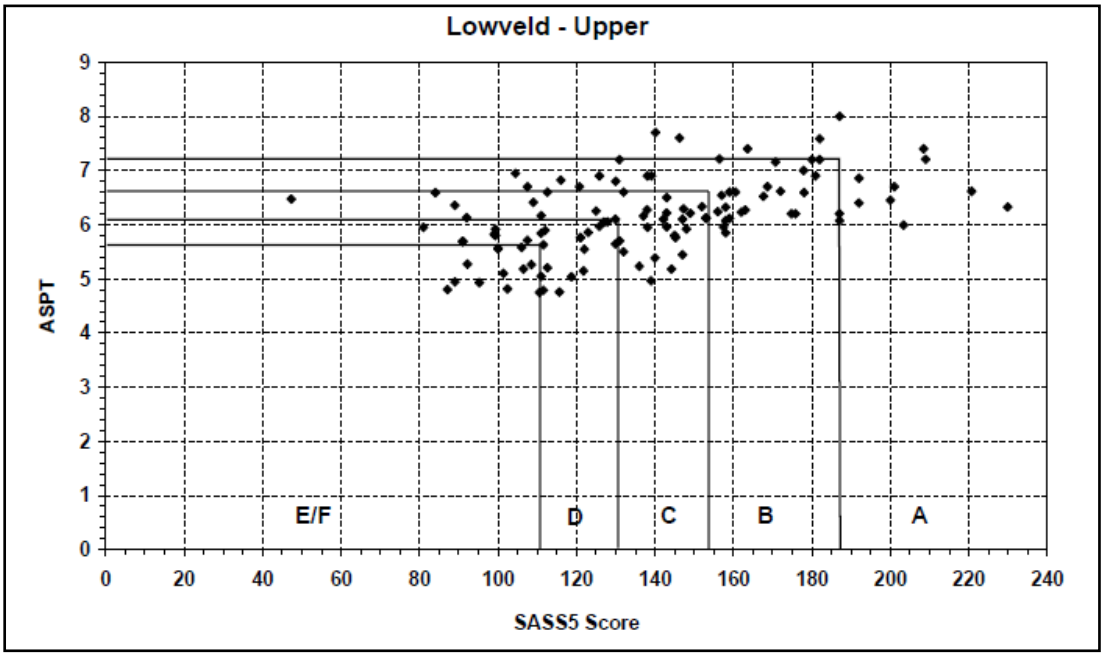

Figure 5: SASS5 Classification using biological bands calculated form percentiles for the Lowveld ecoregion, Dallas, 2007

Reference state for the sites UMP01, UMP02, UMP04, UMP5 and UMP06 streams was determined as a SASS5 score of 214 and an ASPT of 7.2 based on general conditions of streams in the North-eastern uplands aquatic ecoregion (Figure 6).

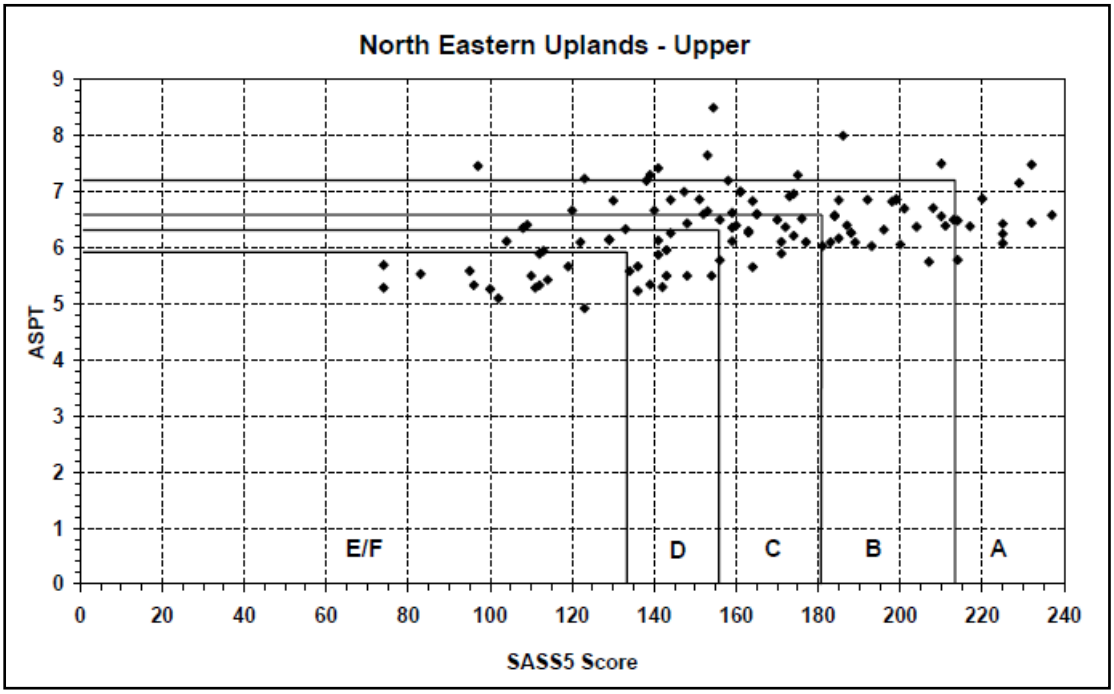

Figure 6: SASS5 Classification using biological bands calculated form percentiles for the North eastern uplands ecoregion, Dallas, 2007

A - UMP01

Table 4: UMP01 site - White Umfolozi River on the North-Eastern Uplands Eastern Ecoregion.

Water Quality			
Ecoregion	North-Eastern Uplands Ecoregion	**Quaternary Catchment**	W21H
pH	8.56	**Temperature (˚C)**	29.4
DO (%) / mg/L	72.71% / 5.3 mg/L	**Electrical Conductivity (mS/m)**	33
Water Quality Discussion	The water quality conditions at the UMP01 assessment site located on the White Umfolozi River were considered ideal and without major impacts during the current assessment in March 2023. Sufficient dissolved oxygen was measured (72.71%), although this was below the 80 – 120% recommended saturation limit, it is not considered a significant limitation for establishment of sensitive benthic taxa (DWAF, 1996). The electrical conductivity was also considered acceptable (33 mS/m) and not indicate of significant impacts on the system. The turbidity of the White Umfolozi was considered an observable impact likely due to extensive catchment and large volumes with high capacity to carry sediment resulting in reduced water clarity.		
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	14	**ASPT Score**	4.71
SASS5 Score	66	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	44 (Poor)	**MIRAI Score**	59.9 (C/D)
Biological Response (Benthic Macro-invertebrates)	The ecological integrity of the system can be considered modified when compared to the reference scores of the North eastern uplands aquatic ecoregion (SASS5 score - 214 and ASPT of 7.2). The ecological integrity of the system has been impacted by significant turbidity due to upstream activities, abstraction of water for irrigation and as well increase in impaired water quality inputs from various upstream tributaries of the system. The ASPT score, shows the absence of relatively sensitive taxa currently in the area. And at the time of the assessment no significantly sensitive taxa was identified and only moderately sensitive taxa were identified which included Gomphidae and Naucoridae. The habitat suitability score was considered poor due to limitations in available habitat such as stones in current and instream vegetation due to significantly high flows at the time of the assessment.		

B - UMP02

Table 5: UMP02 site - Mhlahlane River, tributary of White Umfolozi River on the North Eastern Uplands Eastern Ecoregion.

<table>
<tr><td colspan="4">   </td></tr>
<tr><th colspan="4">Water Quality</th></tr>
<tr><td>Ecoregion</td><td>North-Eastern Uplands Ecoregion</td><td>Quaternary Catchment</td><td>W21H</td></tr>
<tr><td>pH</td><td>8.01</td><td>Temperature (˚C)</td><td>Moderate</td></tr>
<tr><td>DO (%) / mg/L</td><td>64.4 % / 4.33 mg/L</td><td>Electrical Conductivity (mS/m)</td><td>35.1 mS/m</td></tr>
<tr><td>Water Quality Discussion</td><td colspan="3">The Mhlahlane River is a tributary of the White Umfolozi River and at the time flows were relatively low at the site. The water quality conditions were considered ideal and without major impacts during the current assessment in March 2023. The dissolved oxygen was below recommended saturation limit and has the potential to limit establishment of sensitive benthic macroinvertebrates. The electrical conductivity (35.1%) was also considered acceptable and does not indicate presence of upstream activities which have the potential to introduce salts into the system (DWAF, 1996).</td></tr>
<tr><th colspan="4">Biological Response (Benthic Macro-invertebrates)</th></tr>
<tr><td>Number of taxa</td><td>10</td><td>ASPT Score</td><td>6.4</td></tr>
<tr><td>SASS5 Score</td><td>64</td><td>SASS5 classification (Dallas, 2007)</td><td>E/F</td></tr>
<tr><td>IHAS Score</td><td>55 (Fair/Adequate)</td><td>SASS5 Score</td><td>58.2 (C/D)</td></tr>
<tr><td>Biological Response (Benthic Macro-invertebrates)</td><td colspan="3">The ecological integrity of the system can be considered modified when compared to the reference scores of the North-eastern uplands aquatic ecoregion (SASS5 score - 214 and ASPT of 7.2). The absence of significant flows at the time of the assessment is considered a contributing factor to lower than expected benthic macroinvertebrate scores at the assessment site. When compared to the reference scores (Dallas 2007), the ASPT score shows the absence of relatively sensitive taxa currently in the area. During the assessment, no significantly sensitive taxa were identified, and only moderately sensitive taxa were identified which included Aeshnidae and Gomphidae (contributed to improved ASPT score). The habitat suitability score was considered fair/adequate due to available habitat such as stones in current although limitations in available aquatic vegetation were also noted.</td></tr>
</table>

C - UMP03

Table 6: UMP03 site - White Umfolozi River

<table>
<tr><td colspan="4">   </td></tr>
<tr><td colspan="4">Ecoregion</td></tr>
<tr><td>Ecoregion</td><td>Lowveld Ecoregion</td><td>Quaternary Catchment</td><td>W21K</td></tr>
<tr><td>pH</td><td>8.50</td><td>Temperature (˚C)</td><td>29.0</td></tr>
<tr><td>DO (%) / mg/L</td><td>75.7% / 5.52 mg/L</td><td>Electrical Conductivity (mS/m)</td><td>30 mS/m</td></tr>
<tr><td>Water Quality Discussion</td><td colspan="3">The water quality conditions at the UMP03 assessment site located on the White Umfolozi River were considered ideal and without major impacts during the current assessment in March 2023. Sufficient dissolved oxygen was measured, although this was below the 80 – 120% recommended saturation limit, it is not considered a significant limitation for establishment of sensitive benthic taxa (DWAF, 1996). The electrical conductivity was also considered acceptable and not indicate of significant impacts on the system. The turbidity of the White Umfolozi was considered an observable impact likely due to extensive catchment and large volumes with high capacity to carry sediment resulting in reduced water clarity. Observed impacts include removal of sand on banks and water abstraction.</td></tr>
<tr><td colspan="4">Biological Response (Benthic Macro-invertebrates)</td></tr>
<tr><td>Number of taxa</td><td>13</td><td>ASPT Score</td><td>6.08</td></tr>
<tr><td>SASS5 Score</td><td>73</td><td>SASS5 classification (Dallas, 2007)</td><td>E/F</td></tr>
<tr><td>IHAS Score</td><td>44 (Poor)</td><td>MIRAI Score</td><td>58.6 (C/D)</td></tr>
<tr><td>Biological Response (Benthic Macro-invertebrates)</td><td colspan="3">The ecological integrity of the system can be considered modified when compared to the reference scores of the Lowveld aquatic ecoregion (SASS5 score - 188 and ASPT of 7.2). The ecological integrity of the system has been impacted by significant turbidity due to upstream activities, abstraction of water for irrigation and as well increase in impaired water quality inputs from various upstream tributaries of the system. The ASPT score, shows the absence of relatively sensitive taxa currently in the area and at the time of the assessment no significantly sensitive taxa was identified and only moderately sensitive taxa were identified which included Gomphidae and Naucoridae. The habitat suitability score was considered poor due to limitations in available habitat such as stones in current/out of current and instream vegetation due to significantly high flows at the time of the assessment.</td></tr>
</table>

D - UMP04

Table 7: UMP 04 - Munywana River, tributary of White Umfolozi River on the North-Eastern Uplands Eastern Ecoregion.

<table>
<tr><td colspan="4">   </td></tr>
<tr><th colspan="4">Water Quality</th></tr>
<tr><td>Ecoregion</td><td>North-Eastern Uplands Ecoregion</td><td>Quaternary Catchment</td><td>W21L</td></tr>
<tr><td>pH</td><td>8.75</td><td>Temperature (˚C)</td><td>34.3</td></tr>
<tr><td>DO (%) / mg/L</td><td>59.6% / 4.1 mg/L</td><td>Electrical Conductivity (mS/m)</td><td>139</td></tr>
<tr><td>Water Quality Discussion</td><td colspan="3">The Munywana River is a tributary of the White Umfolozi River and at the time flows were relatively low at the site. At the time of the assessment, the flows were largely disconnected and ponding upstream of the concrete bridge. High electrical conductivity was measured (139 mS/m), this is possibly due to the stagnant flows resulting in concentration of salts at a single point (DWAF, 1996). The absence of significant flows also contributed to reduced dissolved oxygen (59.6%) measured at the site and these conditions are considered likely to be limitations for the establishment of taxa. In addition, increased turbidity was observed at the site, this is considered an impact since turbidity blocks the sunlight that plants need to produce oxygen for benthic macro-invertebrates and other aquatic life.</td></tr>
<tr><th colspan="4">Biological Response (Benthic Macro-invertebrates)</th></tr>
<tr><td>Number of taxa</td><td>7</td><td>ASPT Score</td><td>3.71</td></tr>
<tr><td>SASS5 Score</td><td>26</td><td>SASS5 classification (Dallas, 2007)</td><td>E/F</td></tr>
<tr><td>IHAS Score</td><td>30 (Poor)</td><td>MIRAI Score</td><td>52.7 (C/D)</td></tr>
<tr><td>Biological Response (Benthic Macro-invertebrates)</td><td colspan="3">Stagnant flows at the site have the potential to result in impacts on aquatic taxa with a high preferred for medium to fast flows. The conditions at the site displayed poor habitat availability and diversity of biotopes and significantly reduced flow rates, which influenced the macro-invertebrate community assemblage. At the time of the assessment no significantly sensitive taxa was identified and only taxa considered to be tolerant of changes in water quality such as Chironomidae, Simuliidae and Oligochaeta were dominant at the assessment point. The habitat suitability score was considered poor due to limitations in available habitat such as stones in current and instream vegetation due to significantly high flows at the time of the assessment.</td></tr>
</table>

E - UMP05

Table 8: UMP05 - Nseleni River, a tributary of the Mhlathuze River on the North-Eastern Uplands Eastern Ecoregion.

<table>
<tr><td colspan="2">  </td><td colspan="2">  </td></tr>
<tr><th colspan="4">Water Quality</th></tr>
<tr><td>Ecoregion</td><td>North-Eastern Uplands Ecoregion</td><td>Quaternary Catchment</td><td>W21G</td></tr>
<tr><td>pH</td><td>9.3</td><td>Temperature (˚C)</td><td>28.1</td></tr>
<tr><td>DO (%) / mg/L</td><td>34.1% / 2.95 mg/L</td><td>Electrical Conductivity (mS/m)</td><td>78 mS/m</td></tr>
<tr><td>Water Quality Discussion</td><td colspan="3">The Nseleni River is located in the vicinity of communities and as a result is subject to various impacts from domestic activities. The Nseleni River is a tributary of the White Mhlathuze River River and at the time flows were relatively low at the site. At the time of the assessment, the flow were considered moderate and significant litter/waste was observed at the site. In addition, severe smell of sewage and animal waste was present at the site, and this is likely to result in impacts on water quality. The electrical conductivity was elevated at the time (78 mS/m) and the dissolved oxygen considered low (34.1%) resulting in limitations on the system for establishment of sensitive benthic macroinvertebrates. Disposal of dead animals into the river increases microbial pathogens in water which have a significant impact on aquatic life.</td></tr>
<tr><th colspan="4">Biological Response (Benthic Macro-invertebrates)</th></tr>
<tr><td>Number of taxa</td><td>9</td><td>ASPT Score</td><td>4.22</td></tr>
<tr><td>SASS5 Score</td><td>38</td><td>SASS5 classification (Dallas, 2007)</td><td>E/F</td></tr>
<tr><td>IHAS Score</td><td>51 (Poor)</td><td>MIRAI Score</td><td>52.0 (D)</td></tr>
<tr><td>Biological Response (Benthic Macro-invertebrates)</td><td colspan="3">Impacts at the site including disposal of solid waste have impacted on the habitat suitability given the observed smothering of habitat by the disposed waste from upstream domestic activities. These impacts in conjunction with the impaired water quality (elevated electrical conductivity and low dissolved oxygen) have resulted in cumulative impacts on the system which have greatly reduced the availability of the site to the establishment of sensitive taxa. The site was largely dominated by species known to have low sensitivity and are considered tolerant of impaired water quality such as Chironomidae, Simuliidae and Oligochaeta. Aeshnidae were identified but in very low abundance.</td></tr>
</table>

F - UMP06

Table 9: UMP06 - Ntambanana River, a tributary of the Mhlathuze River on the North Eastern Uplands Eastern Ecoregion.

			
Water Quality			
Ecoregion	North-Eastern Uplands Ecoregion	**Quaternary Catchment**	W21D
pH	9.14	**Temperature (˚C)**	26.0
DO (%) / mg/L	32.1% / 2.33 mg/L	**Electrical Conductivity (mS/m)**	173 mS/m
Water Quality Discussion	The Ntambanana River is a tributary of the Mhlathuze and at the time of the assessment, the flows were largely disconnected and ponding upstream of the concrete bridge. High electrical conductivity was measured (173 mS/m), this is possibly due to the stagnant flows resulting in concentration of salts at a single point. The absence of significant flows also contributed to reduced dissolved oxygen (32.1%) measured at the site and these conditions are considered likely to be limitations for the establishment of taxa. In addition, increased turbidity was observed at the site, this is considered an impact since turbidity blocks the sunlight that plants need to produce oxygen for benthic macro-invertebrates and other aquatic life.		
Biological Response (Benthic Macro-invertebrates)			
Number of taxa	7	**ASPT Score**	3.43
SASS5 Score	24	**SASS5 classification (Dallas, 2007)**	E/F
IHAS Score	30 (Poor)	**MIRAI Score**	40 (D/E)
Biological Response (Benthic Macro-invertebrates)	Stagnant flows at the site have the potential to result in impacts on aquatic taxa with a high preferred for medium to fast flows. The conditions at the site displayed poor habitat availability and diversity of biotopes and significantly reduced flow rates, which influenced the macro-invertebrate community assemblage. At the time of the assessment no significantly sensitive taxa was identified and only taxa considered to be tolerant of changes in water quality such as Chironomidae, Simuliidae and Oligochaeta were dominant at the assessment point. The habitat suitability score was considered poor due to limitations in available habitat such as stones in current and instream vegetation due to significantly high flows at the time of the assessment.		

SUMMARY OF AQUATIC ASSESSMENT FINDINGS

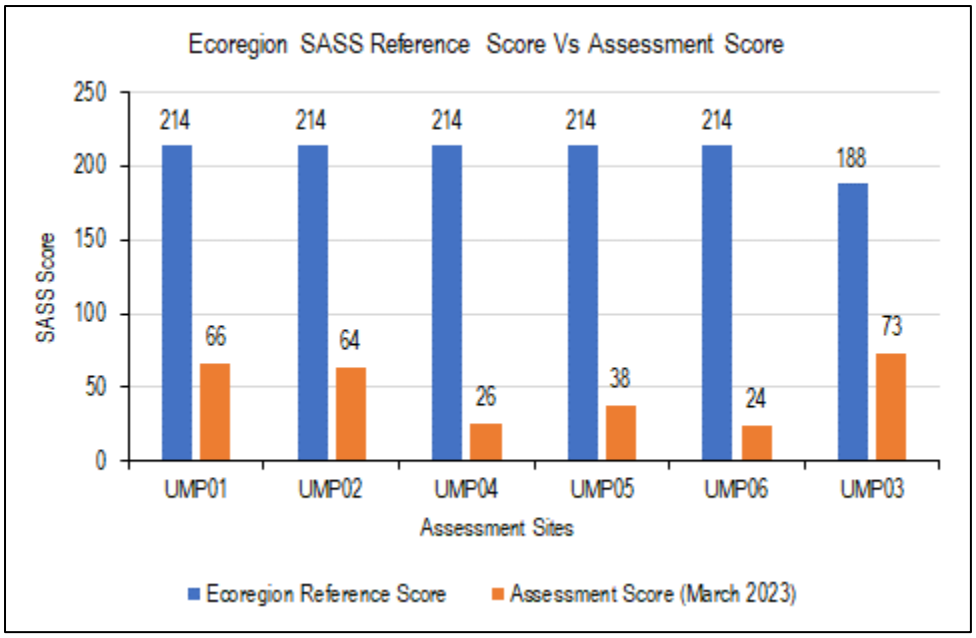

Figure 7: SASS ecoregion reference scores vs assessment scores (March 2023).

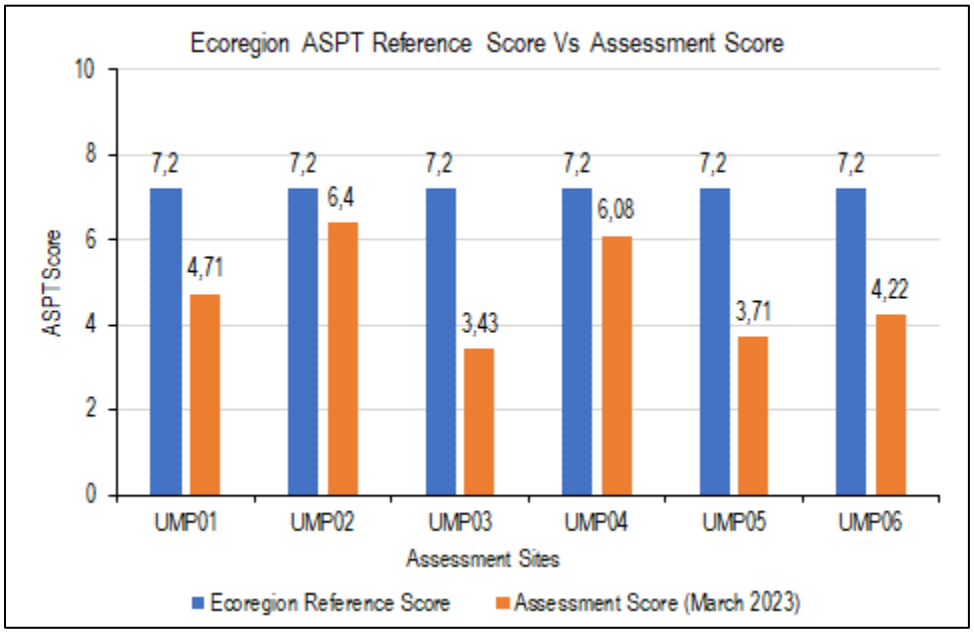

Figure 8: ASPT ecoregion reference scores vs assessment scores (March 2023).

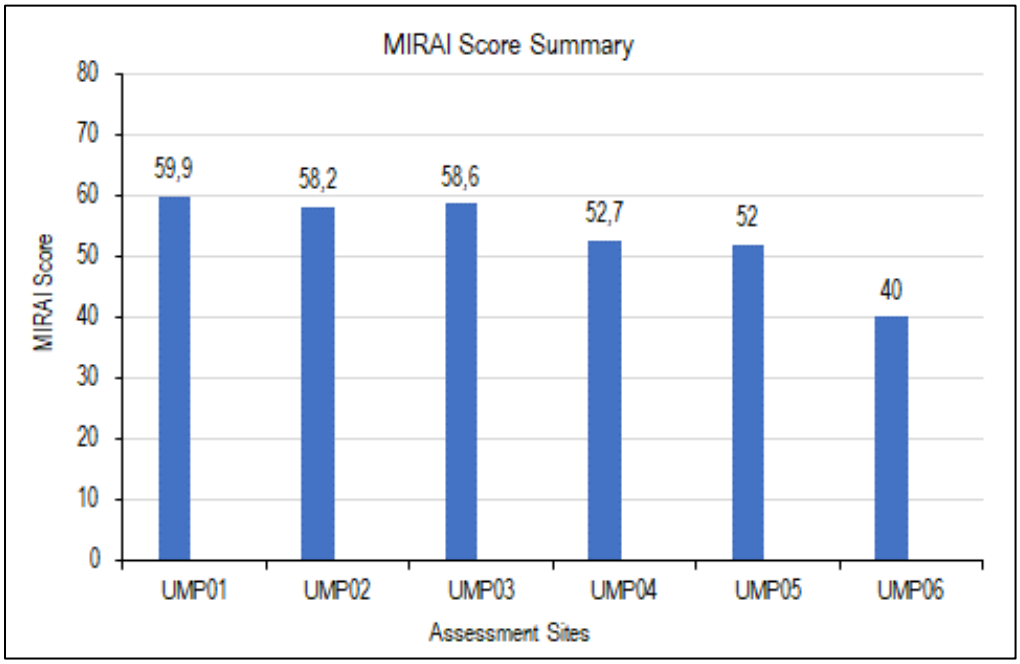

Figure 9: MIRAI scores for each assessment site (March 2023).

6. AQUATIC BIODIVERSITY IMPACT ASSESSMENT

The potential aquatic biodiversity impacts of the proposed construction and operation of the powerline and associated infrastructure are medium without suitable mitigation measures and low with the implementation of suitable mitigation measures provided in terms of any potential impact to aquatic habitat, biota, water quality, or flow for all phases of the proposed development. Impacts significance is likely to be slightly higher during the construction phase due to breaking ground activities which may result in sedimentation of the system, however this will be temporary and will be significantly reduced during the operational phase where only maintenance of the infrastructure will be necessary.

A – Construction Phase

Table 10: Potential impacts and mitigations during construction phase (ground breaking activities).

Activity and potential impact:				
Ground-breaking activities for installation of pylons/support infrastructure: • Construction for support towers/pylons will result in disturbance of the surface area and clearing of vegetation cover for clearing and preparation of the site at the various footprint areas; • This has the potential to result in runoff causing soil and water losses due to levelling and compacting soil of footprint areas including the site camp; • Clearing of vegetation has the potential to result in the spread of alien and invasive species within the disturbed footprint along the route of the powerline; • Potential disturbance of the aquatic habitat and water quality impacts due to runoff resulting in sedimentation and increased turbidity of the riverine system; and • Decrease water quality due to sedimentation and decrease water clarity which has the ability to affect the depth to which aquatic plants can grow, dissolved oxygen content, and water temperature.				
Impact Significance without Mitigations				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Medium*	*Definite*	*High*	*Medium*
Impact Significance with Mitigations				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Short term*	*Unlikely*	*High*	*Low*
Essential mitigation measures:				
• Direct disturbance of the aquatic systems should be avoided by ensuring that pylons and support towers are spread adequately at crossing points and avoid any direct impact; • Where construction is to be done in the vicinity of the riverine systems, restrict construction to the drier months if possible to avoid sedimentation of the river system; • No support structures should be constructed within the wetland areas. If at all possible all support structures should be developed above the 1: 50 year flood line and above the 1:10 year flood line as a minimum; • Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers; • Development of new access roads should be minimised as must as possible and the existing road infrastructure must be utilised as far as possible in order to minimise overall disturbance; • On-site stormwater management measures and sediment control devises must be established in order to limit the sediment laden runoff into the aquatic systems; • Stormwater within construction sites must be handled properly to ensure that sediment is trapped and that flow velocities are reduced in order to minimise erosion impacts.				

Table 11: Potential impacts and mitigations during construction phase (concrete foundations).

Activity and potential impact:				
Construction of concrete foundations and installation of support towers/pylons including substations: • Concrete is to be used for the installation of the foundations for support towers including pylons within the route of the powerline; • There is the potential for some water quality impacts associated with the batching of concrete, from hydrocarbon spills or associated with the other construction activities on the site.				
Impact Significance without Mitigation				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Medium term*	*Definite*	*High*	*Medium*
Impact Significance with Mitigation				
Extent	**Duration**	**Probability**	**Reversibility**	**Impact Significance**
On site	*Short term*	*Unlikely*	*High*	*Low*
Essential mitigation measures:				
• A construction camp with a temporary laydown area and the concrete batching plant would likely need to be placed within the site for the construction works; • On-site stormwater management measures and sediment control devises must be established in order to limit the sediment laden runoff into the aquatic systems; • Where construction is to be done in the vicinity of the riverine systems, restrict construction to the drier months if possible, to avoid sedimentation of the river system; • Prevention of hydrocarbon spills from machinery and vehicles by the use of drip-trays and permanent bunded areas for overnight parking; • Domestic effluent from the construction camps should be stored temporarily in a safe manner (unlikely to leak or be breached), and should be removed by approved contractors weekly; • Appropriate engineering designs must be implemented to reduce erosion and minimise sedimentation risks, including geotextiles to trap ejected sediment (or another suitable design).				

B – Operational Phase

Operation and maintenance of the infrastructure (support towers/pylons including substations).

Table 12: Potential impacts during operational phase (maintenance of infrastructure).

Activity and potential impact:				
Operation of the infrastructure and regular scheduled maintenance: • During the operation of the powerline, the infrastructure will be largely unattended and require low maintenance; • Access roads created for maintenance purposes will likely result in some generation of sediment and increased runoff due to absence of vegetation and limited infiltration rates; • This has the potential to result in sedimentation and increased turbidity of the riverine systems although it is not considered to be significant; and • Potential risk of alien and invasive species spread during the maintenance activities.				
Impact Significance without Mitigation				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Short term*	*Definite*	*High*	*Low*
Impact Significance with Mitigation				
Extent	Duration	Probability	Reversibility	Impact Significance
On site	*Short term*	*Unlikely*	*High*	*Low*
Essential mitigation measures:				
• Management of alien and invasive species within the disturbed areas should be conducted on an ongoing basis to minimise spread and loss of indigenous vegetation; • Re-vegetation of areas where vegetation was cleared must be conducted in order to ensure that runoff velocity is slowed down, thereby minimising risk of soil erosion;				

- Should any erosion features develop and be observed during maintenance activities, they should be stabilised as soon as possible;
- Tower footprints and rehabilitated construction areas must be inspected every six months for erosion and measures must be implemented to limit erosion;
- During maintenance activities, vehicles must only be driven on existing, maintained access roads and not drive indiscriminately through natural areas; and
- In any areas where disturbance of banks or vegetation occurs, bank and bed profile should be re-instated in such a way as reinstate predevelopment habitat conditions.

7. CONCLUSION AND RECOMMENDATIONS

An aquatic ecological assessment was conducted for the proposed 765 kV Umfolozi – Mbewu powerline (98 km) between Empangeni and Ulundi. Based on the aquatic ecological assessment it is the opinion of the specialist that the proposed powerline construction project be considered. It should also be ensured that recommendations as outlined in the Section 5 of the report are adhered to in order to minimise any potential impacts on the riverine systems to be crossed by the infrastructure. Some essential mitigation measures and recommendations for the project are outlined below:

- No support structures should be constructed within the riverine systems areas. If at all possible, all support structures should be developed above the 1: 50 year flood line and above the 1:10 year flood line as a minimum;
- Limit the footprint area of the construction activities to what is absolutely essential in order to minimise environmental damage, especially where towers will encroach upon the riverine systems boundary. Construction vehicles must use existing roads where possible;
- Tower footprints and rehabilitated construction areas must be inspected every six months for erosion and measures must be implemented to curb erosion;
- Management of alien and invasive species within the disturbed areas should be conducted on an ongoing basis to minimise spread and loss of indigenous vegetation.

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APPENDIX 1: METHODOLOGY SECTION

A) On-Site Observation Assessment

Representative photographs at each assessment site were taken. During this time information on site impacts from anthropogenic activities as well as natural constraints were all noted and discussed.

B) On-Site Water Quality

On-site testing of biota specific water quality variables took place. Parameters measured include pH, electrical conductivity, dissolved oxygen concentration and temperature.

C) Invertebrate Habitat Integrity Assessment (IHAS)

The ultimate aim of the IHAS is to summarise and numerically reflect the quantity, quality and diversity of biotopes available for habitation by macroinvertebrates at a sampling site (McMillan 1998, Dallas 2000). The scoring system is based on a total of 100 points, split into two sections: Sampling Habitat (55 points) and Stream Condition/Characteristics (45 points). The Sampling Habitat section is further divided into three sub-sections: Stones-in- Current (20 points), Vegetation (15 points), and Other Habitat (20 points), including stones-out-of-current, gravel, sand and mud. The Stream Condition section provides an evaluation of a site in terms of its physical characteristics and the degree of disturbance present, including estimates of aspects such as stream width, depth and velocity. The IHAS scores and description of conditions are as follows:

A)	>75	-	Excellent;
B)	65 – 74	-	Good;
C)	55 – 64	-	Adequate / Fair; and
D)	<55	-	Poor.

D) The South African Scoring System (SASS) Version 5 Rapid Bioassessment

The SASS5 method is a refinement of the highly successful SASS (South African Scoring System) method developed by Chutter (1994), which forms the backbone of this programme. SASS data is meaningful only when assessed together with the various factors that may influence the scores. Most important of these are measures of habitat quantity, quality and diversity. A method of habitat assessment developed by McMillan (1998) is available, although, at the time of writing, this method is still under development. Other methods include those by Roux *et al*. (1994) and Plafkin et al. (1989) but these are less suited to invertebrate assessments than to fish. The principle to be aware of is that, where habitat diversity is poor, there will be less biotic diversity and consequently a lower SASS Score. ASPT will be less affected (Dallas 1997, Chutter 1998), because the few organisms present may have the appropriate sensitivity. The ASPT score may be depressed where, for example, a sand bed river in pristine condition may produce a low ASPT, as it will be occupied by hardy, adaptable taxa. Chutter (1998) also points out that ASPT is a more reliable measure of the health of good quality rivers [as opposed to poor quality rivers] than SASS Score is.

APPENDIX 2: IMPACT ASSESSMENT METHODOLOGY

Extent of impact	Explanation of extent
Site	- Impacts limited to construction site and direct surrounding area.
Local	- Impacts affecting environmental elements within the local area/district.
Regional	- Impacts affecting environmental elements within the province.
National	- Impacts affecting environmental elements on a national level.

Duration of impact	Explanation of duration
Short term	- 0 - 5 years. The impact is reversible in less than 5 years.
Medium term	- 5 - 15 years. The impact is reversible in less than 15 years.
Long term	- >15 years, but where the impacts will cease if the project is decommissioned.
Permanent	- The impact will continue indefinitely and is irreversible.

Probability of impact	Explanation of Probability
Unlikely	- The chance of the impact occurring is extremely low;
Possible	- The impact may occur;
Probable	- The impact will very likely occur; and
Definite	- Impact will certainly occur.

Reversibility of impact	Explanation of Reversibility Ratings
Low	- The affected environment will not be able to recover from the impact - permanently modified.
Medium	- The affected environment will only recover from the impact with significant intervention.
High	- The affected environmental will be able to recover from the impact.

Significance of impact	Explanation of Significance
None	- There is no impact at all;
Low	- Impact is negligible or is of a low order and is likely to have little real effect;
Moderate	- Impact is real but not substantial;
High	- Impact is substantial;
Very high	- Impact is very high and can therefore influence the viability of the project.

APPENDIX 3: SASS5 SCORE SHEETS

DATE: 17 March 2023	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**
GRID REFERENCE:	**PORIFERA**	5					**HEMIPTERA:**						**DIPTERA:**					
S: -28.247940°	**COELENTERATA**	1					Belostomatidae*	3					Athericidae	10				
E: 31.305956°	**TURBELLARIA**	3					Corixidae*	3		**A**	**A**	**B**	Blepharoceridae	15				
Site Code: UMP 01	**ANNELIDA:**						Gerridae*	5					Ceratopogonidae	5				
River: WHITE UMFOLOZI TRIBUTARY	Oligochaeta	1					Hydrometridae*	6					Chironomidae	2			**A**	**A**
Site Description: Upstream of Powerline route	Leeches	3					Naucoridae*	7		**A**		**A**	Culicidae*	1		**A**	**A**	**B**
Weather Conditions: Sunny	**CRUSTACEA:**						Nepidae*	3					Dixidae*	10				
Temperature: 29,4	Amphipoda	13					Notonectidae*	3					Empididae	6				
Ph: 8,56	Potamonautidae*	3		**1**		**1**	Pleidae*	4					Ephydridae	3				
DO: 72,71% (5,3 mg/L)	Atyidae	8					Veliidae/M…veliidae*	5		**A**		**A**	Muscidae	1				
Conductivity: 33 mS/m	Palaemonidae	10					**MEGALOPTERA:**						Psychodidae	1				
BIOTOPES SAMPLED:	**HYDRACARINA**	8					Cordalidae	8					Simuliidae	5		**A**		**A**
SIC: TIME: minutes	**PLECOPTERA:**						Sialidae	6					Syrphidae*	1				
SOOC:	Notonemouridae	14					**TRICHOPTERA**						Tabanidae	5				
BEDROCK:	Perlidae	12					Dipseudopsidae	10					Tipulidae	5				
AQUATIC VEG: DOM SP:	**EPHEMEROPTERA**						Ecnomidae	8					**GASTROPODA**					
M VEG IC: DOM SP:	Baetidae 1 sp	4		**A**	**B**		Hydropsychidae 1 sp	4					Ancylidae	6				
M VEG OOC: DOM SP:	Baetidae 2 sp	6				**B**	Hydropsychidae 2 sp	6					Bulininae*	3				
GRAVEL…….	Baetidae >2 sp	12					Hydropsychidae >2 sp	12					Hydrobiidae*	3				
SAND…….	Caenidae	6		**A**		**A**	Philopotamidae	10					Lymnaeidae*	3				
MUD…….	Ephemeridae	15					Polycentropodidae	12					Physidae*	3				
HAND PICKING/VISUAL OBS…….	Heptageniidae	13					Psychomyiidae/Xiphocen.	8					Planorbidae*	3				
FLOW: Moderate to High **Flow**	Leptophlebiidae	9					**CASED CADDIS:**						Thiaridae*	3				
TURBIDITY: **Moderate**	Oligoneuridae	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
RIPARIAN LAND USE: Other	Polymitarcyidae	10					Calamoceratidae ST	11					**PELECYPODA**					
	Prosopistomatidae	15					Glossosomatidae SWC	11					Corbiculidae	5				
	Teloganodidae SWC	12					Hydroptilidae	6					Sphaeriidae	3				
	Tricorythidae	9					Hydrosalpingidae SWC	15					Unionidae	6				
	ODONATA:						Lepidostomatidae	10					**SASS SCORE:**		0	54	22	66
DISTURBANCE IN RIVER:	Calopterygidae ST,T	10					Leptoceridae	6					**NO OF TAXA:**		0	12	6	14
Cattle drinking	Chlorocyphidae	10					Petrothrincidae SWC	11					**ASPT:**		#DIV/0!	4,50	3,67	4,71
sand winning	Chlorolestidae	8					Pisuliidae	10					**IHAS**:					44%
SIGNS OF POLLUTION:	Coenagrionidae	4		**A**	**A**	**B**	Sericostomatidae SWC	13										
Turbid water	Lestidae	8					**COLEOPTERA:**											
	Platycnemidae	10					Dytiscidae*	5		**1**		**1**						
OTHER OBSERVATIONS:	Protoneuridae	8					Elmidae/Dryopidae*	8										
	Zygoptera juvs.	6					Gyrinidae*	5		**A**		**A**						
	Aeshnidae	8			**A**	**A**	Halipidae*	5										
	Corduliidae	8					Helodidae	12										
	Gomphidae	6		**A**		**A**	Hydraenidae*	8										
	Libellulidae	4					Hydrophilidae*	5										
	LEPIDOPTERA:						Limnichidae	10										
	Pyralidae	12					Psephenidae	10										

DATE: 17 March 2023	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**
GRID REFERENCE:	**PORIFERA**	5					**HEMIPTERA:**						**DIPTERA:**					
S: -28.248000°	**COELENTERATA**	1					Belostomatidae*	3					Athericidae	10				
E: 31.332412°	**TURBELLARIA**	3					Corixidae*	3					Blepharoceridae	15				
Site Code: UMP 02	**ANNELIDA:**						Gerridae*	5			**A**	**A**	Ceratopogonidae	5		**A**		**A**
River: MHLAHLANE - WHITE UMFOLOZI TRIBUT	Oligochaeta	1					Hydrometridae*	6					Chironomidae	2				
Site Description: Downstream of Powerline route	Leeches	3					Naucoridae*	7					Culicidae*	1				
Weather Conditions: Sunny	**CRUSTACEA:**						Nepidae*	3					Dixidae*	10				
Temperature: 30	Amphipoda	13			**A**	**A**	Notonectidae*	3					Empididae	6				
Ph: 8,01	Potamonautidae*	3					Pleidae*	4					Ephydridae	3				
DO: 64,4% (4,33 mg/L)	Atyidae	8					Veliidae/M…veliidae*	5		**A**		**A**	Muscidae	1				
Conductivity: 35,1 mS/m	Palaemonidae	10					**MEGALOPTERA:**						Psychodidae	1				
BIOTOPES SAMPLED:	**HYDRACARINA**	8					Cordalidae	8					Simuliidae	5	**A**		**A**	**B**
SIC: TIME: minutes	**PLECOPTERA:**						Sialidae	6					Syrphidae*	1				
SOOC:	Notonemouridae	14					**TRICHOPTERA**						Tabanidae	5				
BEDROCK:	Perlidae	12					Dipseudopsidae	10					Tipulidae	5				
AQUATIC VEG: DOM SP:	**EPHEMEROPTERA**						Ecnomidae	8					**GASTROPODA**					
M VEG IC: DOM SP:	Baetidae 1 sp	4	**A**	**A**		**A**	Hydropsychidae 1 sp	4		**A**		**A**	Ancylidae	6				
M VEG OOC: DOM SP:	Baetidae 2 sp	6					Hydropsychidae 2 sp	6					Bulininae*	3				
GRAVEL…….	Baetidae >2 sp	12					Hydropsychidae >2 sp	12					Hydrobiidae*	3				
SAND…….	Caenidae	6	**A**			**A**	Philopotamidae	10					Lymnaeidae*	3				
MUD…….	Ephemeridae	15					Polycentropodidae	12					Physidae*	3				
HAND PICKING/VISUAL OBS…….	Heptageniidae	13					Psychomyiidae/Xiphocen.	8					Planorbidae*	3				
FLOW: **Low Flow**	Leptophlebiidae	9					**CASED CADDIS:**						Thiaridae*	3				
TURBIDITY: **Moderate**	Oligoneuridae	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
RIPARIAN LAND USE: Other	Polymitarcyidae	10					Calamoceratidae ST	11					**PELECYPODA**					
	Prosopistomatidae	15					Glossosomatidae SWC	11					Corbiculidae	5				
	Teloganodidae SWC	12					Hydroptilidae	6					Sphaeriidae	3				
	Tricorythidae	9		**A**		**A**	Hydrosalpingidae SWC	15					Unionidae	6				
	ODONATA:						Lepidostomatidae	10					**SASS SCORE:**		23	27	31	64
DISTURBANCE IN RIVER:	Calopterygidae ST,T	10					Leptoceridae	6					**NO OF TAXA:**		4	5	4	10
Cattle drinking	Chlorocyphidae	10					Petrothrincidae SWC	11					**ASPT:**		5,75	5,40	7,75	6,40
sand winning	Chlorolestidae	8					Pisuliidae	10					**IHAS**:					55%
SIGNS OF POLLUTION:	Coenagrionidae	4					Sericostomatidae SWC	13										
Turbid water	Lestidae	8					**COLEOPTERA:**											
	Platycnemidae	10					Dytiscidae*	5										
OTHER OBSERVATIONS:	Protoneuridae	8					Elmidae/Dryopidae*	8										
	Zygoptera juvs.	6					Gyrinidae*	5										
	Aeshnidae	8	**A**		**A**	**A**	Halipidae*	5										
	Corduliidae	8					Helodidae	12										
	Gomphidae	6					Hydraenidae*	8										
	Libellulidae	4					Hydrophilidae*	5										
	LEPIDOPTERA:						Limnichidae	10										
	Pyralidae	12					Psephenidae	10										

DATE: 17 March 2023	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**
GRID REFERENCE:	**PORIFERA**	5					**HEMIPTERA:**						**DIPTERA:**					
S: -28.393950°	**COELENTERATA**	1					Belostomatidae*	3					Athericidae	10				
E: 31.679300°	**TURBELLARIA**	3					Corixidae*	3					Blepharoceridae	15				
Site Code: UMP 03	**ANNELIDA:**						Gerridae*	5			**A**	**A**	Ceratopogonidae	5		**A**		**A**
River: WHITE UMFOLOZI RIVER	Oligochaeta	1			**A**	**A**	Hydrometridae*	6					Chironomidae	2				
Site Description: Upstream of Powerline route	Leeches	3					Naucoridae*	7					Culicidae*	1				
Weather Conditions: Sunny	**CRUSTACEA:**						Nepidae*	3					Dixidae*	10				
Temperature: 29,0	Amphipoda	13			**A**	**A**	Notonectidae*	3					Empididae	6				
Ph: 8,50	Potamonautidae*	3					Pleidae*	4					Ephydridae	3				
DO: 75,7% (5,52 mg/L)	Atyidae	8					Veliidae/M…veliidae*	5		**A**		**A**	Muscidae	1				
Conductivity: 30 mS/m	Palaemonidae	10					**MEGALOPTERA:**						Psychodidae	1				
BIOTOPES SAMPLED:	**HYDRACARINA**	8					Cordalidae	8					Simuliidae	5	**A**		**A**	**B**
SIC: TIME: minutes	**PLECOPTERA:**						Sialidae	6					Syrphidae*	1				
SOOC:	Notonemouridae	14					**TRICHOPTERA**						Tabanidae	5				
BEDROCK:	Perlidae	12					Dipseudopsidae	10					Tipulidae	5				
AQUATIC VEG: DOM SP:	**EPHEMEROPTERA**						Ecnomidae	8					**GASTROPODA**					
M VEG IC: DOM SP:	Baetidae 1 sp	4	**A**	**A**		**A**	Hydropsychidae 1 sp	4		**A**		**A**	Ancylidae	6				
M VEG OOC: DOM SP:	Baetidae 2 sp	6					Hydropsychidae 2 sp	6					Bulininae*	3				
GRAVEL…….	Baetidae >2 sp	12					Hydropsychidae >2 sp	12					Hydrobiidae*	3				
SAND…….	Caenidae	6	**A**			**A**	Philopotamidae	10					Lymnaeidae*	3				
MUD…….	Ephemeridae	15					Polycentropodidae	12					Physidae*	3				
HAND PICKING/VISUAL OBS…….	Heptageniidae	13					Psychomyiidae/Xiphocen.	8					Planorbidae*	3				
FLOW: Moderate to High Flow	Leptophlebiidae	9					**CASED CADDIS:**						Thiaridae*	3				
TURBIDITY: High	Oligoneuridae	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
RIPARIAN LAND USE: Other	Polymitarcyidae	10					Calamoceratidae ST	11					**PELECYPODA**					
	Prosopistomatidae	15					Glossosomatidae SWC	11					Corbiculidae	5				
	Teloganodidae SWC	12					Hydroptilidae	6					Sphaeriidae	3				
	Tricorythidae	9		**A**		**A**	Hydrosalpingidae SWC	15					Unionidae	6				
	ODONATA:						Lepidostomatidae	10					**SASS SCORE:**		23	32	32	70
DISTURBANCE IN RIVER:	Calopterygidae ST,T	10					Leptoceridae	6					**NO OF TAXA:**		4	6	5	12
Cattle drinking	Chlorocyphidae	10					Petrothrincidae SWC	11					**ASPT:**		5,75	5,33	6,40	5,83
sand winning	Chlorolestidae	8					Pisuliidae	10					**IHAS**:					44%
SIGNS OF POLLUTION:	Coenagrionidae	4					Sericostomatidae SWC	13										
Turbid water	Lestidae	8					**COLEOPTERA:**											
	Platycnemidae	10					Dytiscidae*	5		**A**		**A**						
OTHER OBSERVATIONS:	Protoneuridae	8					Elmidae/Dryopidae*	8										
	Zygoptera juvs.	6					Gyrinidae*	5										
	Aeshnidae	8	**A**		**A**	**A**	Halipidae*	5										
	Corduliidae	8					Helodidae	12										
	Gomphidae	6					Hydraenidae*	8										
	Libellulidae	4					Hydrophilidae*	5										
	LEPIDOPTERA:						Limnichidae	10										
	Pyralidae	12					Psephenidae	10										

DATE: 17 March 2023	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**
GRID REFERENCE:	**PORIFERA**	5					**HEMIPTERA:**						**DIPTERA:**					
S:° -28.442976°	**COELENTERATA**	1					Belostomatidae*	3					Athericidae	10				
E: ° 31.717559	**TURBELLARIA**	3					Corixidae*	3		**A**	**A**	**A**	Blepharoceridae	15				
SITE CODE: UMP 04	**ANNELIDA:**						Gerridae*	5					Ceratopogonidae	5		**A**	**A**	**B**
RIVER: MUNYWANA WHITE UMFOLOZI TRI	Oligochaeta	1					Hydrometridae*	6					Chironomidae	2		**A**	**A**	**B**
SITE DESCRIPTION:	Leeches	3					Naucoridae*	7					Culicidae*	1				
Weather Conditions: Sunny	**CRUSTACEA:**						Nepidae*	3					Dixidae*	10				
Temperature: 34,3	Amphipoda	13					Notonectidae*	3		**A**		**A**	Empididae	6				
Ph: 8,75	Potamonautidae*	3		**A**		**A**	Pleidae*	4		**A**	**A**	**A**	Ephydridae	3				
DO: 59,6% (4,1 mg/L)	Atyidae	8					Veliidae/M…veliidae*	5					Muscidae	1				
Conductivity: 139 mS/m	Palaemonidae	10					**MEGALOPTERA:**						Psychodidae	1				
BIOTOPES SAMPLED:	**HYDRACARINA**	8					Cordalidae	8					Simuliidae	5		**A**		**A**
SIC: TIME: minutes	**PLECOPTERA:**						Sialidae	6					Syrphidae*	1				
SOOC:	Notonemouridae	14					**TRICHOPTERA**						Tabanidae	5				
BEDROCK:	Perlidae	12					Dipseudopsidae	10					Tipulidae	5				
AQUATIC VEG: DOM SP:	**EPHEMEROPTERA**						Ecnomidae	8					**GASTROPODA**					
M VEG IC: DOM SP:	Baetidae 1 sp	4					Hydropsychidae 1 sp	4					Ancylidae	6				
M VEG OOC: DOM SP:	Baetidae 2 sp	6		**B**			Hydropsychidae 2 sp	6					Bulininae*	3				
GRAVEL:	Baetidae >2 sp	12				**B**	Hydropsychidae >2 sp	12					Hydrobiidae*	3				
SAND:	Caenidae	6					Philopotamidae	10					Lymnaeidae*	3				
MUD:	Ephemeridae	15					Polycentropodidae	12					Physidae*	3				
HAND PICKING/VISUAL OBS:	Heptageniidae	13					Psychomyiidae/Xiphocen.	8					Planorbidae*	3				
FLOW:	Leptophlebiidae	9					**CASED CADDIS:**						Thiaridae*	3				
TURBIDITY:	Oligoneuridae	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
RIPARIAN LAND USE:	Polymitarcyidae	10					Calamoceratidae ST	11					**PELECYPODA**					
Other	Prosopistomatidae	15					Glossosomatidae SWC	11					Corbiculidae	5				
	Teloganodidae SWC	12					Hydroptilidae	6					Sphaeriidae	3				
	Tricorythidae	9					Hydrosalpingidae SWC	15					Unionidae	6				
	ODONATA:						Lepidostomatidae	10					**SASS SCORE:**		0	57	22	63
DISTURBANCE IN RIVER:	Calopterygidae ST,T	10					Leptoceridae	6					**NO OF TAXA:**		0	12	5	12
Bridge	Chlorocyphidae	10					Petrothrincidae SWC	11					**ASPT:**		#####	4,75	4,40	5,25
Disconnected flow	Chlorolestidae	8					Pisuliidae	10					**IHAS**:					51%
Ponding	Coenagrionidae	4		**A**		**A**	Sericostomatidae SWC	13										
Waste	Lestidae	8					**COLEOPTERA:**											
SIGNS OF POLLUTION:	Platycnemidae	10					Dytiscidae*	5										
Waste disposal	Protoneuridae	8					Elmidae/Dryopidae*	8		**A**		**A**						
	Zygoptera juvs.	6					Gyrinidae*	5										
	Aeshnidae	8		**A**	**A**	**A**	Halipidae*	5										
	Corduliidae	8					Helodidae	12										
OTHER OBSERVATIONS:	Gomphidae	6		**A**		**A**	Hydraenidae*	8										
	Libellulidae	4					Hydrophilidae*	5										
	LEPIDOPTERA:						Limnichidae	10										
	Pyralidae	12					Psephenidae	10										

DATE: 17 March 2023	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**
GRID REFERENCE:	**PORIFERA**	5					**HEMIPTERA:**						**DIPTERA:**					
S:° -28.570183°	**COELENTERATA**	1					Belostomatidae*	3					Athericidae	10				
E: 31.852921°	**TURBELLARIA**	3					Corixidae*	3					Blepharoceridae	15				
SITE CODE: UMP 03	**ANNELIDA:**						Gerridae*	5					Ceratopogonidae	5		**A**		**A**
RIVER: NSELENI RIVER / WHITE UMFOLOZI '	Oligochaeta	1		**A**		**A**	Hydrometridae*	6					Chironomidae	2		**A**	**A**	**B**
SITE DESCRIPTION:	Leeches	3		**A**		**A**	Naucoridae*	7					Culicidae*	1				
Weather Conditions: Sunny	**CRUSTACEA:**						Nepidae*	3					Dixidae*	10				
Temperature: 28,1	Amphipoda	13					Notonectidae*	3					Empididae	6				
Ph: 9,3	Potamonautidae*	3					Pleidae*	4					Ephydridae	3				
DO: 34,1% (2,91 mg/L)	Atyidae	8					Veliidae/M…veliidae*	5		**A**		**A**	Muscidae	1				
Conductivity: 78 mS/m	Palaemonidae	10					**MEGALOPTERA:**						Psychodidae	1				
BIOTOPES SAMPLED:	**HYDRACARINA**	8					Cordalidae	8					Simuliidae	5		**A**	**A**	**B**
SIC: TIME: minutes	**PLECOPTERA:**						Sialidae	6					Syrphidae*	1				
SOOC:	Notonemouridae	14					**TRICHOPTERA**						Tabanidae	5		**A**		**A**
BEDROCK:	Perlidae	12					Dipseudopsidae	10					Tipulidae	5				
AQUATIC VEG: DOM SP:	**EPHEMEROPTERA**						Ecnomidae	8					**GASTROPODA**					
M VEG IC: DOM SP:	Baetidae 1 sp	4					Hydropsychidae 1 sp	4					Ancylidae	6				
M VEG OOC: DOM SP:	Baetidae 2 sp	6					Hydropsychidae 2 sp	6					Bulininae*	3				
GRAVEL:	Baetidae >2 sp	12					Hydropsychidae >2 sp	12					Hydrobiidae*	3				
SAND:	Caenidae	6					Philopotamidae	10					Lymnaeidae*	3				
MUD:	Ephemeridae	15					Polycentropodidae	12					Physidae*	3				
HAND PICKING/VISUAL OBS:	Heptageniidae	13					Psychomyiidae/Xiphocen.	8					Planorbidae*	3				
FLOW: Moderate	Leptophlebiidae	9					**CASED CADDIS:**						Thiaridae*	3				
TURBIDITY: Moderate	Oligoneuridae	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
RIPARIAN LAND USE:	Polymitarcyidae	10					Calamoceratidae ST	11					**PELECYPODA**					
Other	Prosopistomatidae	15					Glossosomatidae SWC	11					Corbiculidae	5				
Communities	Teloganodidae SWC	12					Hydroptilidae	6					Sphaeriidae	3				
	Tricorythidae	9					Hydrosalpingidae SWC	15					Unionidae	6				
	ODONATA:						Lepidostomatidae	10					**SASS SCORE:**		0	26	7	26
DISTURBANCE IN RIVER:	Calopterygidae ST,T	10					Leptoceridae	6					**NO OF TAXA:**		0	7	2	7
Disposal of waste and decomposing animal waste	Chlorocyphidae	10					Petrothrincidae SWC	11					**ASPT:**		#####	3,71	3,50	3,71
Bridge crossing	Chlorolestidae	8					Pisuliidae	10					**IHAS**:					
	Coenagrionidae	4					Sericostomatidae SWC	13										
	Lestidae	8					**COLEOPTERA:**											
SIGNS OF POLLUTION:	Platycnemidae	10					Dytiscidae*	5										
Strong smell of decomposing waaste	Protoneuridae	8					Elmidae/Dryopidae*	8										
	Zygoptera juvs.	6					Gyrinidae*	5										
	Aeshnidae	8					Halipidae*	5										
	Corduliidae	8					Helodidae	12										
OTHER OBSERVATIONS:	Gomphidae	6					Hydraenidae*	8										
	Libellulidae	4					Hydrophilidae*	5										
	LEPIDOPTERA:						Limnichidae	10										
	Pyralidae	12					Psephenidae	10										

DATE: 17 March 2023	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**	**TAXON**		**S**	**VG**	**GSM**	**TOT**
GRID REFERENCE:	**PORIFERA**	5					**HEMIPTERA:**						**DIPTERA:**					
S:°	**COELENTERATA**	1					Belostomatidae*	3					Athericidae	10				
E: °	**TURBELLARIA**	3					Corixidae*	3		**A**	**A**	**A**	Blepharoceridae	15				
SITE CODE: UMP 06	**ANNELIDA:**						Gerridae*	5					Ceratopogonidae	5		**A**	**A**	**B**
RIVER: NTAMBANANA RIVER / WHITE UMFOLOZI	Oligochaeta	1		**A**	**A**	**A**	Hydrometridae*	6					Chironomidae	2		**B**	**A**	**B**
Weather Conditions: Sunny	Leeches	3					Naucoridae*	7					Culicidae*	1				
Temperature: 26,0	**CRUSTACEA:**						Nepidae*	3					Dixidae*	10				
Ph: 9,14	Amphipoda	13					Notonectidae*	3					Empididae	6				
DO: 32,1% (2,33 mg/L)	Potamonautidae*	3		**A**		**A**	Pleidae*	4					Ephydridae	3				
Conductivity: 173 mS/m	Atyidae	8					Veliidae/M…veliidae*	5					Muscidae	1				
Cond:	Palaemonidae	10					**MEGALOPTERA:**						Psychodidae	1				
BIOTOPES SAMPLED:	**HYDRACARINA**	8					Cordalidae	8					Simuliidae	5		**A**	**A**	**B**
SIC: TIME: minutes	**PLECOPTERA:**						Sialidae	6					Syrphidae*	1				
SOOC:	Notonemouridae	14					**TRICHOPTERA**						Tabanidae	5				
BEDROCK:	Perlidae	12					Dipseudopsidae	10					Tipulidae	5				
AQUATIC VEG: DOM SP:	**EPHEMEROPTERA**						Ecnomidae	8					**GASTROPODA**					
M VEG IC: DOM SP:	Baetidae 1 sp	4					Hydropsychidae 1 sp	4					Ancylidae	6				
M VEG OOC: DOM SP:	Baetidae 2 sp	6					Hydropsychidae 2 sp	6					Bulininae*	3				
GRAVEL:	Baetidae >2 sp	12					Hydropsychidae >2 sp	12					Hydrobiidae*	3				
SAND:	Caenidae	6					Philopotamidae	10					Lymnaeidae*	3				
MUD:	Ephemeridae	15					Polycentropodidae	12					Physidae*	3				
HAND PICKING/VISUAL OBS:	Heptageniidae	13					Psychomyiidae/Xiphocen.	8					Planorbidae*	3				
FLOW:	Leptophlebiidae	9					**CASED CADDIS:**						Thiaridae*	3				
TURBIDITY:	Oligoneuridae	15					Barbarochthonidae SWC	13					Viviparidae* ST	5				
RIPARIAN LAND USE:	Polymitarcyidae	10					Calamoceratidae ST	11					**PELECYPODA**					
	Prosopistomatidae	15					Glossosomatidae SWC	11					Corbiculidae	5				
	Teloganodidae SWC	12					Hydroptilidae	6					Sphaeriidae	3				
	Tricorythidae	9					Hydrosalpingidae SWC	15					Unionidae	6				
	ODONATA:						Lepidostomatidae	10					**SASS SCORE:**		0	24	16	24
DISTURBANCE IN RIVER:	Calopterygidae ST,T	10					Leptoceridae	6					**NO OF TAXA:**		0	7	5	7
Bridge crossing	Chlorocyphidae	10					Petrothrincidae SWC	11					**ASPT:**		####	###	3,20	3,43
Lack of hydrological conn.	Chlorolestidae	8					Pisuliidae	10					**IHAS**:					30%
Ponding flows	Coenagrionidae	4					Sericostomatidae SWC	13										
	Lestidae	8					**COLEOPTERA:**											
SIGNS OF POLLUTION:	Platycnemidae	10					Dytiscidae*	5		**A**		**A**						
Waste disposal	Protoneuridae	8					Elmidae/Dryopidae*	8										
Ordour	Zygoptera juvs.	6					Gyrinidae*	5										
	Aeshnidae	8					Halipidae*	5										
	Corduliidae	8					Helodidae	12										
OTHER OBSERVATIONS:	Gomphidae	6					Hydraenidae*	8										
	Libellulidae	4					Hydrophilidae*	5										
	LEPIDOPTERA:						Limnichidae	10										
	Pyralidae	12					Psephenidae	10										

Integrated Specialist Services (Pty) Ltd

PHASE 1 ARCHAEOLOGICAL AND HERITAGE IMPACT ASSESSMENT FOR PROPOSED CONSTRUCTION OF A 765KV TRANSMISSION POWER LINE, A NEW SUBSTATION AND A NEW 400KV LOOP IN AND LOOP OUT POWERLINES IN THE ZULULAND AND KING CETSHWAYO DISTRICT MUNICIPALITIES, KWAZULU-NATAL PROVINCE

Trust Mlilo

DOCUMENT SYNOPSIS (EXECUTIVE SUMMARY)

Item	Description
Proposed development and location	Proposed construction of a 765kv Transmission Powerline a new substation and a loop in and loop out powerlines in the Zululand and King Cetshwayo District Municipality in the KwaZulu Natal Province
Purpose of the study	The Phase 1 Archaeological Impact Assessment is for the Proposed construction of a 765kv Transmission Powerline a new substation and a loop in and loop out powerlines in the Zululand and King Cetshwayo District Municipality in the KwaZulu Natal Province
Municipalities	Zululand and King Cetshwayo District municipality
Predominant land use of surrounding area	Rural residential, rail, road and sugar cane plantation
Applicant	Eskom Holdings SOC Ltd
EAP	Kimopax (Pty) Ltd Head Office: 546 16th Road, Constantia Park, Midrand, 1685 Tel: +27 11 312 9765 Fax: +27 11 312 9768/ +27 86 219 8717
Heritage Practitioner	Integrated Specialist Services (Pty) Ltd Cell: 071 685 9247 Email: trust@issolutions.co.za
Authors	Trust Mlilo
Date of Report	10 April 2023

This report serves to inform and guide the applicant and contractors about the possible impacts that the proposed 400kv loop in and loop out powerline and substation development may have on heritage resources (if any) located in the study area. In the same light, the document must also inform Amafa aKwaZulu Natali and Research Institute about the presence, absence and significance of heritage resources located along the proposed powerline route and substation site. This report is submitted in terms of Section 41 (2) of the Amafa aKwaZulu Natal and Research Institute of 2018 read together with Section 38 (8) of the National Heritage Resources Act 25 of 1999 as part of the Environmental authorisation for Eskom Holdings SOC Ltd powerline project in the KwaZulu Natal Province. The purpose of this study is to identify, record and if necessary, salvage the irreplaceable heritage resources that may be impacted upon by the proposed powerline and substation project. In compliance with these laws, Kimopax (Pvt) Ltd tasked Integrated Specialist Services (Pty) Ltd on behalf of Eskom Holdings to conduct a Phase 1 Archaeological and Heritage Impact Assessment (AIA/HIA) for proposed powerline and substation project. Desktop studies, drive-throughs and fieldwalking were conducted in order to identity heritage landmarks along the proposed powerline route and substation site. The powerline route and substation site got authorisation 2011 (see Department of Environmental Affairs Reference 12/12/20/881 dated 29 August 2011). Subsequently a walk down survey was conducted by Nzumbululo Heritage Solution to map out all heritage resources recorded along the approved powerline route (Amafa Reference SAH14/4579). In addition, mitigation of burial sites located along the powerline route was conducted by Nzumbululo Heritage Solutions in 2016. The current study sought to assess the previously approved corridor for any heritage resources that might have been missed during the previous studies and any new heritage resources such as new graves that might have been interred after the heritage mitigation. It is against this background that Integrated Specialist services (Pty) Ltd was appointed to conduct a heritage survey along the previously approved powerline route and substation. It is interesting to note that the author participated in the walk down and mitigation of the approved route and is thus familiar with the study area. The survey noted that the powerline route and substation site are not on pristine ground, having seen significant transformations owing to previous and current land use activities (see Plate 1 to 10). The general project area is known for occurrence of archaeological and historical sites. In terms of the built environment the structures along the proposed powerline route, no historical buildings were recorded during the survey. In terms of Section of the NHRA the study confirmed that there are no new graves located along the proposed powerline route. However, the potential of encountering previously unidentified burial sites is for ever present in the landscape. No unknown graves were recorded within the corridor. It should be noted that archaeological

remains and unmarked graves may still exist and when encountered during construction, work must be stopped forth-with, and the finds must be reported to Amafa akwaZulu Natali and/or Research Institute South African Heritage Resource Agency (SAHRA) as well as the project archaeologist. This report must be submitted to Amafa akwaZulu Natali and Research Institute for review in terms of Section 38 (4) of the NHRA.

The report makes the following observations:

- The findings of this report have been informed by desktop data review, field survey and impact assessment reporting which include recommendations to guide heritage authorities in making decisions with regards to the proposed powerline and substation project.
- Most sections of the proposed powerline route are accessible.
- The immediate project area is predominantly communal agriculture fields and rural residential.
- Some sections on the proposed powerline route are severely degraded from previous and current agriculture activities.
- The study did not record any archaeological site within the proposed powerline route and substation site.

The report sets out the potential impacts of the proposed powerline and substation development on heritage matters and recommends appropriate safeguard and mitigation measures that are designed to reduce the impacts where appropriate. The Report makes the following recommendations:

1. It is recommended that Amafa aKwaZulu Natali and Research Institute endorse the report as having satisfied the requirements of Section 41 (2) of the Amafa aKwaZulu Natali and Research Institute of 2018 read together with Section 38 (8) of the National Heritage Resources Act 25 of 1999.
2. It is recommended that Amafa aKwaZulu Natali and Research Institute decide in terms of Section 38 (4) of the NHRA to approve the proposed substation and powerline route on condition that no significant heritage sites were identified along the approved corridor.
3. From a heritage perspective supported by the findings of this study, the project is supported. However, construction activities should be approved under observation that the dimensions do not extend beyond the area considered in this report.

4. Should chance archaeological materials or human remains be exposed during activities on any section of the powerline corridor and substation site, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption of the project scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the Amafa akwaZulu Natali and Research Institute regulations.
5. Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of this heritage report, there are no significant cultural heritage resources barriers to the proposed powerline development. SAHRA may approve the project as planned with special commendations to implement the recommendations here in made.

This report concludes that the impacts of the proposed powerline development on the cultural environmental values are not likely to be significant on the entire site if the EMP includes recommended safeguard and mitigation measures identified in this report.

NATIONAL LEGISLATION AND REGULATIONS GOVERNING THIS REPORT

This is a specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014.

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence.

I, **Trust Mlilo**, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own, notwithstanding the fact that I have received fair remuneration from the client for preparation of this report.

Expertise:

Trust Mlilo, PhD *cand* (Wits), MA. (Archaeology), BA Hons, PDGE and BA & (Univ. of Pretoria) ASAPA (Professional affiliation member) and more than 15 years of experience in archaeological and heritage impact assessment and management. Mlilo is an accredited member of the Association for Southern

African Professional Archaeologists (ASAPA), Amafa akwaZulu Natali and Eastern Cape Heritage Resources Agency (ECPHRA). He has conducted more than hundred AIA/HIA Studies, heritage mitigation work and heritage development projects over the past 15 years of service. The completed projects vary from Phase 1 and Phase 2 as well as heritage management work for government, parastatals (Eskom) and several private companies such as BHP Billiton and Rhino Minerals.

Independence

The views expressed in this document are the objective, independent views of Mr Trust Mlilo and the survey was carried out under Integrated Specialist Services (Pty) Ltd. The company has no business, personal, financial or other interest in the proposed powerline development apart from fair remuneration for the work performed.

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Integrated Specialist Services (Pty) Ltd reserves the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field or pertaining to this investigation.

This report must not be altered or added to without the prior written consent of the author and Integrated Specialist Services (Pty) Ltd. This also refers to electronic copies of the report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must refer to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

Authorship: This AIA/HIA Report has been prepared by Mr Trust Mlilo (Professional Archaeologist). The report is for the review of the Heritage Resources Agency (PHRA).

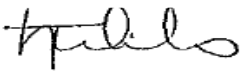
Geographic Co-ordinate Information**:** Geographic co-ordinates in this report were obtained using a hand-held Garmin Global Positioning System device. The manufacturer states that these devices are accurate to within +/- 5 m.

Maps**:** Maps included in this report use data extracted from the NTS Map and Google Earth Pro.

Disclaimer**:** The Authors are not responsible for omissions and inconsistencies that may result from information not available at the time this report was prepared.

The Archaeological and Heritage Impact Assessment Study was carried out within the context of tangible and intangible cultural heritage resources as defined by the SAHRA Regulations and Guidelines as to the approval of the proposed powerline and substation development being proposed by Eskom Holdings SOC Ltd

Signed by



10/ 04/ 2023

ACKNOWLEDGEMENTS

The authors acknowledge Kimopax (Pvt) Ltd staff for their assistance with the site visit and responding to technical queries related to the project.

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ABBREVIATIONS

AIA Archaeological Impact Assessment

ASAPA Association of South African Professional Archaeologists

EIA Environmental Impact Assessment

EIA Early Iron Age *(EIA refers to both Environmental Impact Assessment and the Early Iron Age but in both cases the acronym is internationally accepted.*

EIAR Environmental Impact Assessment Report

ESA Early Stone Age

GPS Global Positioning System

HIA Heritage Impact Assessment

ICOMOS International Council of Monuments and Sites

LIA Late Iron Age

LFC Late Farming Community

LSA Late Stone Age

MIA Middle Iron Age

MSA Middle Stone Age

NEMA National Environmental Management Act 107 of 1998

NHRA National Heritage Resources Act 25 of 1999

PHRA Provincial Heritage Resource Agency of Free State

SAHRA South African Heritage Resources Agency

ToR Terms of Reference

KEY CONCEPTS AND TERMS

Periodization

Periodization Archaeologists divide the different cultural epochs according to the dominant material finds for the different time periods. This periodization is usually region-specific, such that the same label can have different

dates for different areas. This makes it important to clarify and declare the periodization of the area one is studying. These periods are nothing a little more than convenient time brackets because their terminal and commencement are not absolute and there are several instances of overlap. In the present study, relevant archaeological periods are given below.

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

Early Iron Age (~ AD 200 to 1000)

Late Iron Age (~ AD1100-1840)

Historic (~ AD 1840 to 1950, but a Historic building is classified as over 60 years old)

Definitions

Definitions Just like periodization, it is also critical to define key terms employed in this study. Most of these terms derive from South African heritage legislation and its ancillary laws, as well as international regulations and norms of best practice. The following aspects have a direct bearing on the investigation and the resulting report:

Cultural (heritage) resources are all non-physical and physical human-made occurrences, and natural features that are associated with human activity. These can be singular or in groups and include significant sites, structures, features, ecofacts and artefacts of importance associated with the history, architecture, or archaeology of human development.

Cultural significance is determined by means of aesthetic, historic, scientific, social, or spiritual values for past, present, or future generations.

Value is related to concepts such as worth, merit, attraction or appeal, concepts that are associated with the (current) usefulness and condition of a place or an object. Although significance and value are not mutually exclusive, in some cases the place may have a high level of significance but a lower level of value. Often, the evaluation of any feature is based on a combination or balance between the two.

Isolated finds are occurrences of artefacts or other remains that are not *in-situ* or are located apart from archaeological sites. Although these are noted and recorded, but do not usually constitute the core of an impact assessment, unless if they have intrinsic cultural significance and value.

In-situ refers to material culture and surrounding deposits in their original location and context, for example an archaeological site that has not been disturbed by farming.

Archaeological site/materials are remains or traces of human activity that are in a state of disuse and are in, or on, land and which are older than 100 years, including artefacts, human and hominid remains, and artificial features and structures. According to the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), no archaeological artefact, assemblage or settlement (site) and no historical building or structure older than 60 years may be altered, moved or destroyed without the necessary authorisation from the South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority.

Historic material are remains resulting from human activities, which are younger than 100 years, but no longer in use, including artefacts, human remains and artificial features and structures.

Chance finds means archaeological artefacts, features, structures or historical remains accidentally found during development.

A grave is a place of interment (variably referred to as burial) and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place. A grave may occur in isolation or in association with others where upon it is referred to as being situated in a cemetery (contemporary) or burial ground (historic).

A site is a distinct spatial cluster of artefacts, structures, organic and environmental remains, as residues of past human activity.

Heritage Impact Assessment (HIA) refers to the process of identifying, predicting and assessing the potential positive and negative cultural, social, economic and biophysical impacts of any proposed project which requires authorisation of permission by law, and which may significantly affect the cultural and natural heritage resources. Accordingly, an HIA must include recommendations for appropriate mitigation measures for minimising or circumventing negative impacts, measures enhancing the positive aspects of the proposal and heritage management and monitoring measures.

Impact is the positive or negative effects on human well-being and / or on the environment.

Mitigation is the implementation of practical measures to reduce and circumvent adverse impacts or enhance beneficial impacts of an action.

Mining heritage sites refer to old, abandoned mining activities, underground or on the surface, which may date from the prehistorical, historical or the relatively recent past.

Study area or '**project area'** refers to the area where the developer wants to focus its development activities (refer to plan).

Phase I studies refer to surveys using various sources of data and limited field walking in order to establish the presence of all possible types of heritage resources in any given area.

Assumptions and disclaimer

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be remembered that archaeological deposits (including graves and traces of mining heritage) usually occur below the ground level. Should artefacts or skeletal material be exposed along the proposed powerline route during construction activities, such activities should be halted immediately, and a competent heritage practitioner and SAHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6). Recommendations contained in this document do not exempt the applicant from complying with any national, provincial, and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. Integrated Specialist Services (Pty) Ltd assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.

1 INTRODUCTION

Integrated Specialist Services (Pty) Ltd was requested by Kimopax (Pvt) Ltd on behalf of Eskom Holdings SOC Ltd to carry out a Phase 1 AIA/ HIA for the proposed construction of a 400kv Transmission line, a Loop in and Loop out Powerline and a new Substation in the Zululand and King Cetshwayo District, Municipalities in KwaZulu Natal Province. This study was conducted in terms Section 41 (2) of the Amafa aKwaZulu Natal and Research Institute of 2018 read together with Section 38 (8) of the National Heritage Resources Act 25 of 1999as part of environmental authorisation for the proposed powerline and substation. The purpose of this heritage study is to identify, assess any heritage resources that may be located along the proposed powerline route and substation site in order to make recommendations for their appropriate management. To achieve this, we conducted background research of published literature, maps, and databases (desktop studies) which was then followed by ground-truthing by means of drive-through surveys and field walking along the proposed powerline route. The powerline route and substation site got authorisation 2011 (see Dea Reference 12/12/20/881 dated 29 August 2011). Subsequently a Heritage walk down survey was conducted by Nzumbululo Heritage Solution to map out all heritage resources recorded along the approved powerline route (Amafa Reference SAH14/4579). In addition, mitigation of burial sites located along the powerline route was conducted by Nzumbululo Heritage Solutions in 2016. The current study sought to assess the previously approved corridor for any heritage resources that might have been missed during the previous studies and any new heritage resources such as new graves that might have been interred after the heritage mitigation. It is against this background that Integrated Specialist services (Pty) Ltd was appointed to conduct a heritage survey along the previously approved powerline route and substation. It is interesting to note that the author participated in the walk down and mitigation of the approved route and is thus familiar with the study area. Desktop studies revealed that the general project area is rich in Late Iron Age (LIA) and historical sites. It should be noted that while heritage resources may have been located in the entire study area, previous and current agriculture activities have either obliterated these materials or reduced them to isolated finds that can only be identifiable as chance finds during construction. The proposed powerline and substation development may be approved subject to adopting recommendations and mitigation measures proposed in this report. Based on the findings there is no archaeological and heritage reasons why the proposed substation and powerline cannot be approved, taking full cognizance of clear procedures to follow in the event of chance findings.

1.1 Terms of Reference (ToR)

The Integrated Specialist Services (Pty) Ltd was requested by Kimopax (Pvt) Ltd to conduct an AIA/HIA study addressing the following issues:

- Archaeological and heritage potential of the proposed powerline route and substation site including any known data on affected areas.

- Provide details on methods of study; potential and recommendations to guide the Amafa to make an informed decision in respect of authorisation of the proposed powerline and substation development.
- Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located along the proposed powerline route and substation site.
- Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
- Describe the possible impact of the proposed Transmission powerline and substation development on these cultural remains, according to a standard set of conventions;
- Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources; and
- Review applicable legislative requirements.

1.2 Project Location

The proposed project and associated infrastructure are situated between the proposed new Mbewu substation near Empangeni to the existing Umfolozi substation near Ulundi in the Zululand and King Cetshwayo District Municipalities. The Figure 1 & 2 below shows the locality of the transmission line and the estimated length in kilometres of the Umfolozi-Mbewu Transmission Line.

Table 1: Information on properties affected by the project.

ITERM	PROPERTY NAME	21 DIGIT SURVEYOR-GENERAL CODE
1	Langgewacht	N0GU00000000023500000
2	Duikerfontein	N0GU00000000052800000
3	Uitkijk	N0GU00000000035300000
4	Eensgevonden	N0GU00000000055100000
5	Lottery	N0GU00000000053100000
6	Reserve No 20	N0GU00000001584000000
7	Ximba	N0GU00000001650600000
8	Reserve No 11	N0GU00000001583100000
9	Fuleni Reserve	N0GU00000001437500000
10	Lot 321 Empangeni	N0GU00000001304000000

11	Lot 317 Empangeni	N0GU00000001440400000
12	Lot 316 Empangeni	N0GU00000001305100000
13	Lot 309 Empangeni	N0GU00000001305000000
14	Lot 285 Empangeni	N0GU00000001340000000
15	Dube Ridge	N0GU00000001522300000
16	Lot 290 Empangeni	N0GU00000001338800000
17	Lynwood	N0GU00000001142500000
18	Lot 292 Empangeni	N0GU00000001339900000
19	Sylvia	N0GU00000001630500000
20	Lot 244 Empangeni	N0GU00000001057400000
21	Ezulwini	N0GU00000001106500000
22	Needmore	N0GU00000001138600000
23	Lot 241 Empangeni	N0GU00000001105800000
24	Bella vista	N0GU00000001840900000
25	Ntomboti	N0GU00000001841000000
26	Newlands	N0GU00000001158800000
27	Valley	N0GU00000001678600000

Coordinates

28°	12'	47,89"	31°	11'	22,5"
28°	22’	14,07"	31°	36'	23,79"
28°	42'	11,73"	31°	45'	33,14"

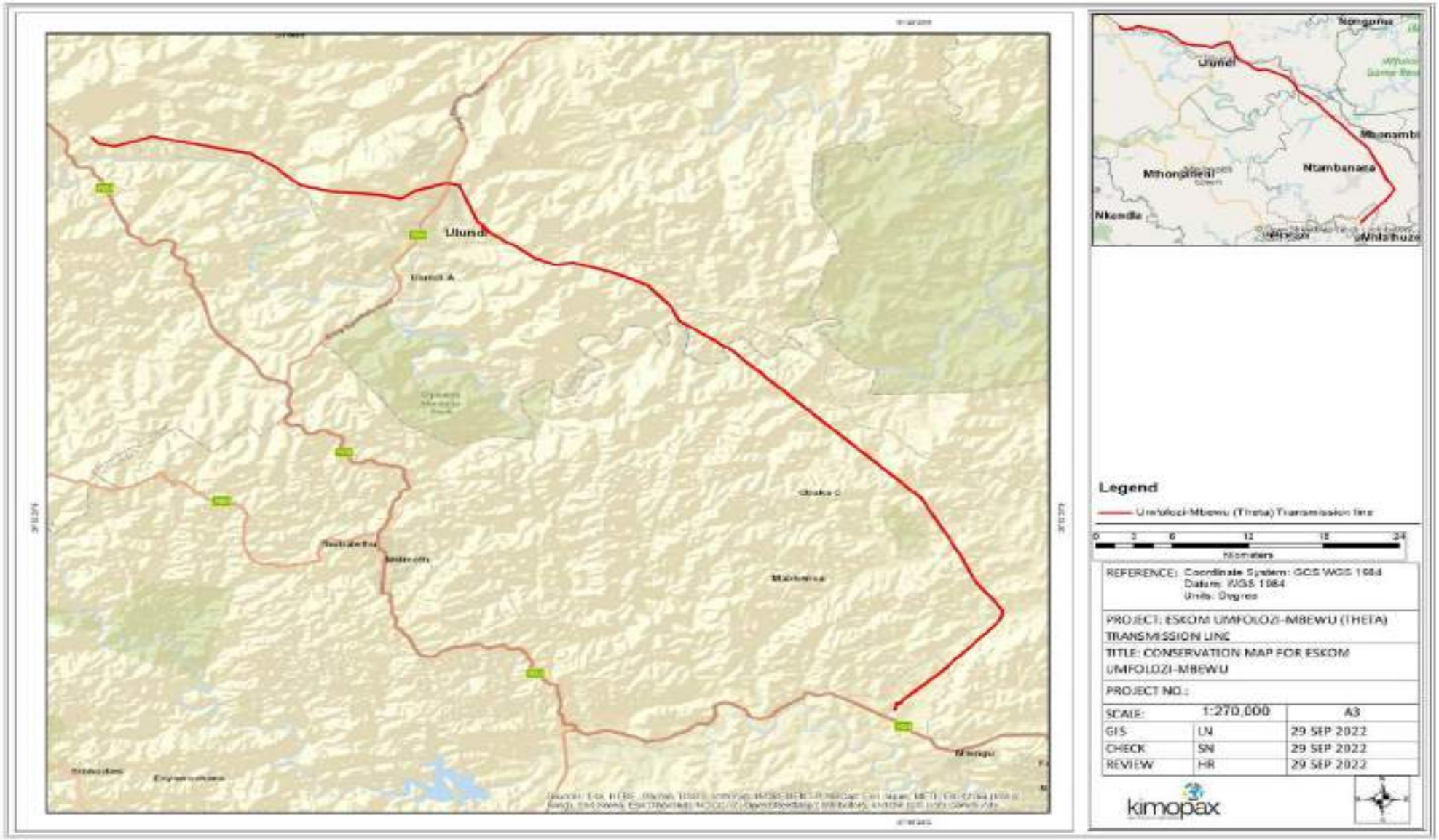

Figure 1: Locality map of the proposed powerline and substation

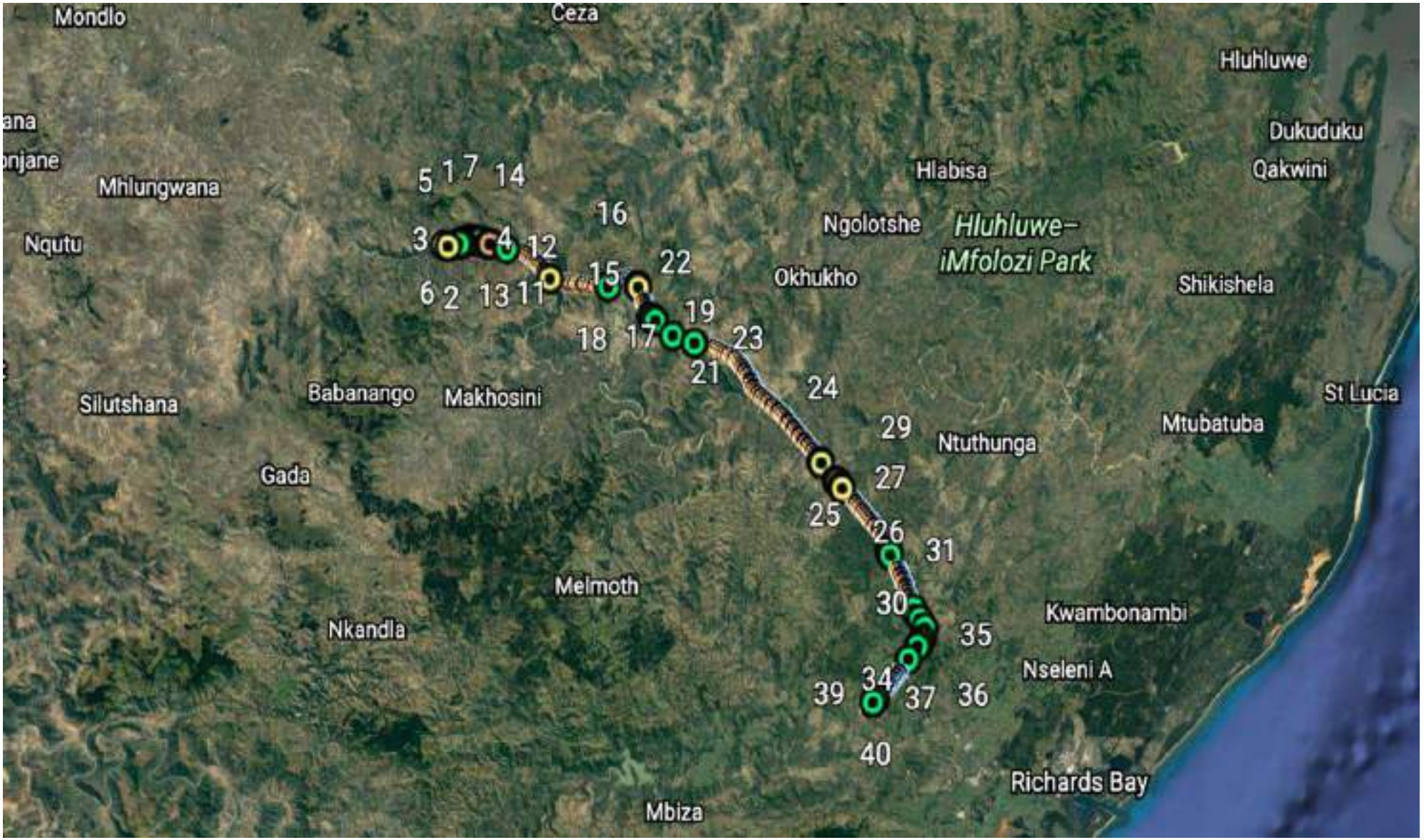

Figure 2: Location of proposed powerline route and substation

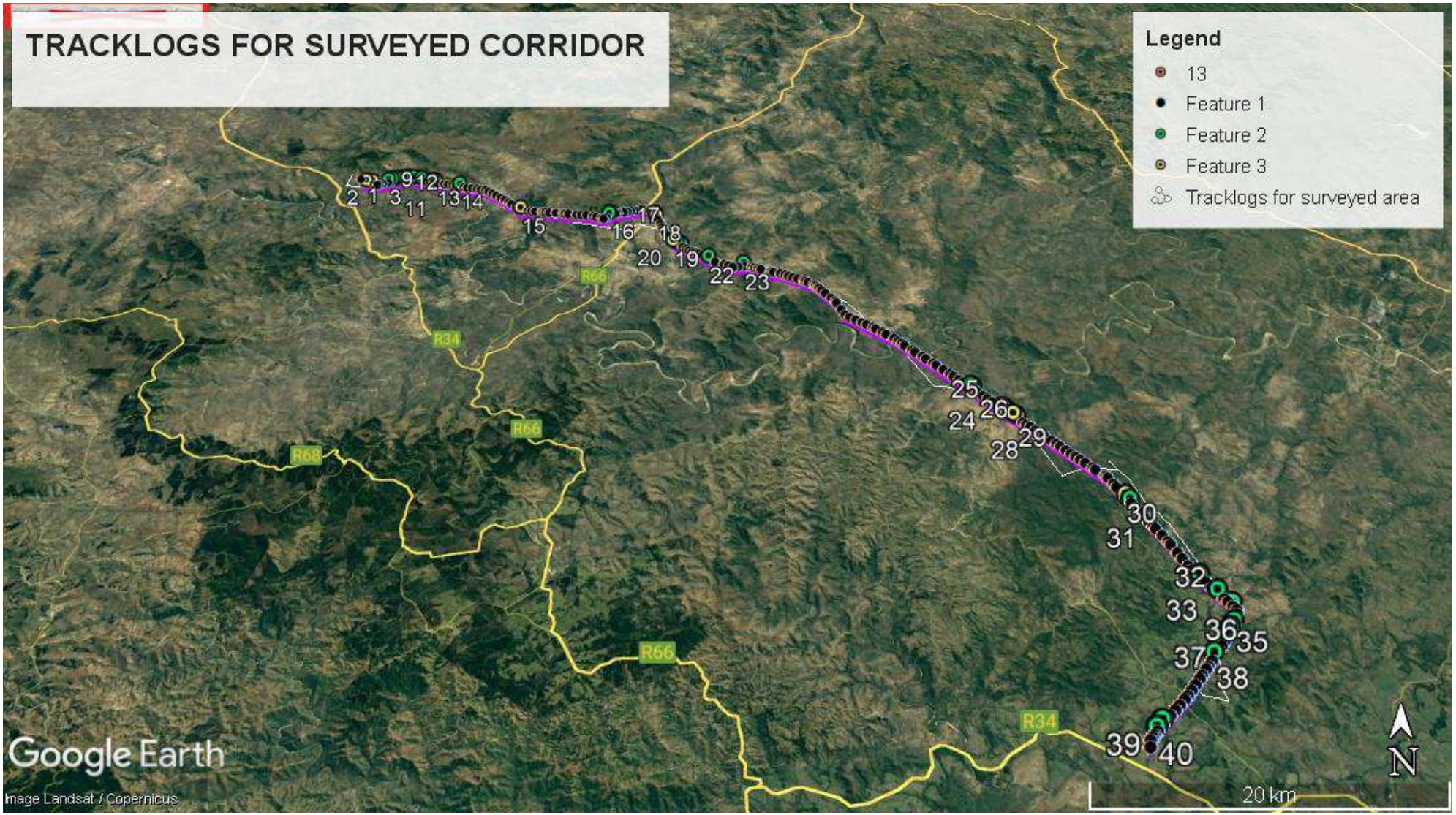

Figure 3: Tracklogs for surveyed corridor and substation site

1.3 Project description

The coordinates of the centreline of the route and position of the towers would determine by surveyors after a final route corridor was approved by the environmental authorities. The construction process would consist of the following phases:

a) Contractor site establishment,

b) Survey and pegging of tower positions,

c) Access road negotiation and construction,

d) Gate installation and vegetation clearing,

e) Foundation excavation and installation,

f) Tower assembly,

g) Conductor stringing and tensioning,

h) Servitude clean-up and rehabilitation.

2 LEGISLATIVE CONTEXT

Three main pieces of legislations are relevant to the present study and there are presented here. Under KwaZulu Natal Amafa and Research Institute Act No. 05 of 2018), the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA), an AIA or HIA is required as a specialist sub-section of the Basic Assessment (BA) process.

General protection for Structures,

37.(1)(a) No structure which is, or which may reasonably be expected to be, older than 60 years, may be demolished, altered or added to without the prior written approval of the Institute having been obtained on written application to the Institute.

(b) Where the Institute does not grant approval, the Institute must consider special protection in terms of sections 44, 45, 46, 47 and 49 of Chapter 9.

(2) The Institute may, by notice in the Gazette, exempt –

(a) a defined geographical area; or

(b) defined categories of sites within a defined geographical area,

from the provisions of subsection (1) where the Institute is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 44, 45, 46, 47 and 49 of Chapter 9.

(3) A notice referred to in subsection (2) may, by notice in the Gazette, be amended or withdrawn by the Institute.

General protection: Graves of victims of conflict

38. No person may damage, alter, exhume, or remove from its original position –

(a) the grave of a victim of conflict.

(b) a cemetery made up of such graves; or

(c) any part of a cemetery containing such graves, without the prior written approval of the Institute having been obtained on written application to the Institute and in terms of the Regulations to this Act

General protection: Graves of victims of conflict

39. (1) No grave or burial ground older than 60 years, or deemed to be of heritage significance by a heritage authority –

(a) not otherwise protected by this Act; and

(b) not located in a formal cemetery managed or administered by a local authority,

may be damaged, altered, exhumed, inundated, removed from its original position, or otherwise disturbed without the prior written approval of the Institute having been obtained on written application to the Institute.

(2) The Institute may only issue written approval once it is satisfied that –

(a) the applicant has provided evidence of efforts to consult with communities or descendants who may have an interest in the grave, using the guidelines and criteria for consultation set out in regulations; and

(b) the applicant and the relevant communities or descendants have reached agreement regarding the grave

General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites

40.(1) No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Institute having been obtained on written application to the Institute.

(2) Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Institute without delay.

(3) The Institute may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Institute to be inappropriate within 50 metres of a rock art site.

(4) No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Institute having been obtained on written application to the Institute

(5) No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Institute having been obtained on written application to the Institute.

(6)(a) The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vests in the Provincial Government and the Institute is regarded as the custodian on behalf of the Provincial Government.

(b) The Institute may establish and maintain a provincial repository or repositories for the safekeeping or display of –

(i) archaeological objects;

(ii) palaeontological material;

(iii) ecofacts;

(iv) objects related to battlefield sites;

(v) material cultural artefacts; or

(vi) meteorites.

(7) The Institute may, subject to such conditions as the Institute may determine, loan any object or material referred to in subsection (6) to a national or provincial museum or institution.

(8) No person may, without the prior written approval of the Institute having been obtained on written application to the Institute, trade in, export or attempt to export from the province –

(a) any category of archaeological object;

(b) any palaeontological material;

(c) any ecofact;

(d) any object which may reasonably be regarded as having been recovered from a battlefield site;

(e) any material cultural artefact; or

(f) any meteorite.

(9)(a) A person or institution in possession of an object or material, referred to in paragraphs (a) - (f) of subsection (8), must submit full particulars of such object or material, including such information as may be prescribed, to the Institute.

(b) An object or material referred to in paragraph (a) must, subject to paragraph (c) and the directives of the Institute, remain under the control of the person or institution submitting the particulars thereof.

(c) The ownership of any object or material referred to in paragraph (a) vests in the Provincial Government and the Institute is regarded as the custodian on behalf of the Provincial Government.

Heritage resources management

41.(1) Any person who intends to undertake a development categorised as –

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m 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;

(ii) involving three or more existing erven or subdivisions thereof;

(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;

(d) the rezoning of a site exceeding 10 000 m2 in extent; or

(e) any other category of development provided for in regulations,

must, at the very earliest stages of initiating such a development, notify the Institute and furnish it with details regarding the location, nature and extent of the proposed development.

(2) The Institute must, within 14 days of receipt of a notification in terms of subsection (1) –

(a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report: Provided that such

report must be compiled at the cost of the person proposing the development, by a person or persons approved by the Institute with relevant qualifications and experience and professional standing in heritage resources management; or

(b) notify the person concerned that this section does not apply.

(3) The Institute must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included –

(a) the identification and mapping of all heritage resources in the area affect;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in regulations;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) the consideration of alternatives, if heritage resources will be adversely affected by the proposed development; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development.

(4) The report must be considered timeously by the Institute which must, after consultation with the person proposing the development, decide –

(a) whether or not the development may proceed;

(b) any limitations or conditions to be applied to the development;

(c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;

(d) whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and

(e) whether the appointment of specialists is required as a condition of approval of the proposal.

(5) The Institute must not make any decision under subsection (4), with respect to any development which impacts on a heritage resource protected at national level, unless it has consulted the heritage resources authority.

(6) The applicant may appeal against the decision of the Institute to the responsible Member of the Executive Council, who –

(a) must consider the views of both parties; and

(b) may, at his or her discretion

(i) appoint a committee to undertake an independent review of the impact assessment report and the decision of the Institute; and

(ii) consult the National Heritage Resources Agency; and

(c) must uphold, amend or overturn such decision.

(7) The provisions of this section do not apply to a development described in subsection (1) affecting any heritage resource formally protected by the National Heritage Resources Agency unless the Institute decides otherwise.

(8) The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that –

(a) the evaluation fulfils the requirements of the Institute in terms of subsection (3); and

(b) any comments and recommendations of the Institute with regard to such development have been taken into account prior to the granting of the consent.

(9) The Institute, with the approval of the responsible Member of the Executive Council, may, by notice in the Provincial Gazette, exempt from the requirements of this section any place specified in the notice.

(10) Any person who has complied with the decision of the Institute in subsection (4) or of the responsible Member of the Executive Council in terms of subsection (6) or other requirements referred to in subsection (8), is exempted from compliance with all other protections in terms of this Part, but any existing heritage agreements made in terms of section 42 continue to apply

Table 2: Evaluation of the proposed development as guided by the criteria in NHRA and NEMA

ACT	Stipulation for developments	Requirement details
NHRA Section 38(8)	The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority regarding such developments have been taken into account prior to the granting of the consent	yes
NHRA Section 34	Impacts on buildings and structures older than 60 years	Non recorded
NHRA Section 35	Impacts on archaeological and palaeontological heritage resources	Subject to identification during Phase 1
NHRA Section 36	Impacts on graves	Subject to identification during Phase 1
NHRA Section 37	Impacts on public monuments	Subject to identification during Phase 1
Chapter 5 (21/04/2006) NEMA	HIA is required as part of an EIA	Yes
Section 39(3)(b) (iii) of the MPRDA	AIA/HIA is required as part of an EIA	No, it is not a mining project

3 METHODOLOGY

This document aims at providing an informed heritage-related opinion about the proposed powerline development in the Zululand and King Cetshwayo District Municipalities in KwaZulu Natal Province. This is usually achieved through a combination of a review of any existing literature and a site inspection. As part of the desktop study, Heritage Impact reports, walkdown survey reports and mitigation reports produced for the project formed the basis of our desktop study. In addition, published literature and cartographic data, as well as archival data on heritage legislation, the history and archaeology of the area were studied. The desktop study was followed by field surveys. The field assessment was conducted according to generally accepted AIA/HIA practices and aimed at locating all possible objects, sites, and features of cultural significance on the development footprint. Initially a drive-through was undertaken along the previously approved corridor as a way of acquiring the archaeological impression of the general area. This was then followed by a walk down survey along the proposed powerline route and substation site, with a handheld Global Positioning System (GPS) for recording the location/position of each possible site. Detailed photographic recording was also undertaken where relevant. The findings were then analysed in view of the proposed transmission powerline development in order to make recommendations to the competent authority. The result of this investigation is a report indicating the presence/absence of heritage resources and how to manage them in the context of the proposed powerline development.

3.1 The Fieldwork survey

The fieldwork survey was undertaken on the 4th of April 2023. The focus of the survey involved a pedestrian survey which was conducted within the electricity supply site. The pedestrian survey focused on parts of the project area where it seemed as if disturbances may have occurred in the past, for example bald spots in the grass veld; stands of grass which are taller that the surrounding grass veld; the presence of exotic trees; evidence for building rubble, existing buildings and ecological indicators such as invader weeds.

The literature survey suggests that prior to the 20th century modern residential developments; the general area would have been a rewarding region to locate heritage resources related to Iron Age and historical sites (Bergh 1999: 4). However, the situation today is completely different. The study area now lies on a clearly modified landscape that is dominated by residential developments, agriculture and associated infrastructure developments (see Figures 2 and 3).

3.2 Visibility and Constraints

Most sections of the proposed powerline route and substation site are accessible although visibility was partially impeded by vegetation cover. It is conceded that due to the subterranean nature of cultural remains this report should not be construed as a record of all archaeological and historic sites in the area.

3.3 Consultations

The Basic Assessment (BA) Public Participation process is conducted by the EAP. The study team consulted residents about the heritage character of the study area. The BA Public Participation Process will also invite and address comments from affected communities and any registered heritage bodies on any matter related to the proposed project including heritage concerns that may arise relating to construction activities. The heritage issues and concerns raised by the public will also be included in the Final Basic Assessment Report.

The following photographs illuminate the nature and character of the Project Area.

Plate 1: showing Umfolozi Substation were the proposed powerline will connect(Photograph by Menno Klapwijk)

Plate 2: showing the Umfolozi Substation

Plate 3: showing proposed powerline route

Plate 4: showing showing proposed powerline route

Plate 5: showing showing proposed powerline route

Plate 6: showing proposed powerline route.

Plate 7: showing showing proposed powerline route

Plate 8: showing proposed powerline route.

Plate 9: showing proposed powerline route

Plate 10: showing proposed powerline route

Plate 11: showing proposed powerline route.

Plate 12: showing proposed powerline route.

Plate 13: showing proposed powerline route.

Plate 14: showing agriculture infrastructure within the proposed project area

Plate 15: showing proposed powerline route

Plate 16: showing proposed powerline route

Plate 17: showing showing proposed powerline route

Plate 18: showing proposed powerline route.

Plate 19: showing proposed powerline route.

Plate 20: showing proposed powerline route.

Plate 21: showing proposed powerline route.

Plate 22: showing proposed powerline route.

Plate 23: showing proposed powerline route.

Plate 24: showing proposed powerline route.

Plate 25: showing proposed powerline route.

Plate 26: showing proposed powerline route.

Plate 27: showing proposed powerline route.

Plate 28: showing proposed powerline route.

Plate 29: showing proposed powerline route.

Plate 30: showing proposed powerline route.

Plate 31: showing proposed powerline route.

Plate 32: showing proposed powerline route.

Plate 33: showing proposed powerline route.

4 ARCHAEOLOGICAL CONTEXT

4.1 Archaeology

The archaeological and history of KwaZulu-Natal dates to over 2 million years, which marks the beginning of the Stone Age (Maggs 1988). The Stone Age in KwaZulu- Natal was extensively researched by Oliver Davies formerly of the Natal Museum (see for example Davies, 1976, 1952). Abundant evidence of Stone Age archaeology of the KZN region are recorded amongst others at Sibudu Cave on the coast of KwaZulu-Natal and Drakensberg Mountains. Archaeological evidence at Sibudu Cave shows early forms of cognitive human behavioural patterns in the MSA of South Africa some 40 000 years BP (e.g., Wadley, 2005; Wadley *et al,* 2004; Wadley, 2001). Border Cave also has abundant evidence of the Stone Age material culture (Fourie, 2003).

KwaZulu Natal is also known to have been occupied by the San people who mainly resided in caves, plains, valleys and foothills. Evidence for San occupation includes numerous of rock art sites, predominantly in the form of rock paintings and material culture recorded in areas such as the Giants Castle and Kamberg in the Drakensburg Mountains located south and east of the province of KwaZulu-Natal (Vinnicombe 1976).

The Iron Age of the KwaZulu Natal region dates back to the 5th Century AD when the Early Iron Age (EIA) proto-Bantu-speaking farming communities began arriving in this region, which was then occupied by hunter-gatherers. These EIA communities are archaeologically referred to as the Kwale branch of the Urewe EIA Tradition (Huffman, 2007: 127-9). The Iron Age communities occupied the foot-hills and valley lands introducing settled life, domesticated livestock, crop production and the use of iron (also see Maggs 1984a; 1984b; Huffman 2007). Alongside the Urewe Tradition was the Kalundu Tradition whose EIA archaeological sites have been recorded along the KwaZulu Natal region.

The second period of occupation in KwaZulu-Natal was during the Early and Middle Iron Age; an occupation of the KwaZulu-Natal region by the Bantu speakers who migrated from as far as the Great Lakes regions of Congo and Cameroon. The site of Mzonjani, near Durban is the oldest known Iron Age site in KwaZulu-Natal, dating to the 3rd Millennium AD (Huffman, 2010). The Mzonjani Facies is the type of pottery most likely to be found within the study area. This pottery is characterized by punctures on the rim and spaced motifs on the shoulder (see Huffman 2007). The Early Iron Age sites typically occur on the alluvial and colluvial soils in the large river valleys below 700m above sea level. Some have been located along the Msunduzi River as well as in the Ashburton area. Later Iron Age sites occur in similar contexts as well as on ridges or plato's in the existing grassland. Some impressive Later Iron Age sites occur in the Umngeni River Valley close to Howick as well as in the Ottos Bluff area near Albert Falls Dam.

From about 15 00 AD the region was occupied by new coming groups of Late Iron Age farmers of the Kalundu Tradition (ibid). The region was the centre of immigration and migration of different African groups some of which

are ancestors of the contemporary Zulu predominant in the region. The archaeological evidence of the Iron Age people in the region is represented through distinct ceramic traditions, stone walls and other structural features such as grain bins and hut floor remains kraal remains, vitrified cattle dung slugs, iron implements, bellows and furnaces. The earliest known type of stonewalling that characterises the Central Cattle Pattern in KwaZulu Natal region (KZN) is known as Moor Park, which dates from 14th to 16th Centuries AD (Huffman, Whitelaw, Davis 1974). This type of stonewalling can be found in defensive position on hilltops in the Midlands of KZN (Huffman, 2010 & 2007). Archaeologists have concluded that the function of these structures was to serve mainly defensive purposes - the site of Moor Park is "located on the spurs and ends of hills, stone walls cut the settlement off from remaining terrain perimeter walls enclose about two thirds of the settlement, leaving the back free" (Huffman, 2007). However, it has to be noted that the Central Cattle Pattern and other forms of Iron Age stonewalling features are not unique to the eastern Bantu Speaking language groups (Nguni) (Huffman's 2007).

Other than stone walled structures, the other form of Iron Age structures are the 'beehive huts'- documented in many of historical records dating as far back as the colonial times. Beehive structures presents a challenge to the archaeological study of Iron Age in the province because they are often not adequately preserved in the archaeological record. Huffman (2007) argues that the archaeology of the KwaZulu-Natal is not as prominent as is in other parts of the country because most of the structures were built of thatch material that do not preserve well. The same is true for their ceramic traditions. The type site of Moor Park therefore presents a unique view of the Iron Age in this region and is worth a mention in this report.

Historians argues that communities existed in numerous small-scale political units of different sizes, population numbers and political structures (Wright & Hamilton, 1989). During the second half of the eighteenth century, stronger chiefdoms and paramountcies emerged (Wright &Hamilton 1989). A more centralized political system emerged in the 1780's. This shift was mainly characterized by population growth and geographical expansion of states. The most important and largest and strongest states at the time were the Mabhudu, Ndwandwe and Mthethwa. However, other smaller states, also established themselves in the greater Tugela Region. These included in the south the Qwabe, Bhaca, Mbo, Hlubi, Bhele, Ngwane and many others (Wright & Hamilton, 1989). As such the Late Iron Age in KwaZulu-Natal and other parts of southern Africa this period was characterised by a variety of expansionists' battles fought by different chiefdoms, culminating in the pre-colonial southern African war called Imfecane (Ommer-Cooper, 1993).

Throughout the middle of the 1800s the region witnessed the Mfecane migrations and displacements linked to Tshaka's expansionist policy. One of the prominent chiefdoms that was conquered was the Ndwandwe chiefdom of Zwide kaLanga which were situated north of King Shaka's territory around the modern day kwaNongoma (Knight, 1998). Shaka managed to achieve his ideal kingdom by strategically expanding the traditional amabutho system. King Shaka's reign as the Zulu King did not last long as he was assassinated by his younger brothers in September 1828. One of them, Dingane KaSenzangakhona later became the king of Zulu. King Shaka moved the

royal homestead to KwaDukuza in Stanger, south of upper Thukela River before his assassination by Dingane (and Mpande) who later re-relocated and rebuilt it at eMgungundlovu. Umgungundlovu is 'The Place Surrounding the Elephant' in the emaKhosini valley where King Shaka and King Dingane's forefathers are buried. It has been suggested that one important reason for the relocation of the royal homestead back to uMgungundlovu- north of the upper Thukela River was the growing influence of the white community at Port Natal (settlers) and the encroaching Trek Boers who crossed uKhahlamba Mountains into Natal in the 1837 (Knight, 1998). Dingane, then King of the Zulus died in February 1840 under the defeat of his brother Mpande with the assistance of the Voortrekkers in the battle on the Maqongqo Hills. Mpande had initially assisted Dingane to assassinate Shaka.

European settlement of the area started soon after 1838 when the first Voortrekker settlers marked out large farms in the area. The Voortrekkers arrived in Natal regions in the shadow of the weakened African kingdoms and chiefdoms in the aftermath of the Mfecane. This effectively ushered in new era of colonial occupation by succeeding Afrikaans and British colonial administration authorities through the last half of the 1800s and into the last 1900s. By 1850s the region witnessed the influx of more settler communities which triggered settler wars between the African chiefdoms and the incoming Afrikaner settlers. Some of these colonial wars and battles lasted into Anglo-Boer wars of 1899-1902. A great number, led by Piet Retief, crossed the Drakensburg into Natal. They encountered the Zulu people who lured them into a trap and brutally massacred the entire group. This is said to be one of the many failures of the white settler expeditions in the frontiers and when the shocking news reached the Cape, more groups were sent to the interior for revenge. A series of battles were fought but the most notable was the Battle of Blood River in 1838 where the Boers defeated the Zulus. This ended the Zulu threat to the white settlers and a permanent and formal settlement in the former Natal Colony was established. However, the Republic of Natalia was annexed by the British in 1845 (Wright & Hamilton, 1989). There after the region was subsequently annexed by the British and effectively placed the majority of African communities under the Union of South Africa in 1910, which eventually ended with the establishment of the new South Africa in 1994.

SAHRIS Database and Impact assessment reports in the proposed project area

According to SAHRIS Database, several archaeological and heritage studies were conducted in the project area. The studies include HIA for solar plants, powerline, roads and other infrastructure development projects were completed by SRK (2006), Whitelaw, (2007a &b), Whelan (2007); Prins (2013a, 2013b, 2013c), Van Schalkwyk (2013), Anderson (2015), Brikholtz (2016). These studies recorded LSA, MSA and LSA sites, burial sites and historical buildings and structures of varying significance. Most importantly the initial HIA study for the proposed project (Seleane 2014) is key to the findings of this report. These findings provided insights regarding the heritage potential of the study sites.

4.2 Intangible Heritage

As defined in terms of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003) intangible heritage includes oral traditions, knowledge and practices concerning nature, traditional craftsmanship and rituals and festive events, as well as the instruments, objects, artefacts and cultural spaces associated with group(s) of people. Thus, intangible heritage is better defined and understood by the particular group of people that uphold it. In the present study area, very little intangible heritage remains because no historically known groups occupied the study area and most of the original settler descendants moved away from the area.

5 RESULTS OF THE FIELD STUDY

5.1 Archaeology

The proposed powerline route and substation site were scanned for archaeological remains during the survey. The study focused on areas previously mentioned in the previous heritage reports. Based on the field study results and field observations no new archaeological sites were recorded along the powerline route. Visibility was compromised by overgrown vegetation cover which impeded detection archaeological remains along the powerline route. As such the receiving environment for the proposed development is low to medium potential to yield previously unidentified archaeological remains during construction. Literature review also revealed that no Stone Age sites are not shown on a map contained in a historical atlas of this area. This, however, should rather be seen as a lack of research in the area and not as an indication that such features do not occur.

5.2 Burial grounds and Graves

Human remains and burials are commonly found close to archaeological sites and abandoned settlements; they may be found in abandoned and neglected burial sites or occur sporadically anywhere because of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human burials on the landscape as these burials, in most cases, are not marked at the surface and concealed by dense vegetation cover. Human remains are usually identified when they are exposed through erosion, earth moving activities and construction. In some instances, packed stones or bricks may indicate the presence of informal burials. If any human bones are found during the course of construction, then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial, they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500) or Department of Health for graves younger than 60 years.

The field survey did not identify any burial sites within the approved corridor that may require mitigation. They have both historical and social significance and are considered sacred. Graves must not be tempered with without a permit from Amafa aKwaZulu Natali and Research institute. Although graves that were directly located within the footprint of the proposed powerline corridor were relocated in 2016, the possibility of encountering human remains during excavation for tower foundations, clearance for access roads, clearance for camp sites and subsurface earth moving activities at the substation is ever present. It is the considered of the author that the possibility of encountering previously unidentified burial sites is low on the substation site, should such sites be identified during construction, they are still protected by applicable legislations, and they should be protected. The proposed powerline development may be approved without any further investigation and mitigation in terms of Section 36 of the NHRA read together with the Human Tissue Act of 1983 and SAHRA Regulations of 2020.

5.3 Public Monuments and Memorials

The study did not record any public memorials and monuments along the proposed powerline route and substation site that require protection during construction. As such the proposed powerline development may be approved without any further investigation and mitigation in terms of Section 27 of the NHRA.

5.4 Buildings and Structures

The study did not record any buildings or structures within the proposed substation and powerline route. As such, the proposed powerline development may be approved without any further investigation and mitigation in terms of Section 34 of the NHRA and its Amafa aKwaZulu Natal equivalent.

5.5 Impact Statement

The main cause of impacts to archaeological sites is direct, physical disturbance of the archaeological remains themselves and their contexts. It is important to note that the heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from their original position. The primary impacts are likely to occur during clearance and digging of tower foundations, indirect impacts may occur during movement of heavy construction vehicles and machinery during installation of powerline towers and stringing. Any additional clearance of access roads will result in the relocation or destruction of all existing surface heritage material (if any are present).

Since heritage sites, including archaeological sites, are non-renewable, it is important that they are identified, and their significance assessed prior to construction. It is important to note that due to the localised nature of archaeological resources, that individual archaeological sites could be missed during the survey, although the probability of this is very low along the proposed powerline route. Further, archaeological sites and unmarked graves may be buried beneath the surface and may only be exposed during surface clearance. The purpose of the AIA is to assess the sensitivity of the area in terms of archaeology and to avoid or reduce the potential impacts of the proposed powerline development by means of mitigation measures (see appended Chance Find Procedure). It is the considered opinion of the author that the chances of recovering significant archaeological materials is very low along the proposed powerline route.

Table 3: Summary of Findings

Heritage resource	**Status/Findings**
Buildings, structures, places and equipment of cultural significance	None recorded along the proposed substation and powerline route

Areas to which oral traditions are attached or which are associated with intangible heritage	None exist
Historical settlements and townscapes	None survives in the proposed area
Landscapes and natural features of cultural significance	None
Archaeological and palaeontological sites	None recorded along the substation and proposed powerline route
Graves and burial grounds	None recorded
Movable objects	None
Overall comment	The surveyed area has no confirmable archaeological remains. The proposed powerline development is supported from a heritage perspective.

5.6 Assessment of development impacts

An impact can be defined as any change in the physical-chemical, biological, cultural, and/or socio-economic environmental system that can be attributed to human activities related to the project site under study for meeting a project need. The significance of the impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the impacts will be assessed considering the following descriptors:

Table 4: Criteria Used for Rating of Impacts

Nature of the impact (N)		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.
`Magnitude(M)		
Minor	2	Negligible effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been altered significantly and have little to no conservation importance (negligible sensitivity*).
Low	4	Minimal effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been largely modified, and / or have a low conservation importance (low sensitivity*).
Moderate	6	Notable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been moderately modified and have a medium conservation importance (medium sensitivity*).
High	8	Considerable effects on biophysical or social functions / processes. Includes areas / environmental

		aspects which have been slightly modified and have a high conservation importance (high sensitivity*).
Very high	10	Severe effects on biophysical or social functions / processes. Includes areas / environmental aspects which have not previously been impacted upon and are pristine, thus of very high conservation importance (very high sensitivity*).
Extent (E)		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration (D)		
Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability of occurrence (P)		
Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur, or where applicable has occurred, regardless or in spite of any mitigation measures.

Once the impact criteria have been ranked for each impact, the significance of the impacts will be calculated using the following formula:

Significance Points (SP) = (Magnitude + Duration + Extent) x Probability

The significance of the ecological impact is therefore calculated by multiplying the severity rating with the probability rating. The maximum value that can be reached through this impact evaluation process is 100 SP (points). The significance for each impact is rated as High (SP≥60), Medium (SP = 31-60) and Low (SP<30) significance as shown in the below.

Table 5: Criteria for Rating of Classified Impacts

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimum or no mitigation and as such have a limited influence on the decision
Medium	31-60	Where the impact can have an influence on the environment and should be mitigated and as such could have an influence on the decision unless it is mitigated.
High	61-100	Where the impact will definitely have an influence on the environment and must be mitigated, where possible. This impact will influence the decision regardless of any possible mitigation.
Significance of predicted POSITIVE impacts		

Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

Table 6: Operational Phase

Impacts and Mitigation measures relating to the proposed project during Operational Phase														
Activity/Aspect	**Impact /**	**Aspect**	**Nature**	**Magnitude**	**Extent**	**Duration**	**Probability**	**Impact before mitigation**	**Mitigation measures**	**Magnitude**	**Extent**	**Duration**	**Probability**	**Impact after mitigation**
Clearing and construction	Destruction of archaeological remains	Cultural heritage	-	2	1	1	2	8	• Use chance find procedure to cater for accidental finds	2	1	1	2	8
	Disturbance of graves	Cultural heritage	-	6	2	2	2	20	• Watch out for any new burials along the corridor • Use appended Chance find procedure to cater for accidental finds.	2	1	1	1	4
	Disturbance of buildings and structures older than 60 years old	Operational	-	2	1	1	1	4	• Mitigation is not required	2	1	1	1	4
Haulage	Destruction public monuments and plaques	Operational	-	2	1	1	1	4	• Mitigation is not required because there are no public monuments within the project site	2	1	1	1	4

5.7 Cumulative Impacts

Cumulative impacts as are defined as Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. Therefore, the assessment of cumulative impacts for the proposed development is considered the total impact associated with the site when combined with other past, present, and reasonably foreseeable future development projects. An examination of the potential for other projects to contribute cumulatively to the impacts on heritage resources from this site was undertaken during the preparation of this report. The total impact arising from the powerline development (under the control of the applicant), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated.

The impacts of the proposed powerline project site were assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation, this provides a good method of assessing a project's impact. However, in this case there are several infrastructure developments, including residential, road networks, commercial infrastructure where baselines have already been affected, the proposed development will add to the existing impacts in the project area. As such increased development in the project area will have a number of cumulative impacts on heritage resource whether known or covered in the ground. For example, during construction phase there will be increase in human activity and movement of heavy construction equipment and vehicles that could change, alter or destroy heritage resources within and outside the electricity supply project site given that archaeological remains occur on the surface. Cumulative impacts that could result from a combination of this project and other actual or proposed future developments in the broader study area include site clearance and the removal of topsoil which could result in damage to or the destruction of heritage resources that have not previously been recorded for example abandoned and unmarked graves.

Heritage resources such as burial grounds and graves, archaeological as well as historical sites are common occurrences within the greater study area. These sites are often not visible and as a result, can be easily affected or lost. Furthermore, many heritage resources in the greater study area are informal, unmarked and may not be visible, particularly during the wet season when grass cover is dense. As such, workers may not see these resources, which results in increased risk of resource damage and/or loss.

Earth moving and extraction of gravel have the potential to interact with archaeology, architectural and cultural heritage.

No specific paleontological resources were found in the project area during the time of this study; however, this does not preclude the fact that paleontological resources may exist within the greater study area. As such, the proposed powerline development has the potential to impact on possible paleontological resources in the area. Sites of archaeological, paleontological, or architectural significance were not specifically identified, and cumulative effects are not applicable. The nature and severity of the possible cumulative effects may differ from site to site depending on the characteristics of the sites and variables.

Cumulative impacts that need attention are related to the impacts of clearances, digging tower foundations, access roads and impacts to buried heritage resources. Allowing the impact of the proposed powerline development to go beyond the surveyed area would result in a significant negative cumulative impact on sites outside the surveyed area. A significant cumulative impact that needs attention is related to stamping by especially construction vehicles at the site. Movement of heavy construction machinery must be monitored to ensure they do not drive beyond the approved sites. No significant cumulative impacts, over and above those already considered in the impact assessment, are foreseen at this stage of the assessment process.

5.8 Mitigation

Mitigation for the proposed substation and powerline development is not required for now until new data suggest that there are significant heritage resources that occur along the powerline corridor. A copy of the chance finds procedure must be kept at the site office to ensure appropriate management of any accidental finds at the project site.

6 ASSESSING SIGNIFICANCE

The Guidelines to the SAHRA Guidelines and the Burra Charter define the following criterion for the assessment of cultural significance:

6.1 Aesthetic Value

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture, and material of the fabric; sense of place, the smells and sounds associated with the place and its use.

6.2 Historic Value

Historic value encompasses the history of aesthetics, science, and society, and therefore to a large extent underlies all the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase, or activity. It may also have historic value as the site of an important event. For any given place, the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

6.3 Scientific value

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality, or representativeness, and on the degree to which the place may contribute further substantial information. Scientific value is also enshrined in natural resources that have significant social value. For example, pockets of forests and bushvelds have high ethnobotany value.

6.4 Social Value

Social value embraces the qualities for which a place has become a focus of spiritual, religious, political, local, national, or other cultural sentiment to a majority or minority group. Social value also extends to natural resources such as bushes, trees and herbs that are collected and harvested from nature for herbal and medicinal purposes.

7 DISCUSSION

Various archaeological and heritage specialist studies have been conducted in the general project area since 2002. The current study should be read in conjunction with previous Phase 1 Impact Studies

conducted in the general project area. These studies recorded sites of varying significance for example Prins (2012, 2014, 2017, 2019) and Beater (2017, 2019) which testify that the project area is a cultural landscape with medium to high potential to yield significant Iron Age sites. The study noted that the substation site and powerline route are located within a degraded area and have reduced sensitivity for the presence of high significance physical cultural site remains on some already disturbed sections. The study did not yield any confirmable archaeological sites that require protection before the construction activities commence. The study noted that the absence of confirmable and significant archaeological cultural heritage sites is not evidence in itself that such sites did not exist within the substation site and powerline route. There is potential of recovering significant archaeological remains beneath the surface. In addition, some sections were not easily accessible due to the steep nature of the powerline route as well as dense vegetation cover at the substation site. Significance of the sites of Interest is not limited to presence or absence of physical archaeological sites.

The findings by archaeological and heritage specialist attest to the fact that the project area may have been located within a rich LIA landscape. As such there is potential for encountering subsurface LIA remains ranges from low to medium on the proposed substation site and powerline route (See the appended Chance find procedure for handling of chance finds). Visibility was affected during the current survey is thought to be a result of previous clearance, and blue gum plantation that may have destroyed surface remains. In addition, surface visibility was compromised by thick vegetation cover. It should be noted that significance of the site is not limited to presence or absence of physical archaeological sites.

Based on the significance assessment criterion employed for this report, the site was rated **low to medium** from an archaeological perspective, However, it should be noted that significance of the sites of Interest is not limited to presence or absence of physical archaeological sites. Significant archaeological remains may be unearthed during development (see appended chance find procedure). The absence of significant archaeological remains may be due to the following factors:

1. That the substation site is located within a heavily degraded area and have reduced sensitivity for the presence of high significance physical cultural site remains due previous agriculture activities.

2. Limited ground surface visibility on sections of the proposed substation site may have impended the detection of other physical cultural heritage site remains or archaeological signatures within the substation site. This factor is exacerbated by the fact that the study was limited to general survey without

necessarily conducting any detailed inspection of specific locations that will be affected by the proposed development.

Based on the significance assessment criterion employed for this report, the electricity supply project site was rated **low** from an archaeological perspective. However, it should be noted that significance of the sites of interest is not limited to presence or absence of physical archaeological sites. Significant archaeological remains may be unearthed during construction. (See appended chance find procedure).

8 RECOMMENDATIONS

1. It is recommended that Amafa aKwaZulu Natali and Research Institute endorse the report as having satisfied the requirements of Section 41 (2) of the Amafa aKwaZulu Natal and Research Institute of 2018 read together with Section 38 (8) of the National Heritage Resources Act 25 of 1999.
2. It is recommended that Amafa aKwaZulu Natal and Research Institute decide in terms of Section 38 (4) of the NHRA to approve the proposed substation and powerline route on condition that no significant heritage sites were identified along the approved corridor.
3. From a heritage perspective supported by the findings of this study, the project is supported. However, construction activities should be approved under observation that the dimensions do not extend beyond the area considered in this report.
4. Should chance archaeological materials or human remains be exposed during activities on any section of the powerline corridor and substation site, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption of the project scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the Amafa akwaZulu Natali and Research Institute regulations.
5. Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of this heritage report, there are no significant cultural heritage resources barriers to the proposed powerline development. SAHRA may approve the project as planned with special commendations to implement the recommendations here in made.

9 CONCLUSIONS

Integrated Specialist Services (Pty) Ltd was tasked by Kimopax(Pvt) Ltd on behalf of Eskom Holdings SOC Ltd to carry out HIA for the proposed Umfplozi Theta Powerline and Substation in the Zululand and King Cetshwayo District Municipalities in KwaZulu Natal Province. The study did not record any new sites along the powerline corridor. Desktop research revealed that the project area is rich in Late Iron Age and historical sites, however, the field study did not identify any sites along the proposed powerline route. In terms of the archaeology, there are no obvious 'Fatal Flaws' or 'No-Go' areas. However, the potential for chance finds, remains and the applicant and contractors are urged to be diligent and observant during topsoil clearance at the site. The procedure for reporting chance finds has clearly been laid out and if this report is adopted by Amafa aKwaZulu Natali and Research institute, then there are no archaeological reasons why the proposed powerline development cannot be approved.

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APPENDIX 1: CHANCE FIND PROCEDURE FOR PROPOSED 400KV UMFOLOZI THETA POWERLINE, LOOP IN AND LOOP OUT POWERLINE AND A NEW SUBSTATION IN THE ZULULAND AND KING CETSHWAYO DISTRICT MUNICIPALITIES OF THE KWAZULU NATAL PROVINCE

10 APRIL 2023

ACRONYMS

BGG	Burial Grounds and Graves
CFPs	Chance Find Procedures
ECO	Environmental Control Officer
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA	South African Heritage Resources Authority
SAPS	South African Police Service
UNESCO	United Nations Educational, Scientific and Cultural Organisation

10.1 CHANCE FIND PROCEDURE

10.1.1 Introduction

An Archaeological Chance Find Procedure (CFP) is a tool for the protection of previously unidentified cultural heritage resources during construction. The main purpose of a CFP is to raise awareness of all construction workers and management on site regarding the potential for accidental discovery of cultural heritage resources and establish a procedure for the protection of these resources. Chance Finds are defined as potential cultural heritage (or paleontological) objects, features, or sites that are identified outside of or after Heritage Impact studies, normally as a result of construction monitoring. Chance Finds may be made by any member of the project team who may not necessarily be an archaeologist or even visitors. Appropriate application of a CFP on development projects has led to discovery of cultural heritage resources that were not identified during archaeological and heritage impact assessments. As such, it is considered to be a valuable instrument when properly implemented. For the CFP to be effective, the site manager must ensure that all personnel on the proposed development site understand the CFP and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided. In short, the Chance find procedure details the necessary steps to be taken if any culturally significant artefacts are found during construction.

10.1.2 Definitions

In short, the term 'heritage resource' includes structures, archaeology, meteors, and public monuments as defined in the South African National Heritage Resources Act (Act No. 25 of 1999) (NHRA) Sections 34, 35, and 38. Procedures specific to burial grounds and graves (BGG) as defined under NHRA Section 36 will be discussed separately as this requires the implementation of separate criteria for CFPs.

10.1.3 Background

The proposed powerline project is located in the Zululand and King Cetshwayo District Municipalities of KwaZulu Natal Province and is subject to heritage survey and assessment at planning stage in accordance with Section 38 (8) of NHRA. These surveys are based on surface indications alone and it is therefore possible that sites or significant archaeological remains can be missed during surveys because they occur beneath the surface. These are often accidentally exposed in the course of construction or any associated construction work and hence the need for a Chance Find Procedure to deal with accidental finds. In this case an extensive Archaeological Impact Assessment was completed by Mlilo (2023) on the proposed powerline route. The AIA/HIA conducted was very comprehensive,

covering the entire site. The current study (Mlilo 2023) did not record any significant archaeological or heritage resources along the proposed powerline route.

10.1.4 Purpose

The purpose of this Chance Find Procedure is to ensure the protection of previously unrecorded heritage resources along the proposed powerline route. This Chance Find Procedure intends to provide the applicant and contractors with appropriate response in accordance with the NHRA and international best practice. The aim of this CFP is to avoid or reduce project risks that may occur as a result of accidental finds whilst considering international best practice. In addition, this document seeks to address the probability of archaeological remains finds and features becoming accidentally exposed during construction and movement of construction equipment. The proposed powerline development has the potential to cause severe impacts on significant tangible and intangible cultural heritage resources buried beneath the surface or concealed by tall grass cover. Integrated Specialist Services (Pty) Ltd developed this Chance Find Procedure to define the process which governs the management of Chance Finds during construction. This ensures that appropriate treatment of chance finds while also minimizing disruption of the construction schedule. It also enables compliance with the NHRA and all relevant regulations. Archaeological Chance Find Procedures are to promote preservation of archaeological remains while minimizing disruption of construction scheduling. It is recommended that due to the low to moderate archaeological potential of the project area, all site personnel and contractors be informed of the Archaeological Chance Find procedure and have access to a copy while on site. This document has been prepared to define the avoidance, minimization and mitigation measures necessary to ensure that negative impacts to known and unknown archaeological remains as a result of project activities and are prevented or where this is not possible, reduced to as low as reasonably practical during construction.

Thus, this Chance Finds Procedure covers the actions to be taken from the discovering of a heritage site or item to its investigation and assessment by a professional archaeologist or other appropriately qualified person to its rescue or salvage.

10.2 GENERAL CHANCE FIND PROCEDURE

10.2.1 General

The following procedure is to be executed in the event that archaeological material is discovered:

- All construction/clearance activities in the vicinity of the accidental find/feature/site must cease immediately to avoid further damage to the find site.

- Briefly note the type of archaeological materials you think you have encountered, and their location, including, if possible, the depth below surface of the find
- Report your discovery to your supervisor or if they are unavailable, report to the project ECO who will provide further instructions.
- If the supervisor is not available, notify the Environmental Control Officer immediately. The Environmental Control Officer will then report the find to the Site Manager who will promptly notify the project archaeologist and Amafa aKwaZulu Natali and Research Institute
- Delineate the discovered find/ feature/ site and provide 30m buffer zone from all sides of the find.
- Record the find GPS location, if able.
- All remains are to be stabilised *in situ.*
- Secure the area to prevent any damage or loss of removable objects.
- Photograph the exposed materials, preferably with a scale (a yellow plastic field binder will suffice).
- The project archaeologist will undertake the inspection process in accordance with all project health and safety protocols under direction of the Health and Safety Officer.

- **Finds rescue strategy**: All investigation of archaeological soils will be undertaken by hand, all finds, remains and samples will be kept and submitted to a museum as required by the heritage legislation. In the event that any artefacts need to be conserved, the relevant permit will be sought from the aMafa aKwaZulu Natali and Research Institute.
- An on-site office and finds storage area will be provided, allowing storage of any artefacts or other archaeological material recovered during the monitoring process.
- In the case of human remains, in addition, to the above, the SAHRA Burial Ground Unit and or Amafa aKwaZulu Natali and Research Institute will be contacted and the guidelines for the treatment of human remains will be adhered to. If skeletal remains are identified, an archaeological will be available to examine the remains.

- The project archaeologist will complete a report on the findings as part of the permit application process.
- Once authorisation has been given by Amafa aKwaZulu Natali and Research Institute as well as the Applicant will be informed when construction activities can resume.

10.2.2 Management of chance finds

Should the Heritage specialist conclude that the find is a heritage resource protected in terms of the NRHA (1999) Sections 34, 36, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), Integrated Specialist Services (Pty) Ltd will notify SAHRA and/or PHRA on behalf of the applicant. Amafa aKwaZulu Natali and Research Institute may require that a search and rescue exercise be conducted in terms of NHRA Section 38, this may include rescue excavations, for which ISS will submit a rescue permit application having fulfilled all requirements of the permit application process.

In the event that human remains are accidently exposed, SAHRA Burial Ground Unit or ISS Heritage Specialist must immediately be notified of the discovery in order to take the required further steps:

a. Heritage Specialist to inspect, evaluate and document the exposed burial or skeletal remains and determine further action in consultation with the SAPS and Traditional authorities:

b. Heritage specialist will investigate the age of the accidental exposure in order to determine whether the find is a burial older than 60 years under the jurisdiction of SAHRA or that the exposed burial is younger than 60 years under the jurisdiction of the Department of Health in terms of the Human Tissue Act.

c. The local SAPS will be notified to inspect the accidental exposure in order to determine where the site is a scene of crime or not.

d. Having inspected and evaluated the accidental exposure of human remains, the project Archaeologist will then track and consult the potential descendants or custodians of the affected burial.

e. The project archaeologist will consult with the traditional authorities, local municipality, and SAPS to seek endorsement for the rescue of the remains. Consultation must be done in terms of NHRA (1999) Regulations 39, 40, 42.

f. Having obtained consent from affected families and stakeholders, the project archaeologist will then compile a Rescue Permit application and submit to SAHRA Burial Ground and Graves Unit or Amafa aKwaZulu Natali and Research Institute.

g. As soon as the project archaeologist receives the rescue permit from SAHRA he will in collaboration with the company/contractor arrange for the relocation in terms of logistics and appointing of an experienced undertaker to conduct the relocation process.

h. The rescue process will be done under the supervision of the archaeologist, the site representative and affected family members. Retrieval of the remains shall be undertaken in such a manner as to reveal the stratigraphic and spatial relationship of the human skeletal remains with other archaeological features in the excavation (e.g., grave goods, hearths, burial pits, etc.). A catalogue and bagging system shall be utilised that will allow ready reassembly and relational analysis of all elements in a laboratory. The remains will not be touched with the naked hand; all Contractor personnel working on the excavation must wear clean cotton or non-powdered latex gloves when handling remains in order to minimise contamination of the remains with modern human DNA. The project archaeologist will document the process from exhumation to reburial.

i. Having fulfilled the requirements of the rescue/burial permit, the project archaeologist will compile a mitigation report which details the whole process from discovery to relocation. The report will be submitted to Amafa aKwaZulu Natali and Research Institute and to the client.

Note that the relocation process will be informed by SAHRA / Amafa aKwaZulu Natal and Research Institute Regulations and the wishes of the descendants of the affected burial.

11 APPENDIX 4: LEGAL PRINCIPLES OF HERITAGE RESOURCES MANAGEMENT IN SOUTH AFRICA

Extracts relevant to this report from the National Heritage Resources Act No. 25 of 1999, (Sections 5, 36 and 47):

General principles for heritage resources management

5. (1) All authorities, bodies and persons performing functions and exercising powers in terms of this Act for the management of heritage resources must recognise the following principles:

(a) Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and as they are valuable, finite, non-renewable and irreplaceable they must be carefully managed to ensure their survival;

(b) every generation has a moral responsibility to act as trustee of the national heritage for succeeding generations and the State has an obligation to manage heritage resources in the interests of all South Africans.

(c) heritage resources have the capacity to promote reconciliation, understanding and respect, and contribute to the development of a unifying South African identity; and

(d) heritage resources management must guard against the use of heritage for sectarian purposes or political gain.

(2) To ensure that heritage resources are effectively managed

(a) the skills and capacities of persons and communities involved in heritage resources management must be developed; and

(b) provision must be made for the ongoing education and training of existing and new heritage resources management workers.

(3) Laws, procedures and administrative practices must

(a) be clear and generally available to those affected thereby;

(b) in addition to serving as regulatory measures, also provide guidance and information to those affected thereby; and

(c) give further content to the fundamental rights set out in the Constitution.

(4) Heritage resources form an important part of the history and beliefs of communities and must be managed in a way that acknowledges the right of affected communities to be consulted and to participate in their management.

(5) Heritage resources contribute significantly to research, education and tourism and they must be developed and presented for these purposes in a way that ensures dignity and respect for cultural values.

(6) Policy, administrative practice and legislation must promote the integration of heritage resources conservation in urban and rural planning and social and economic development.

(7) The identification, assessment and management of the heritage resources of South Africa must—

(a) take account of all relevant cultural values and indigenous knowledge systems;

(b) take account of material or cultural heritage value and involve the least possible alteration or loss of it;

(c) promote the use and enjoyment of and access to heritage resources, in a way consistent with their cultural significance and conservation needs;

(d) contribute to social and economic development;

(e) safeguard the options of present and future generations; and

(f) be fully researched, documented and recorded.

11.1 Burial grounds and graves

36. (1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1) and must maintain such memorials.

(3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of

such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources
authority.
(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority
(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and
(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.
(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority
(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and
(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.
(7) (a) SAHRA must, over a period of five years from the commencement of this Act, submit to the Minister for his or her approval lists of graves and burial grounds of persons connected with the liberation struggle and who died in exile or as a result of the action of State security forces or agents provocateur and which, after a process of public consultation, it believes should be included among those protected under this section.
(b) The Minister must publish such lists as he or she approves in the Gazette.
(8) Subject to section 56(2), SAHRA has the power, with respect to the graves of victims of conflict outside the Republic, to perform any function of a provincial heritage resources authority in terms of this section.
(9) SAHRA must assist other State Departments in identifying graves in a foreign country of victims of conflict connected with the liberation struggle and, following negotiations with the next of kin, or relevant authorities, it may re-inter the remains of that person in a prominent place in the capital of the Republic.

11.2 General policy

47. (1) SAHRA and a provincial heritage resources authority—

(a) must, within three years after the commencement of this Act, adopt statements of general policy for the management of all heritage resources owned or controlled by it or vested in it; and

(b) may from time to time amend such statements so that they are adapted to changing circumstances or in accordance with increased knowledge; and

(c) must review any such statement within 10 years after its adoption.

(2) Each heritage resources authority must adopt for any place which is protected in terms of this Act and is owned or controlled by it or vested in it, a plan for the management of such place in accordance with the best environmental, heritage conservation, scientific and educational principles that can reasonably be applied taking into account the location, size and nature of the place and the resources of the authority concerned, and may from time to time review any such plan.

(3) A conservation management plan may at the discretion of the heritage resources authority concerned and for a period not exceeding 10 years, be operated either solely by the heritage resources authority or in conjunction with an environmental or tourism authority or under contractual arrangements, on such terms and conditions as the heritage resources authority may determine.

(4) Regulations by the heritage resources authority concerned must provide for a process whereby, prior to the adoption or amendment of any statement of general policy or any conservation management plan, the public and interested organisations are notified of the availability of a draft statement or plan for inspection, and comment is invited and considered by the heritage resources authority concerned.

(5) A heritage resources authority may not act in any manner inconsistent with any statement of general policy or conservation management plan.

(6) All current statements of general policy and conservation management plans adopted by a heritage resources authority must be available for public inspection on request.

APPENDIX 4: SITES THAT WERE MITIGATED IN 2016

Number	Coordinates	Description	Significance	Relation to Line	Mitigation
Site 1	S 28° 13' 12.7" E 31° 12' 08.5"	Cemetery containing one grave. The grave comprises a stone packed dressing.	High	The site is located 13m east of the centre of Tower 5. As a result the development of the tower will negatively impact on the site.	• The tower position must be moved away from the site • The new pylon position must be surveyed by an archaeologist
Site 2	S 28° 13' 13.4" E 31° 12' 27.0"	Three undecorated potsherds as well as a lower grinder exposed by recent vegetation clearing. It is impossible to state how old the artefacts are and whether they can be considered archaeological or not.	Low	The site is located 8m south of the centre of Tower 7. As a result the development of the tower will negatively impact on the site.	• Archaeological watching brief during construction • Should significant archaeological material be exposed, further mitigation work may be required.
Site 3	S 28° 12' 59.7" E 31° 13' 06.7"	Circular stone enclosure dating to either the Late Iron Age or Historic Period. A possible grave is located 29m to the south-west of the structure.	Structure - Medium Possible Grave - High	The site is located 171m north-east of Tower 10 and 329m south-west of the centre of Tower 11. The structure is located on the footprint of the line, whereas the possible grave is 8m south-east of the line.	• Eskom currently uses the structure for the storage of materials. This must immediately stop.
Site 4	S 28° 12' 48.1" E 31° 14' 11.0"	Foundation remains of a circular structure. The structure was most likely a small livestock enclosure.	Low to Medium	The site is located 25m south-west of the centre of Tower 15. As such it is unlikely that the site will be impacted.	• Eskom must be aware of the site and its position to minimise any impact on it.
Site 5	S 28° 13' 04.3" E 31° 15' 27.6"	Possible cemetery containing nine individual stone concentrations. Some stone artefacts are also evident.	High	The site is located on top as well as all around the centre of Tower 21. As a result the development of the tower will negatively impact on the site.	• The tower position must be moved away from the site • The new pylon position must be surveyed by an archaeologist

Site 6	S 28° 13' 09.0" E 31° 15' 51.1"	Oval stone enclosure that is 3m x 2m in extent. The possibility that the structure represents a grave dressing cannot be excluded.	Medium	The site is located 30m north-east of the centre of Tower 22. As such it is unlikely that the site will be impacted upon.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 7	S 28° 14' 12.2" E 31° 18' 58.7"	Early Stone Age low density surface scatter. A total of three stone artefacts where observed. It is possible that the stone artefacts were exposed by the construction of a nearby anti-erosion structure.	Low to Medium	The site is located 8m south-east of the centre of Tower 36. As a result, the development of the tower will negatively impact on the site.	• Archaeological watching brief during construction • Should significant archaeological material be exposed, further mitigation work may be required.
Site 8	S 28° 14' 34.2" E 31° 19' 25.9"	A single grave is located here. The grave dressing comprises a rectangular stone packed dressing with a flat cement surface. No formal headstone is evident. According to Ms. Ntombi Mabaso (pers. comm.) who resides in the homestead nearby, the grave is that of her grandmother Ms. Nesi Mabaso.	High	The site is located 28m south-by-southwest of the centre of Tower 38. As such it is unlikely that the site will be impacted upon.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 9	S 28° 14' 56.7" E 31° 19' 52.8"	An extensive Middle Stone Age and/or Later Stone Age site is located here. A large number of stone artefacts are visible on the surface of the site. The site stretches over an area roughly 40m long and 25m wide.	Medium	At its closest point the site is situated 8m north of the centre point of Tower 40. As a result the development of the tower will negatively impact on the site.	• Phase 2 archaeological mitigation of the site. • Application for a destruction permit to have the archaeological site destroyed.
Site 10	S 28° 15' 00.2" E 31° 19' 56.5"	Cemetery containing one grave located near the Mbatha homestead. The dressing is	High	The site is located 147m south-east of Tower 40 and 319m north-west of Tower 41. The	• Eskom must be aware of the site and its position and ensure that no impact on the site take

		orientated along the east-west axis and comprises an oval shaped stone packed dressing which is roughly 0.5m high. According to Mr. Mbatha (pers. comm.) his wife is buried here, and her name was Ms. Cindy Mbatha.		proposed line crosses directly over the site.	place during construction.
Site 11	S 28° 15' 11.0" E 31° 20' 08.7"	Remains of a historic or recent homestead comprising a number of stone foundations. These include once circular stone foundation which may have been a hut, a section of a circular foundation as well as a section of a straight foundation wall. The only associated artefact that could be observed is a glass jar. The site is not old enough to be archaeological. However, the possibility for graves of babies to be buried here cannot be excluded.	Medium (due to the possibility of graves to be located here)	The site is located 153m south-east of Tower 41 and 111m north-west of Tower 42. The proposed line crosses directly over the site.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 12	S 28° 15' 12.9" E 31° 20' 10.8"	Cemetery containing approximately five graves. The dressings of these graves are for the most part stone packed and the site is densely overgrown. No grave goods are evident on the graves and none of the graves have formal headstones. It is possible that this cemetery was associated with the homestead at	High	The site is located 29m north-west of the centre of Tower 42. The proposed line crosses 3m north-east of the site. As a result the possibility exists for the development of the tower to negatively impact the site.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction. • If this cannot be achieved, the pylon position must be relocated and the new pylon position surveyed by an archaeologist.

		Site 11, which is 80m to the north-west.			
Site 13	S 28° 15' 13.5" E 31° 20' 11.6"	Approximately three stone concentrations are located here. These concentrations are circular in shape, and the possibility that these structures represent the dressings for graves cannot be excluded. No grave goods or formal headstones were observed.	High	The site is located 6m north of the centre of Tower 42. As a result the development of the tower will negatively impact on the site.	• The tower position must be moved away from the site • The new pylon position must be surveyed by an archaeologist
Site 14	S 28° 15' 44.5" E 31° 24' 47.2"	Low density surface scatter of Stone age material.	Low to Medium	The site is located 32m west-by-northwest of the centre of Tower 62. As a result the development of the tower has the potential to negatively impact on the site.	• Archaeological watching brief during construction • Should significant archaeological material be exposed, further mitigation work may be required.
Site 15	S 28° 15' 18.4" E 31° 25' 58.7"	Cemetery containing approximately 20 graves. The dressings of these graves comprise stone-enclosed structures which have been filled with soil.	High	The site is located 152m east-by-northeast of Tower 67 and 135m south-west of Tower 68. The site is furthermore also located 33m south-east of the proposed transmission line. As a result the development is not expected to have any impact on the site.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 16	S 28° 15' 15.0" E 31° 26' 56.3"	Cemetery containing approximately seven graves. Six of these graves are oval to rectangular in shape and comprise stone lined dressings with soil in the middle. These six	High	The site is 2m north of the proposed transmission line, and 69m north-west of Tower 72.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.

		graves are orientated along the north-south axis. One grave comprises a circular stone lined dressing also with soil in the middle. No formal headstones or grave goods could be observed. Due to the presence of a circular grave dressing it is possible that the graves are quite old. Two of the graves have been cleared of vegetation which might also indicate that they are visited by families.			
Site 17	S 28° 15' 31.0" E 31° 27' 04.7"	The site comprises an extensive cemetery that is still used by the local community at present. Although the cemetery was not counted, it can easily contain roughly 200 graves. Various different grave dressings are evident including stone packed dressings as well as granite dressings with granite headstones.	High	The site is located 27m west-by-southwest of the centre of Tower 73. As the cemetery stretches over a long distance, the transmission line also passes within 5m of the cemetery further to the north-west. As a result, the development of the tower has the potential to negatively impact on the site.	• The tower position must be moved away from the site. • The new pylon position must be surveyed by an archaeologist
Site 18	S 28° 15' 41.9" E 31° 27' 11.2"	Remains of a historic or recent homestead comprising a number of stone foundations. These stone foundations include a square (or rectangular) structure as well as a circular one. One or both of these structures may have been the foundations of dwellings. The homestead	Medium (due to the possibility of graves to be located here)	The site is located 11m south-east of the centre of Tower 74. As a result, the development of the tower will negatively impact on the site.	• The former residents of the homestead must be identified and consulted with regarding the presence of graves here. • If the former residents cannot be identified the foundations must be tested by using archaeological test excavation techniques to establish whether graves are indeed buried here

		remains does not appear to be archaeological. However, the possibility for graves of babies to be buried here cannot be excluded.			or not. • If the presence of graves are confirmed by either one of these measures, the pylon must be moved and the new position surveyed by an archaeologist. • If no evidence for the presence of graves can be found, the pylon can be constructed.
Site 19	S 28° 17' 46.5" E 31° 28' 26.8"	Remains of a historic homestead comprising a number of stone foundations. These stone foundations are for the most part circular and may be the remains of hut foundations. One upper grinder was observed on the surface of the site. It is presently impossible to say how old the site is. The possibility for graves of babies to be buried here cannot be excluded.	Medium (due to the possibility of graves to be located here)	The site is located 158m south-west of Tower 84 and 289m north-west of Tower 85. It is located underneath as well as on both sides of the proposed transmission line. It appears unlikely for the site to be impacted upon by the proposed development.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 20	S 28° 18' 06.9" E 31° 28' 55.4"	A low density surface scatter of Middle Stone Age material is located here. It stretches over an oval area roughly 32m in length.	Medium	At its closest point the site is situated 3m north-east of the centre point of Tower 87. As a result the development of the tower will negatively impact on the site.	• Phase 2 archaeological mitigation of the site. • Application for a destruction permit to have the archaeological site destroyed.
Site 21	S 28° 15' 31.0" E 31° 27' 04.7"	The site comprises a cemetery that appears to be still used by the local community at present. It comprises approximately 37 graves. Many of the dressings of	High	The site is located 507m south-west of Tower 105 and 344m north-west of Tower 106. Furthermore, it is situated 6m north-east of the transmission	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.

		these graves comprise high stacked stone lined structures which are oval or rectangular in shape. Three of the graves from the cemetery have formal granite headstones whereas one grave has a concrete dressing. The details of the deceased as recorded on the formal granite headstones include Beatrice Thokozile Mlaba (2 February 1932 – 26 July 1998), Zanele Makosi Mlaba (15 April 1970 – 7 October 2002) and Joyce Sindisiwe Mashwala Mlaba (8 January 1963 – 4 December 2004). For the most part the grave dressings are orientated along the east-west axis.		line. It appears unlikely for the site to be impacted upon by the proposed development.	
Site 22	S 28° 19' 37.3" E 31° 33' 04.1"	The site comprises a circular stone line of white painted stones with an entrance on the one end. Nearby an 'x' built of white painted stones was also observed. The stone circle can be identified as a Shembe church site, with the second structure likely forming part of the same site.	Medium to High	The site is located 65m south-west of the centre of Tower 107. As such it appears unlikely for the site to be impacted upon by the proposed development.	• The project social consultants must discuss the proposed construction of the pylon at Tower 107 with the local church officials to ensure that there are no objections from the church with regards to the position of the pylon. • Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 23	S 28° 20' 04.4" E 31° 34' 32.1"	Cemetery containing approximately 25 graves which is still used by the local community.	High	The site is located 119m north of Tower 113 and is situated 104m north-east of the proposed	• Eskom must be aware of the site and its position and ensure that no impact on it takes place

		With the exception of one, all these graves have stone-lined dressings with soil in the middle. The exception is a grave dressing that is rectangular in shape and which is built with concrete bricks. All the dressings are orientated along the east-west axis.		transmission line. As a result the development is not expected to have any impact on the site.	during construction.
Site 24	S 28° 21' 54.6" E 31° 36' 15.7"	The site comprises a circular stone line of white painted stones with an entrance on the northern end. The structure is located near the summit of a hill. It can be identified as a Shembe church site.	Medium to High	The site is located 48m north-by-north-east of the centre of Tower 125. As such it appears unlikely for the site to be impacted upon by the proposed development.	• The project social consultants must discuss the proposed construction of the pylon at Tower 107 with the local church officials to ensure that there are no objections from the church with regards to the position of the pylon. • Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 25	S 28° 22' 27.6" E 31° 36' 44.4"	An irregularly shaped stone concentration is located here and is directly west of an existing footpath which leads down the river escarpment of the White Umfolozi river. The possibility exists for the stone concentration to be an isivivane (or traveller's cairn). It is a Zulu tradition that anyone passing an isivivane must pick up a stone, spit on it and throw it on the heap as a token of good luck.	Medium to High	The site is located 246m south-east of Tower 127 and 309m north-west of Tower 128. It is located 3m north-east of the proposed transmission line. As such it appears unlikely for the site to be impacted upon by the proposed development.	• Eskom must be aware of the site and its position and ensure that no impact on it takes place during construction.

Site 26	S 28° 22' 44.6" E 31° 37' 09.6"	A lower grinder is located here. No associated cultural material could be observed, and as a result it is impossible to suggest an age or cultural association for the artefact.	Low	The site is located 14m north-west of the centre of Tower 129. As a result the construction of the tower will have a negative impact on the site.	• Archaeological watching brief during construction • Should significant archaeological material be exposed, further mitigation work may be required.
Site 27	S 28° 23' 05.6" E 31° 37' 40.3"	A single grave located near a homestead. The grave dressing comprises a rectangular stone lined dressing. No formal headstone or grave goods were evident and the grave was evidently cleared of vegetation. Although no one was home at the nearby homestead, it can be assumed that the grave is associated with the family residing here.	High	The site is located 72m south-east of Tower 131 and 201m north-west of Tower 132. It is located 10m south-west of the proposed transmission line. As such it appears unlikely for the site to be impacted upon by the proposed development.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 28	S 28° 23' 06.6" E 31° 37' 42.5"	A small single grave located near a homestead. The grave dressing comprises a rectangular stone lined dressing. No formal headstone or grave goods were evident and the grave was evidently cleared of vegetation. Although no one was home at the nearby homestead, it can be assumed that the grave is associated with the family residing here.	High	The site is located 143m south-east of Tower 131 and 130m north-west of Tower 132. It is located 7m south-west of the proposed transmission line. As such it appears unlikely for the site to be impacted upon by the proposed development.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.
Site 29	S 28° 23' 20.8"	A low density surface scatter of Stone Age material is located	Low	The site is located on and all around the proposed position of	• Archaeological watching brief during construction

	E 31° 38' 04.4"	here. It stretches over most of the footprint area that was walked for the purposes of the survey.		Tower 133. As a result the development of the tower will negatively impact on the site.	• Should significant archaeological material be exposed, further mitigation work may be required.
Site 30	S 28° 23' 27.4" E 31° 38' 13.3"	A low density surface scatter of Stone Age material is located here.	Low	The site is located on and all around the proposed position of Tower 134. As a result the development of the tower will negatively impact on the site.	• Archaeological watching brief during construction • Should significant archaeological material be exposed, further mitigation work may be required.
Site 31	S 28° 24' 06.3" E 31° 39' 01.4"	A very low density surface scatter of Stone Age material is located here.	Low	The site is located 5m south-west of the centre of Tower 138. As a result the development of the tower will negatively impact on the site.	• No mitigation measures required.
Site 32	S 28° 26' 38.8" E 31° 41' 43.4"	A possible grave is located here. It has a dressing of stone and cement and is situated in a fenced agricultural area near a homestead.	High	The site is located approximately 20m south-east of the centre of Tower 151. As a result the development of the tower will negatively impact on the site.	• The tower position must be moved away from the site • The new pylon position must be surveyed by an archaeologist
Site 33	S 28° 26' 41.7" E 31° 41' 41.4"	Cemetery containing approximately eight graves. The graves have stone-lined dressings with soil in the middle and are orientated along the east-west axis.	High	The site is located 104m south-by-south-west of the centre of Tower 151. As a result the development is not expected to have any impact on the site.	• Eskom must be aware of the site and its position and ensure that no impact on it takes place during construction.
Site 34	S 28° 26' 42.8" E 31° 41' 46.8"	Cemetery containing approximately three graves. The graves have stone-lined dressings with soil in the middle and are orientated along the east-	High	The site is located 73m north-west of the centre of Tower 152 and is located 14m south-west of the proposed transmission line. As a result the development is	• Eskom must be aware of the site and its position and ensure that no impact on it takes place during construction.

		west axis.		not expected to have any impact on the site.	
Site 35	S 28° 27' 1.34" E 31° 42' 5.23"	Cemetery containing approximately seven graves was identified on Google Earth. During the fieldwork it was found that the cemetery and associated homestead is fenced in with high security fencing. As a result the cemetery could not be visited in the field.	High	The site is located 124m north-west of the centre of Tower 154 and is located 43m south-west of the proposed transmission line. As a result the development is not expected to have any impact on the site.	• Eskom must be aware of the site and its position and ensure that no impact on it takes place during construction.
Site 36	S 28° 23' 27.4" E 31° 38' 13.3"	A low density surface scatter of Stone Age material is located here.	Low	The site is located 14m north-west of the centre of Tower 154. As a result the development of the tower will negatively impact on the site.	• Archaeological watching brief during construction • Should significant archaeological material be exposed, further mitigation work may be required.
Site 37	S 28° 27' 34.0" E 31° 42' 42.9"	A Shembe church site is located here. It is comprised of both a circular stone line of white painted stones as well as two buildings (one circular and one square) of concrete bricks and thatch roofs.	Medium to High	The site is located 19m north of the centre of Tower 157. As a result the development of the tower is expected to negatively impact on the site.	• The project social consultants must discuss the proposed construction of the pylon at Tower 157 with the local church officials to establish whether the proposed tower construction would raise any objections or concerns. • If the church is going to be impacted upon, the tower position must be moved away from the site and the new pylon position must be surveyed by an archaeologist
Site 38	S 28° 27' 54.3"	A low density surface scatter of Stone Age material is located	Low	The site is located 17m north-west of the centre of Tower 159.	• Archaeological watching brief during construction

	E 31° 43' 04.1"	here.		As a result the development of the tower will negatively impact on the site.	• Should significant archaeological material be exposed, further mitigation work may be required.
Site 39	S 28° 28' 16.9" E 31° 43' 27.9"	Cemetery containing approximately three graves. The graves have stone-lined dressings with soil in the middle and are orientated along the east-west axis. The cemetery is associated with a number of homesteads, and it can be assumed that the deceased are related to the families living in at least some of the homesteads.	High	The cemetery is located 4m north of the centre of Tower 161. As a result the development of the tower will negatively impact on the site.	• The tower position must be moved away from the site • The new pylon position must be surveyed by an archaeologist
Site 40	S 28° 28' 18.4" E 31° 43' 30.4"	Cemetery containing approximately three graves. The graves have stone-lined dressings with soil in the middle and are orientated along the east-west axis. The cemetery is associated with a number of homesteads, and it can be assumed that the deceased are related to the families living in at least some of the homesteads.	High	The cemetery is located 80m south-east of Tower 161 and is 18m north-east of the proposed transmission line. As a result the development is not expected to have any impact on the site.	• Eskom must be aware of the site and its position and ensure that no impact on it takes place during construction.
Site 41	S 28° 30' 30.6" E 31° 45' 50.9"	An irregularly shaped stone concentration is located here on the bank of a non-perennial stream. The concentration is comprised of medium to small pebbles and is roughly 2m by 1m in extent. The possibility exists for	Medium to High	The site is located 286m south-east of Tower 174 and 146m north-west of Tower 175. It is located 17m north-east of the proposed transmission line. As such it appears unlikely for the site to be impacted upon by the	• Eskom must be aware of the site and its position and ensure that no impact on it takes place during construction.

		the stone concentration to be an isivivane (or traveller's cairn). It is a Zulu tradition that anyone passing an isivivane must pick up a stone, spit on it and throw it on the heap as a token of good luck.		proposed development.	
Site 42	S 28° 30' 52.9" E 31° 46' 18.0"	A number of undecorated potsherds were exposed in a footpath which follows the existing transmission line alongside which the proposed transmission line will be constructed. The potsherds were observed over a section roughly 38m in extent all along a sloped portion of land leading down to the valley bottom below. Apart from the potsherds some bones as well as at least two anvil stones were observed. The concentration of all this cultural material suggests that a midden is located here. It seems likely for a Late Iron Age site to be located here, although the association of the site with a more recent time frame can at present not be excluded as well.	Medium	The area in which the potsherds were exposed by the presence of a footpath, is situated roughly 97m north-east of the centre of Tower 177. However, due to the dense vegetation at Tower 177 and in-between the tower and this site, the possibility of the site extending into the proximity of the tower position cannot be excluded.	• Archaeological watching brief during construction of Tower 177. • Should significant archaeological material be exposed, further mitigation work may be required.
Site 43	S 28° 34' 14.7" E 31° 48' 20.3"	A cemetery is located near a homestead. The grave dressing comprises a stone packed dressing.	High	The site is located 47m to the west of the centre of Tower 192. As such it appears unlikely for the site to be impacted upon by the proposed development.	• Eskom must be aware of the site and its position and ensure that no impact on the site take place during construction.

Site 44	S 28° 38’ 45.2” E 31° 49’ 00.6”	An extensive Early Stone Age and Middle Stone Age site is located here. A large number of stone artefacts are visible on the surface of the site and have been exposed by way of an erosion gully.	Medium	The site is situated roughly 25m to the east of the centre of Tower214, although it is possible for sections of the site to be situated even closer than that. As a result the development of the tower has the potential to negatively impact on the site.	• On site archaeological monitoring must be undertaken by an archaeologist during the construction of the tower to ensure that no impacts will take place on the site. • Should any impacts be identified, Phase 2 archaeological mitigation may be required. If this is undertaken the end result would be an application for a destruction permit to have the site destroyed.

Appendix C-1: A detailed site or route plan(s)

UMFOLOZI – MBEWU 765KV LINE

CONSTRUCTION PROFILES

Structure Family: 701, 702, 705, 518

Conductor: 6 x Tern, 4 x Tern

1  RIVER CROSSING

2  WATER COURSE/BONGA

3  WETLAND/VLEI

4  NO ACCESS

5  ALTERNATIVE CONSTRUCTION

6  RECOMMENDED OR NEGOTIATED ACCESS

7  CONCRETE DRIFTS/ROADS

8  SPECIFIC MAINTENANCE

9  LANDOWNER SPECIAL CONDITIONS

10  GOVT SPECIAL CONDITIONS

11  UNDERGROUND WATER PIPE LINE

12  UNDERGROUND FUEL PIPE LINE

13  IRRIGATION LINES

14  IRRIGATION CANNAL

15  PIVOT IRRIGATION

16  STORMWATER PIPES

17  ELECTRIC FENCE

18  GAME FENCE

19  BUSH CLEARING

20  NO CUTTING OF TREES OR BUSH

21  NO CUTTING OF ENDANGERED SPECIES

22  BIRDS GUARDS

23  BIRDS NESTING ON EXISTING LINES

24  AVIATION

25  BIRDS DIVERTERS

26  GAME FARM

27  ARCHAEOLOGICAL SITE

28  GRAVE

29  EROSION PROTECTION

30  SUGAR CANE

31  GRAPES/VINEYARD

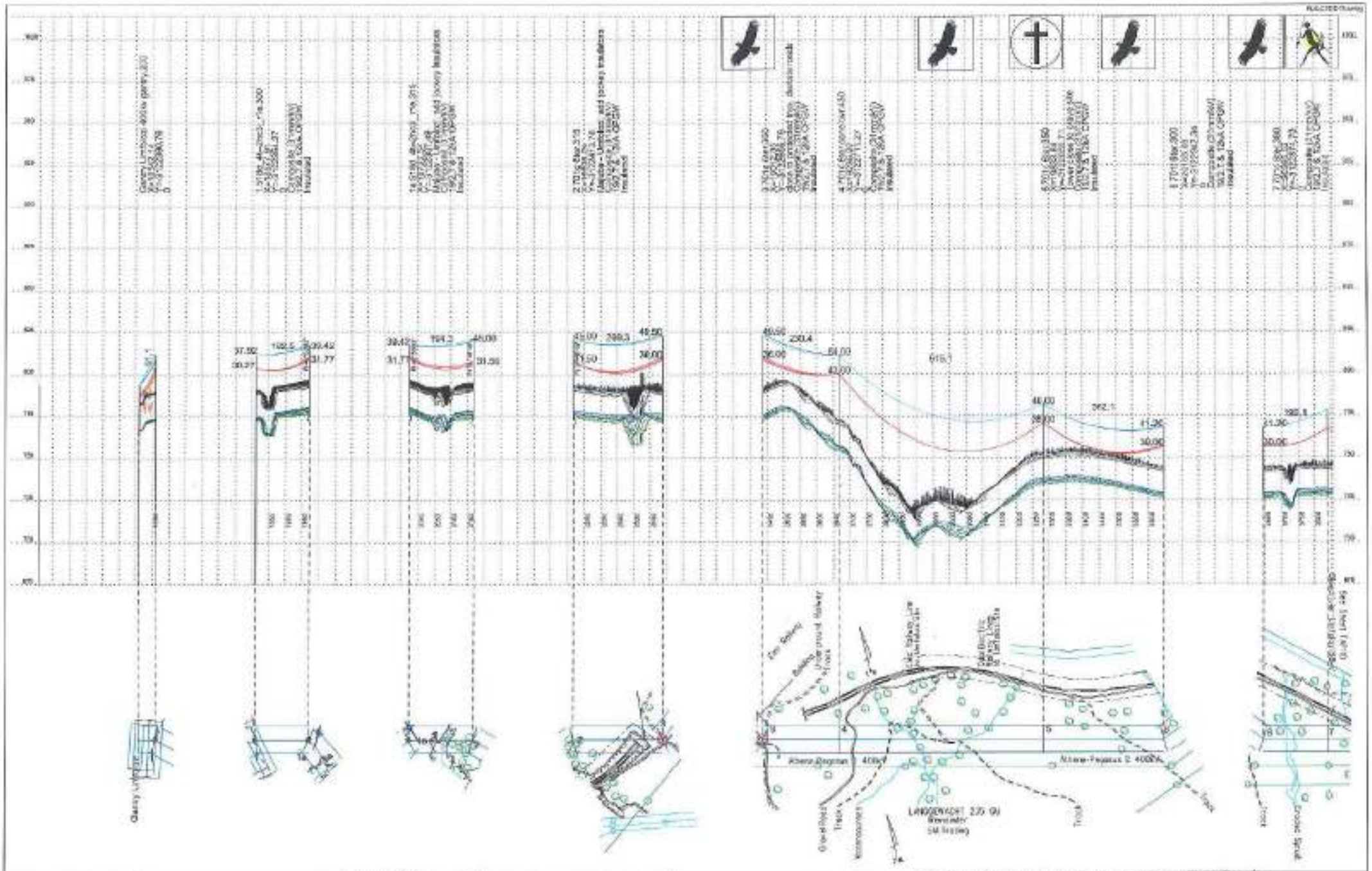
32  SPECIAL FLORA

33  DRY LAND/CROPS

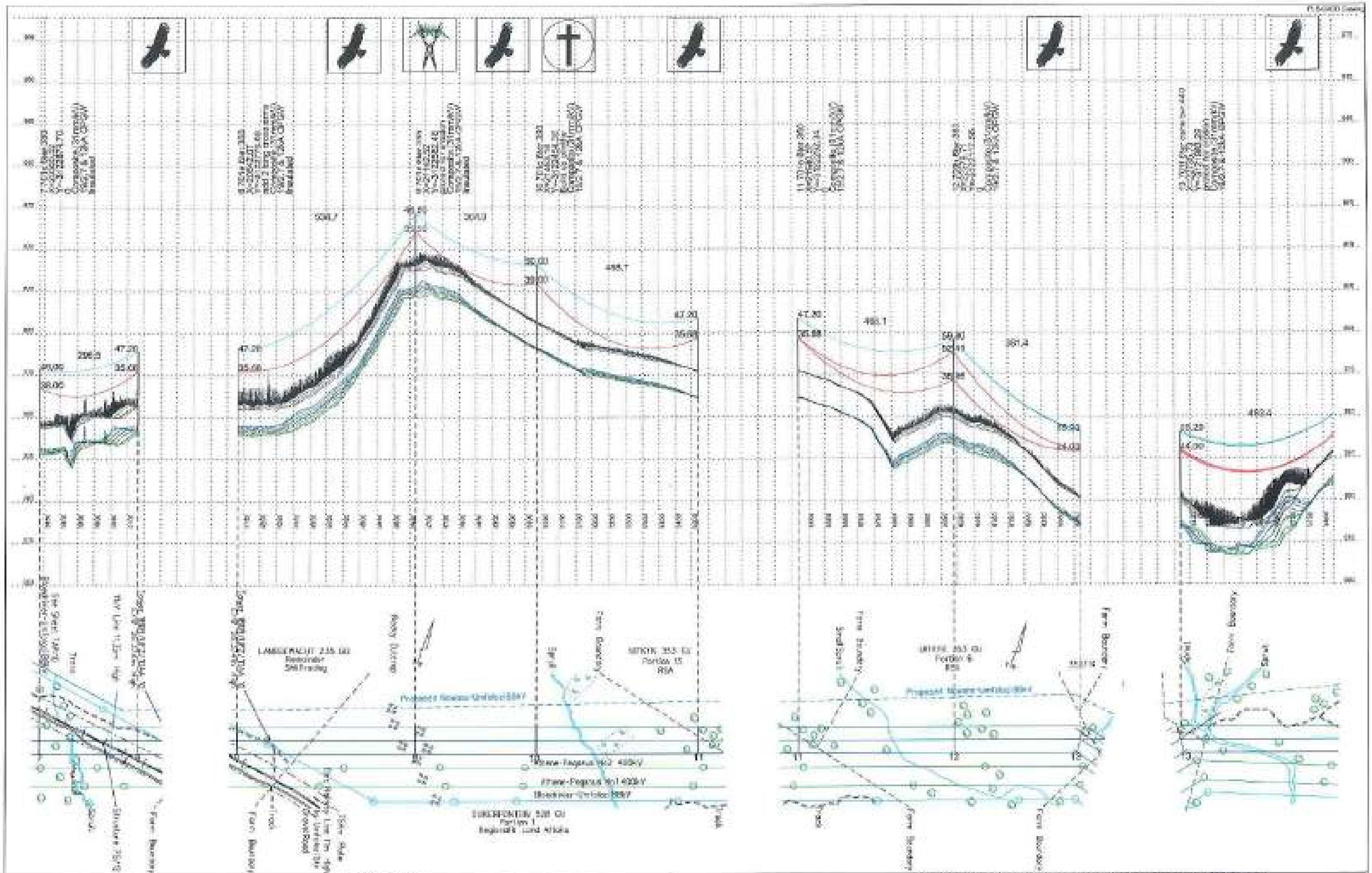
34  NO FIRES

35  PLANTATIONS

36  ENDANGERED ANIMALS



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umiloluzi - Mbewu 765kV Part 1 Structure Family: 701, 702, 705, 718 Conductor: 6 Tern, 4 Tern Templating Temperature: 70 Degrees	DATE: September 2017 Shoot 1/14	Project No. Te. 364



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 516

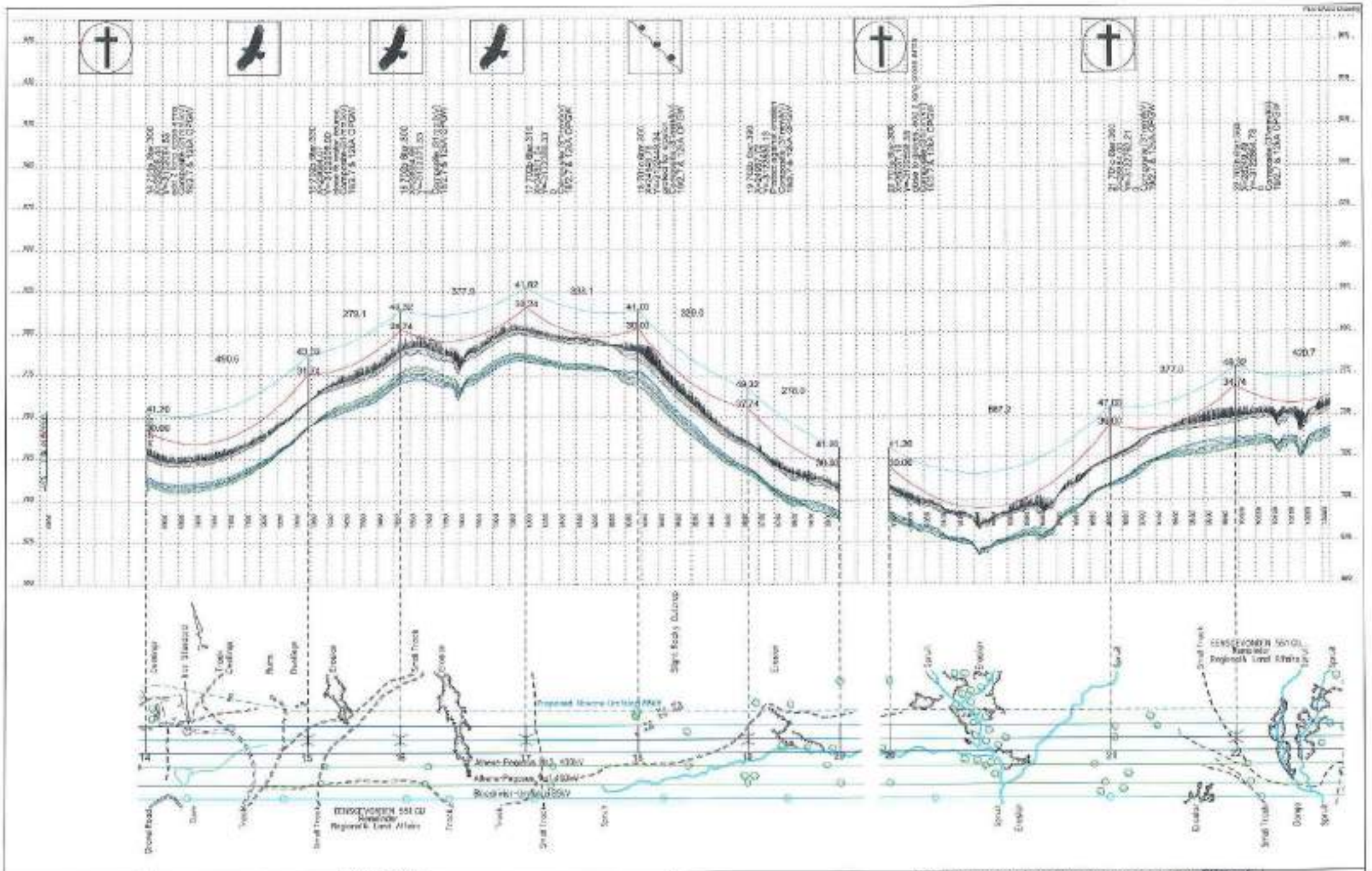
Conductor: 6 Tern, 6 Tern

Templating Temperature: 70 Degrees

DATE: September 2017

Sheet 2/14

Project No.



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Unifolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 618

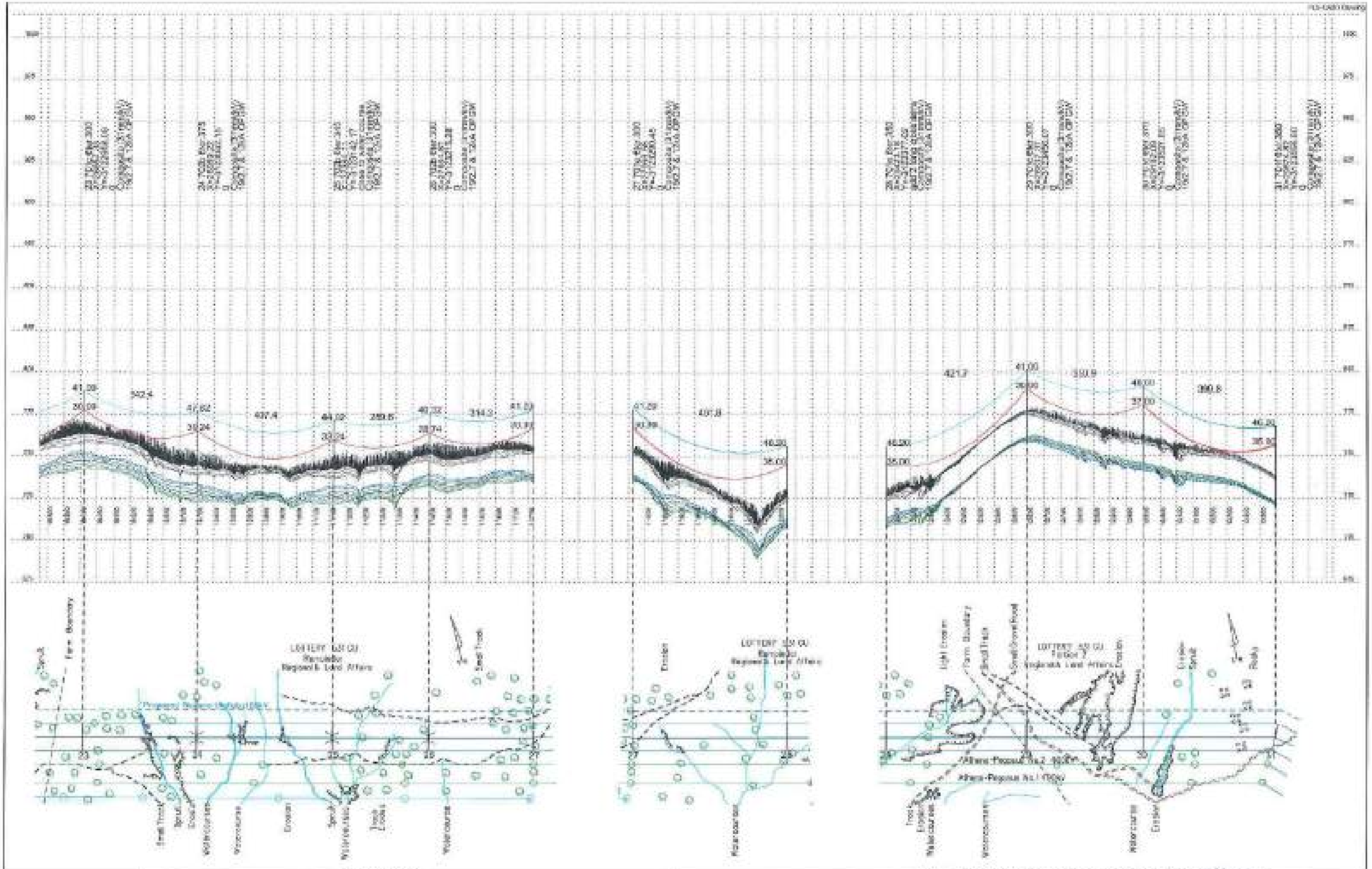
Conductor: 6 Tern, 4 Tern

Templating Temperature: 70 Degrees

DATE: September 2017

Shoot 3/14

Project No. Tx_203



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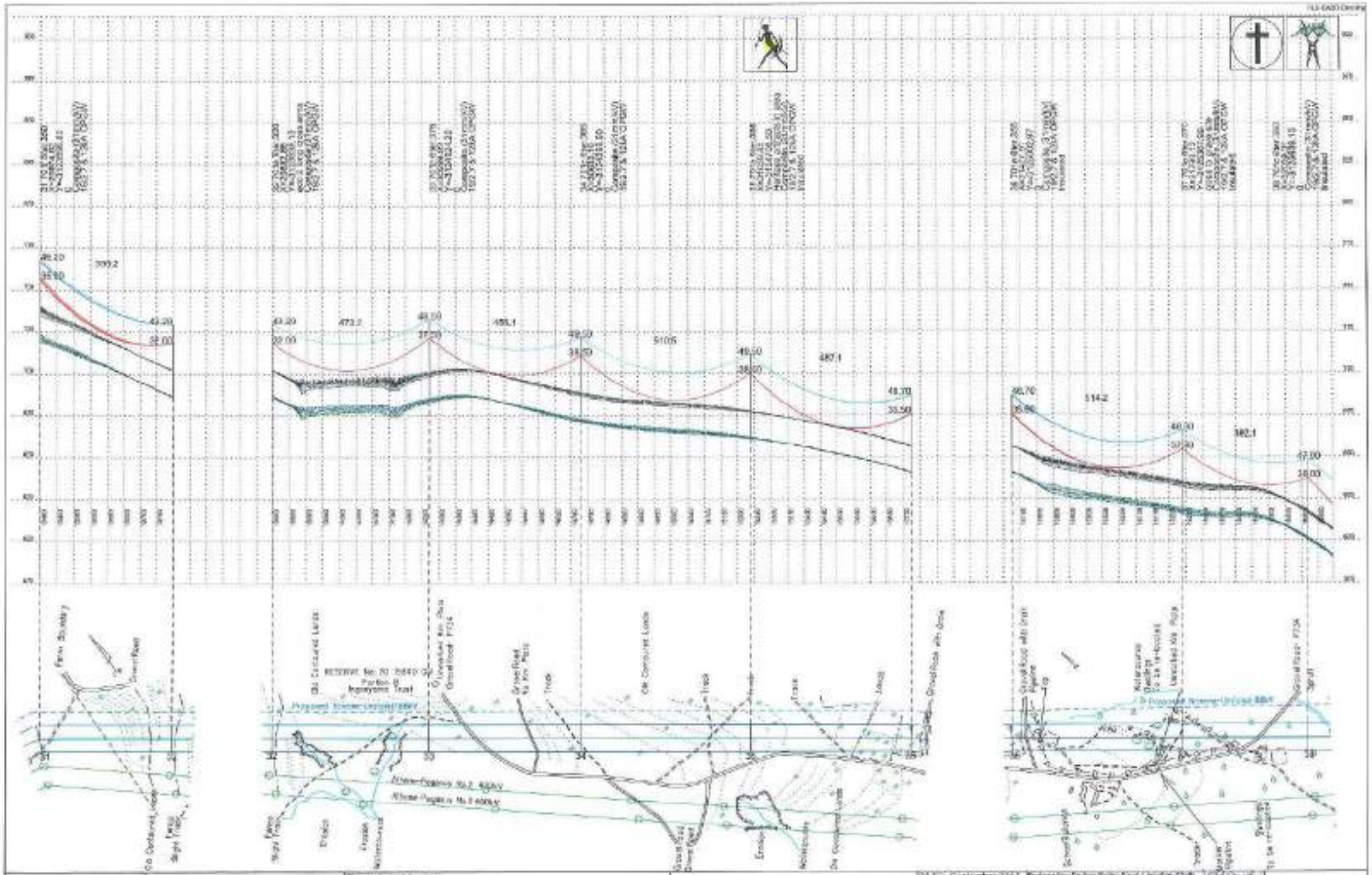
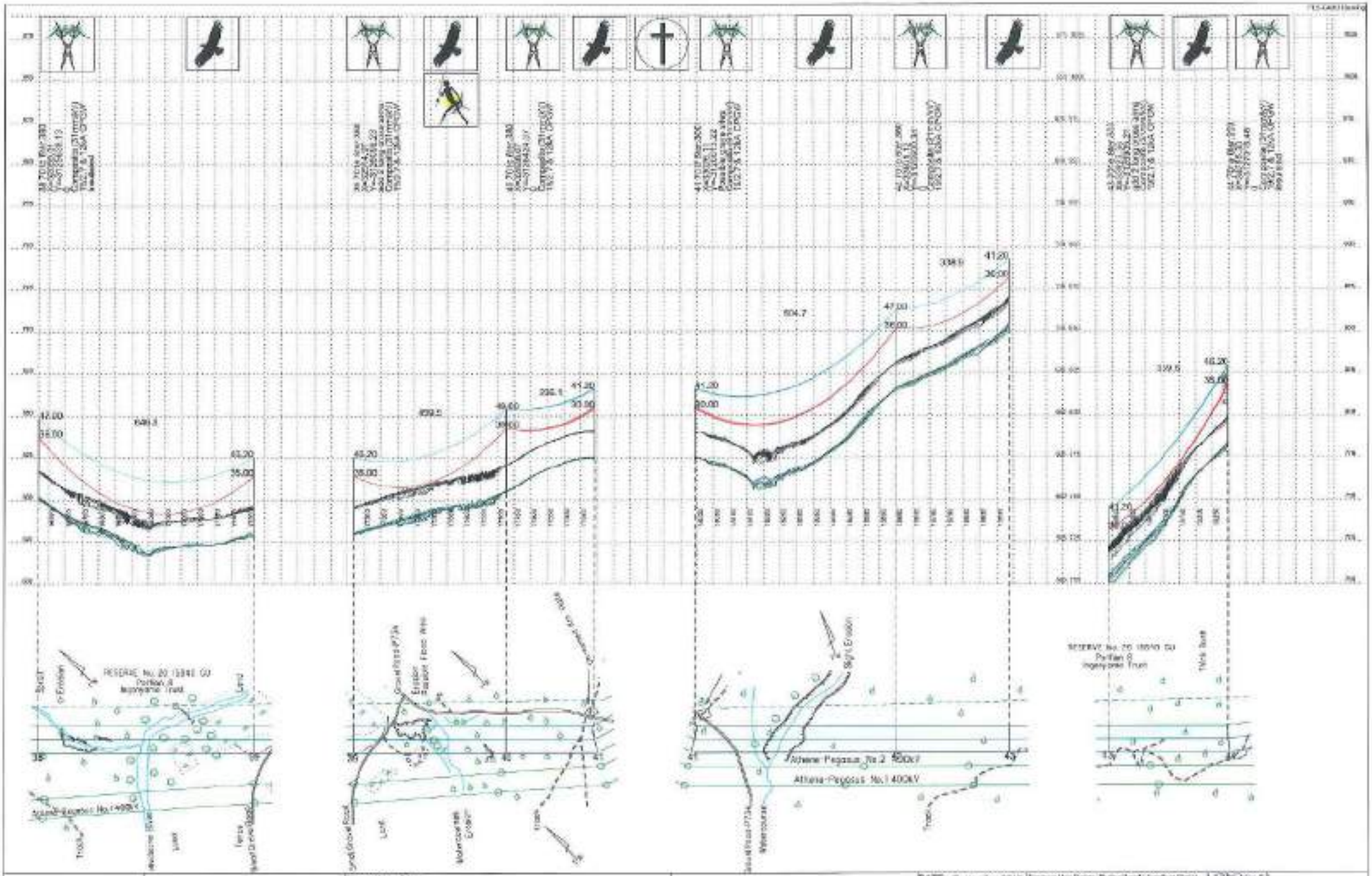
Project No.



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 1 Structure Family: 701, 702, 735, 518 Conductor: 0 Term, 4 Term Templating Temperature: 70 Degrees	DATE: September 2017 Sheet 5/14	Project No: 12_369



100.0 m
Horiz. Scale

20.0 m
Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 731, 732, 735, 618

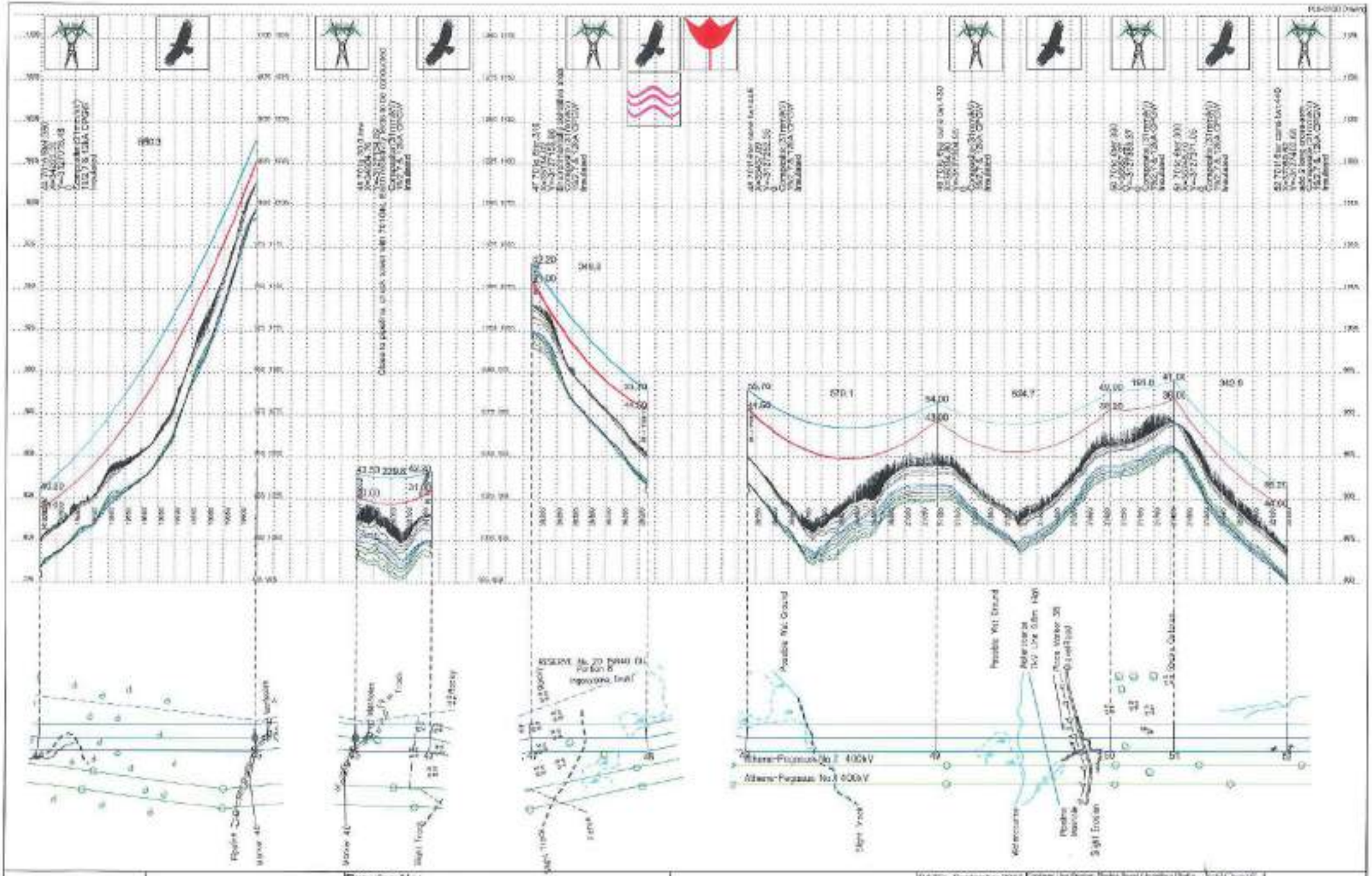
Conductor: 6 Twin, 4 Twin

Templating Temperature: 75 Degrees

DATE: September 2017

Sheet 6/14

Project No.
Te. 269



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Maewu 765kV Part 1

Structure Family: 701, 702, 705, 918

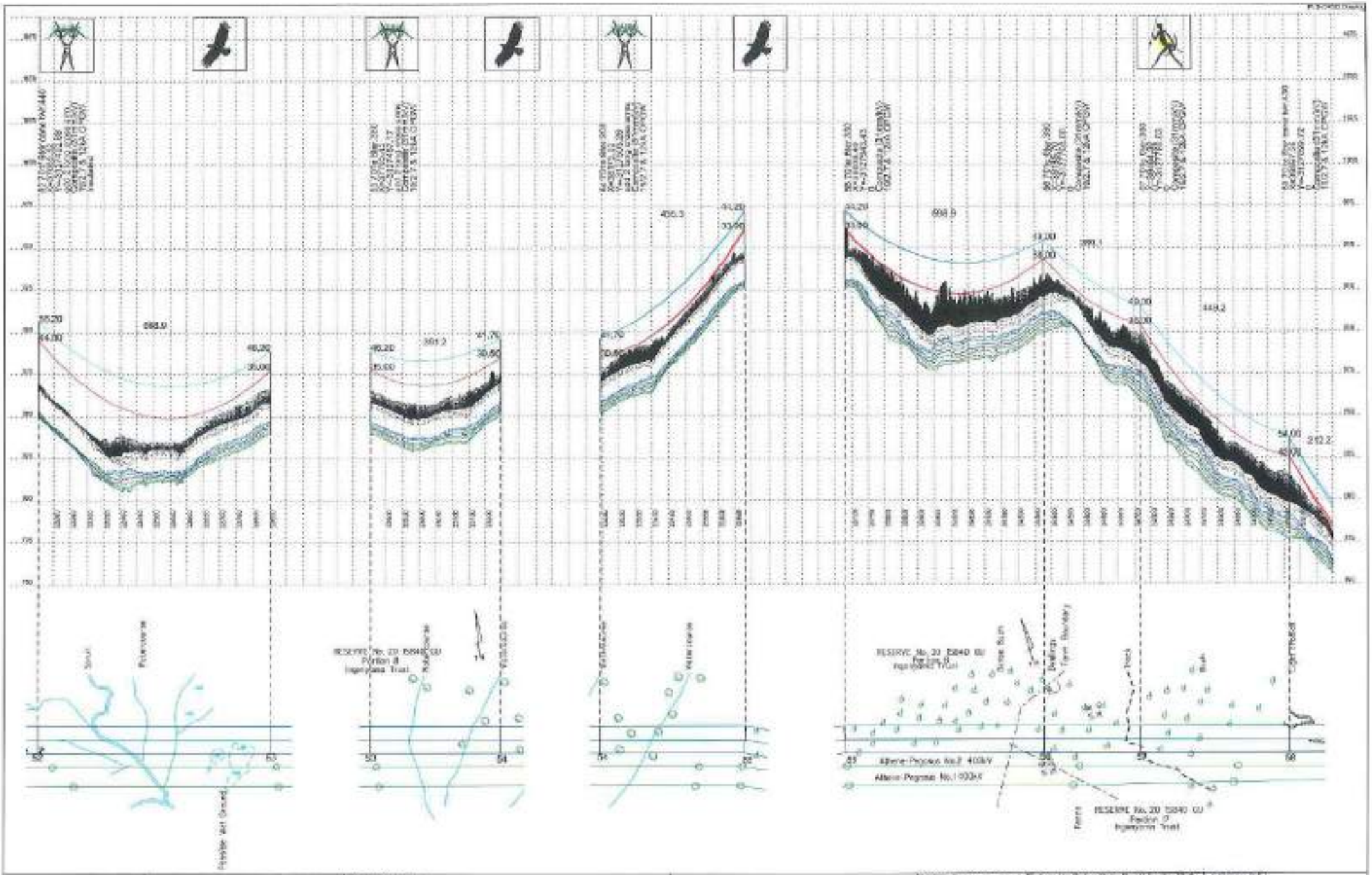
Conductor: 6 Tern, 4 Tern

Sagging Temperature: 70 Degrees

DATE: September 2017

Sheet 7/14

Project No.
TX 201



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20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 518

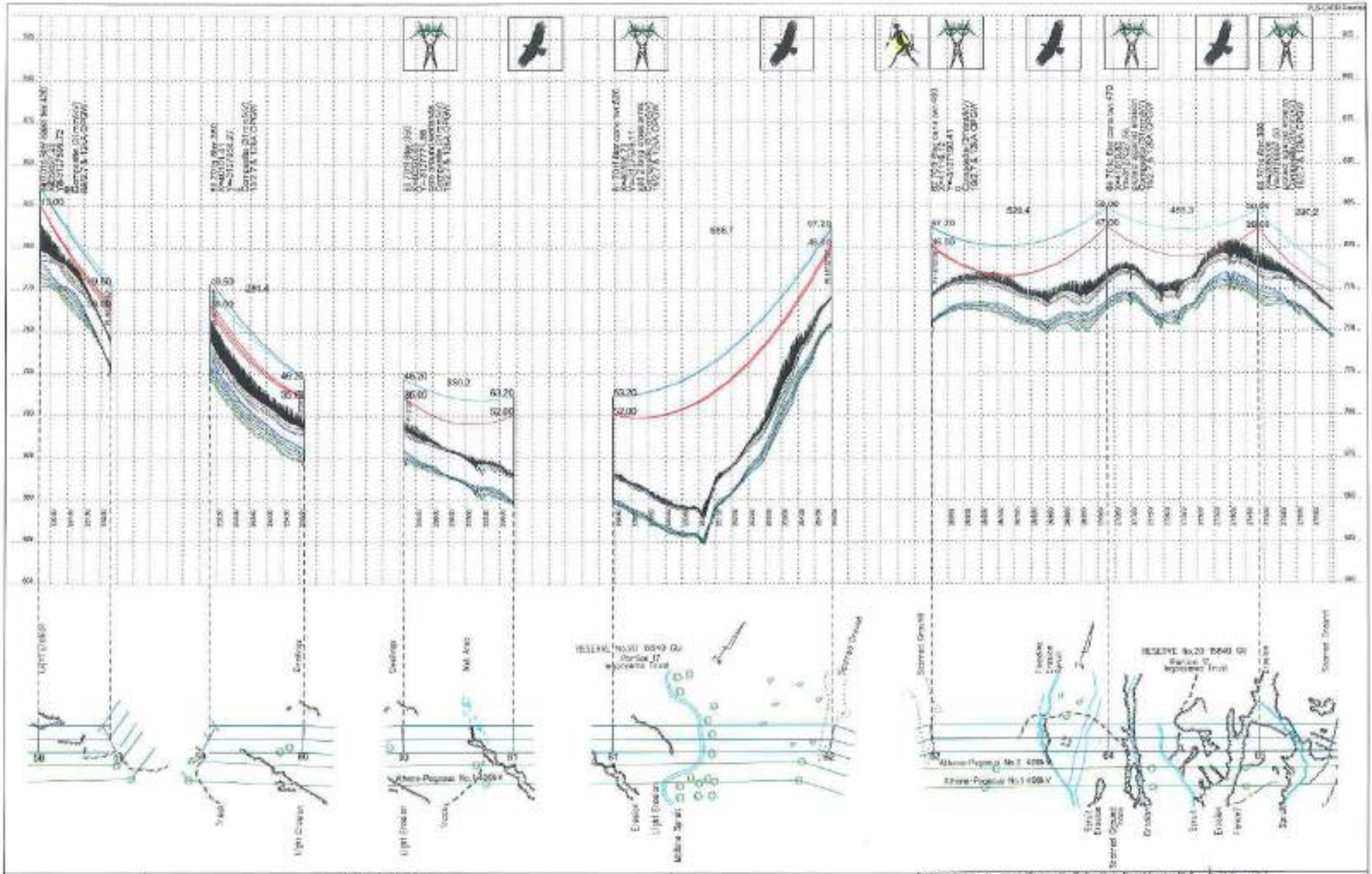
Conductor: 6 Tern, 4 Tern

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 8/14

Project No.
TX 063



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 518

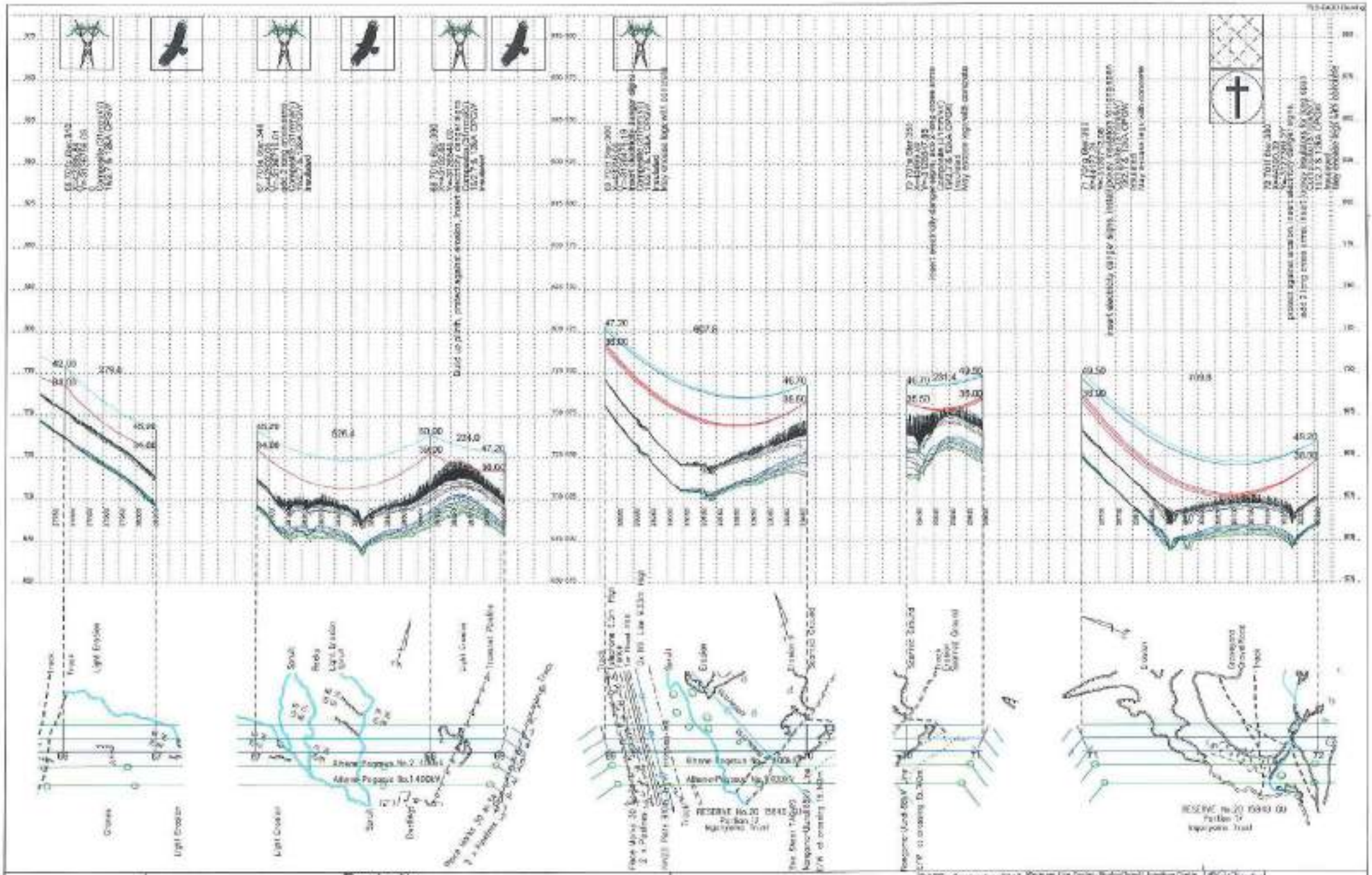
Conductor: 5 Tern, 4 Tern

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 9/14

Project No. Tx 303



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 703, 919

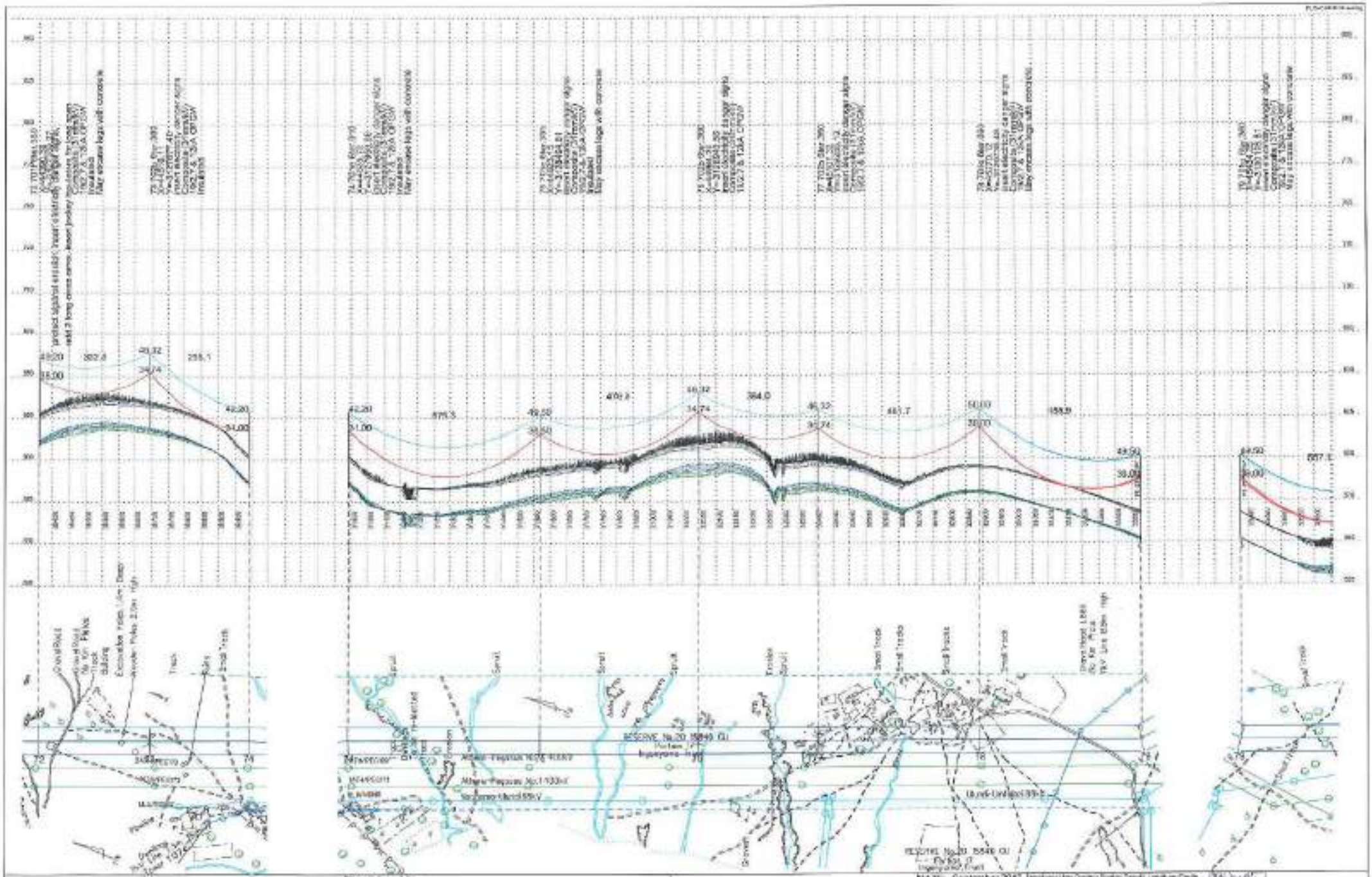
Conductor: 6 Tern, 4 Toxis

Tensioning Temperature: 20 Degrees

DATE: September 2017

Shoot 10/14

Project No. TX. 265



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

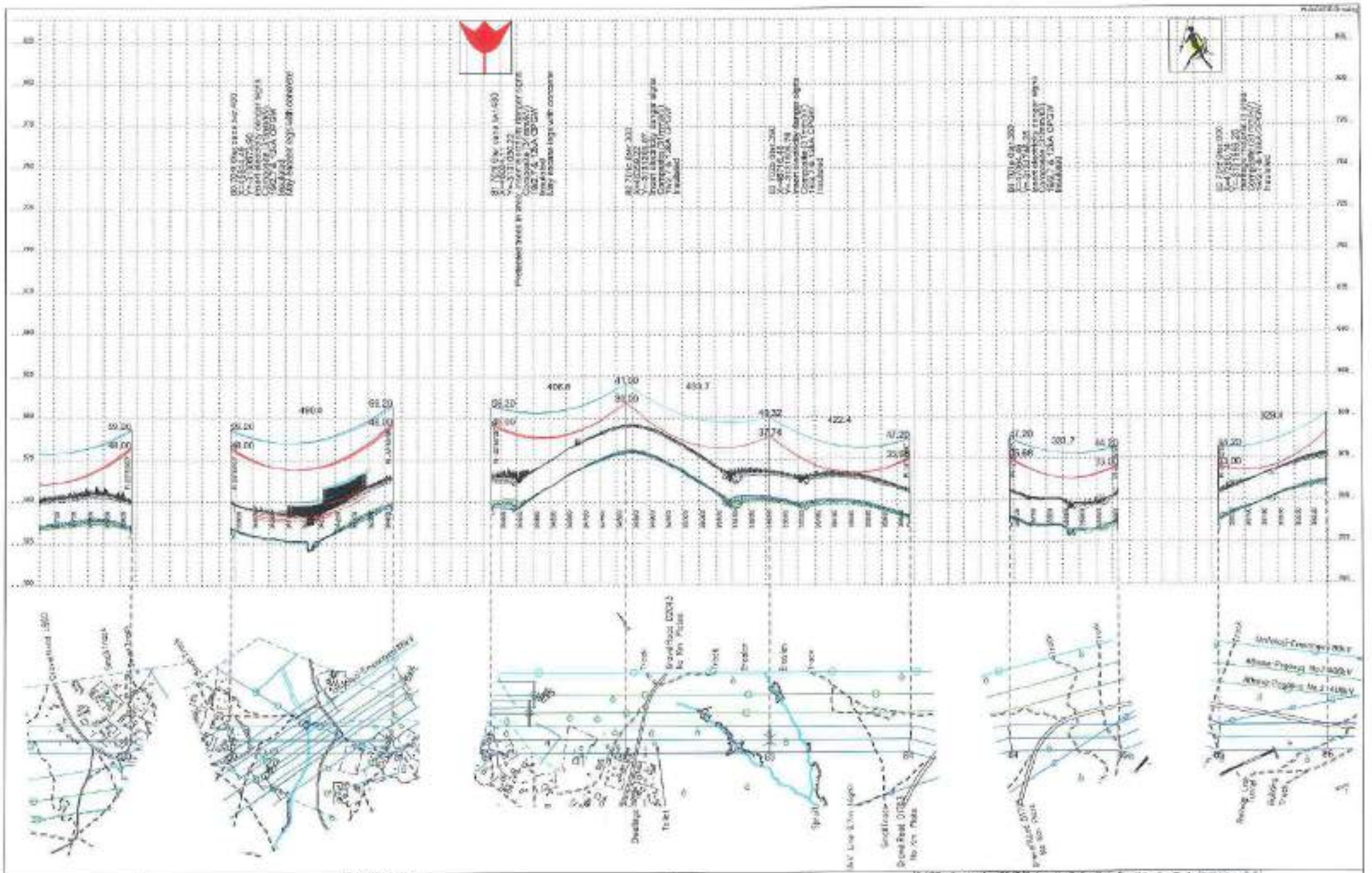
CONSTRUCTION PROFILES

Umfolozi - Mbewu 765kV Part 1

Sheet 11/14

DATE: September 2017

Printed No. 12 203



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20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 018

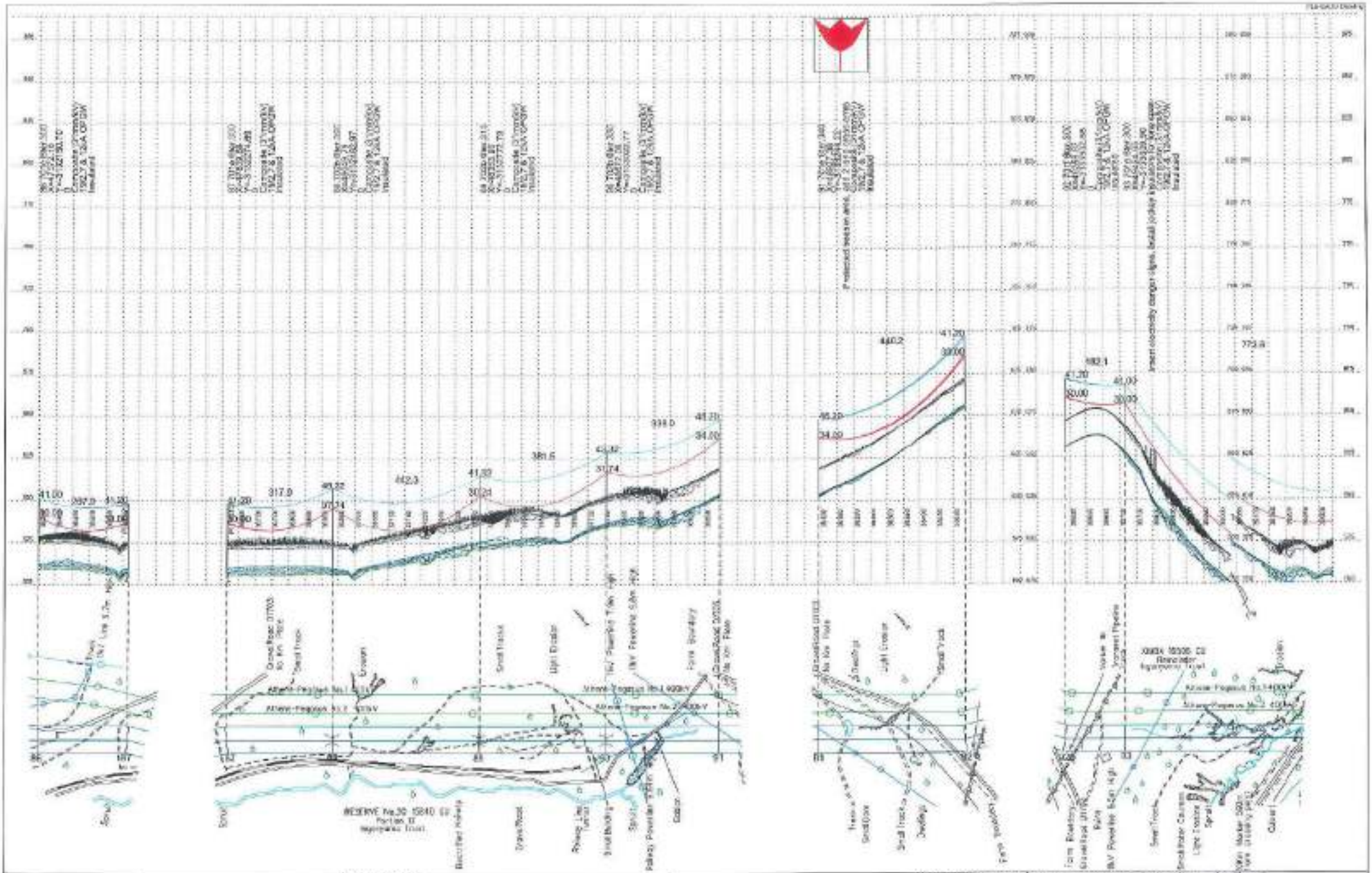
Conductor: 6 Tern, 4 Tern

Templating Temperature: 70 Degrees

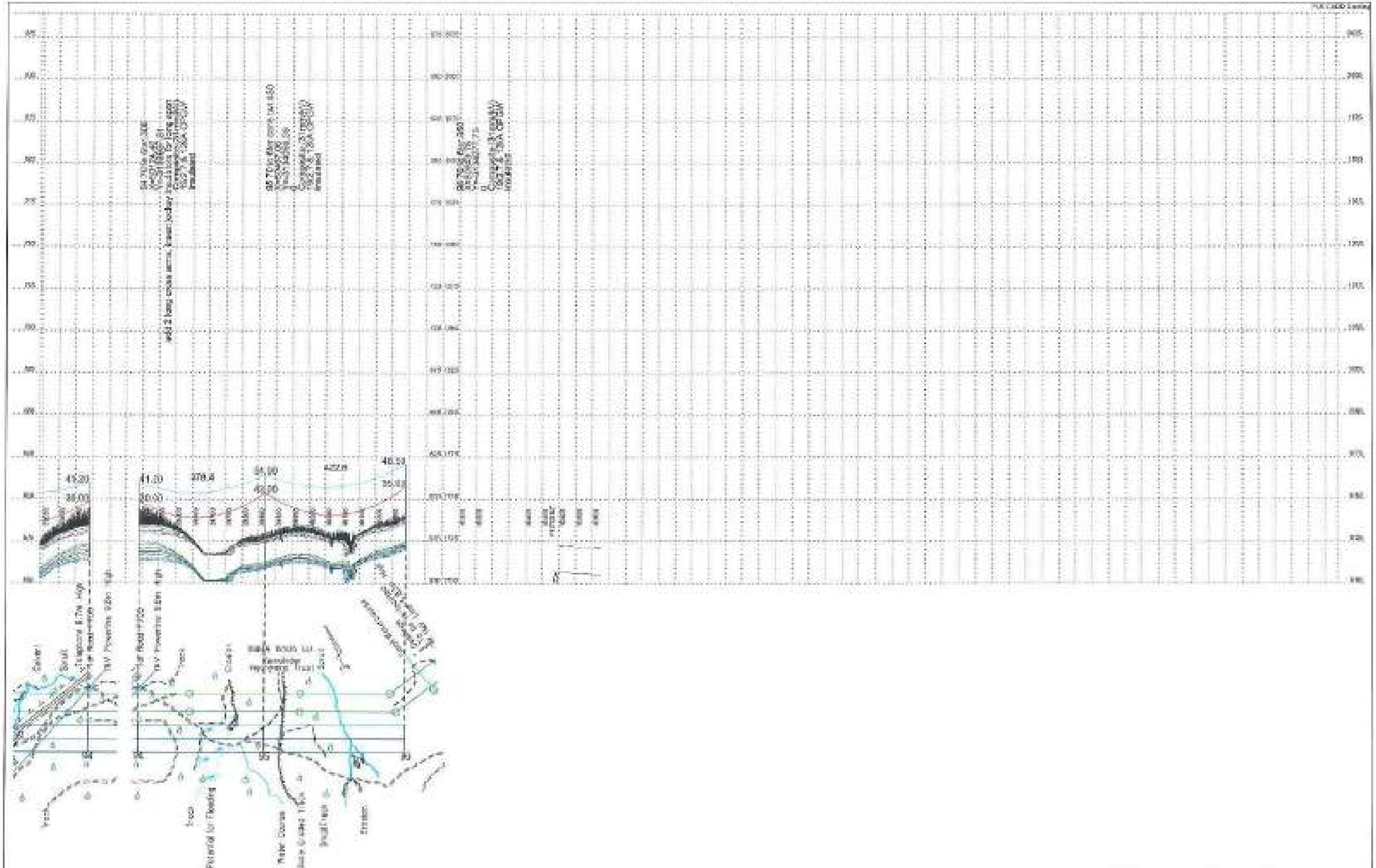
DATE: September 2017

Sheet 12/14

Project No
TX- 205



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 1 Structure Family: 731, 732, 736, 818 Conductor: 6 Tern, 4 Tern Sagging Temperature: 70 Degrees	DATE: September 2017 Sheet 13/14	Project No. Te. 203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 518

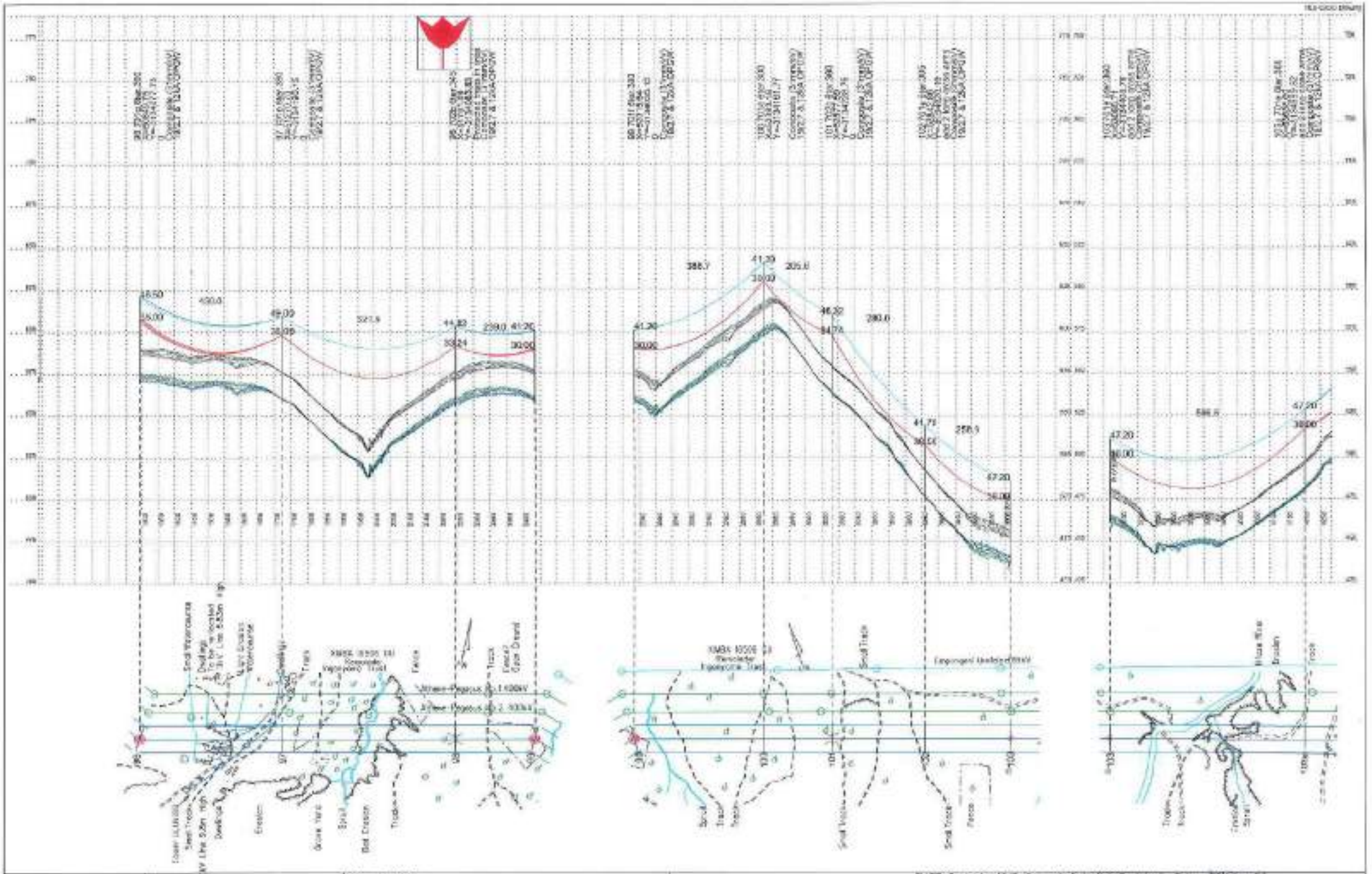
Conductor: 6 Tern, 4 Tern

Templating Temperature: 70 Degrees

DATE: September 2017

Sheet 14/14

Project No.



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Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

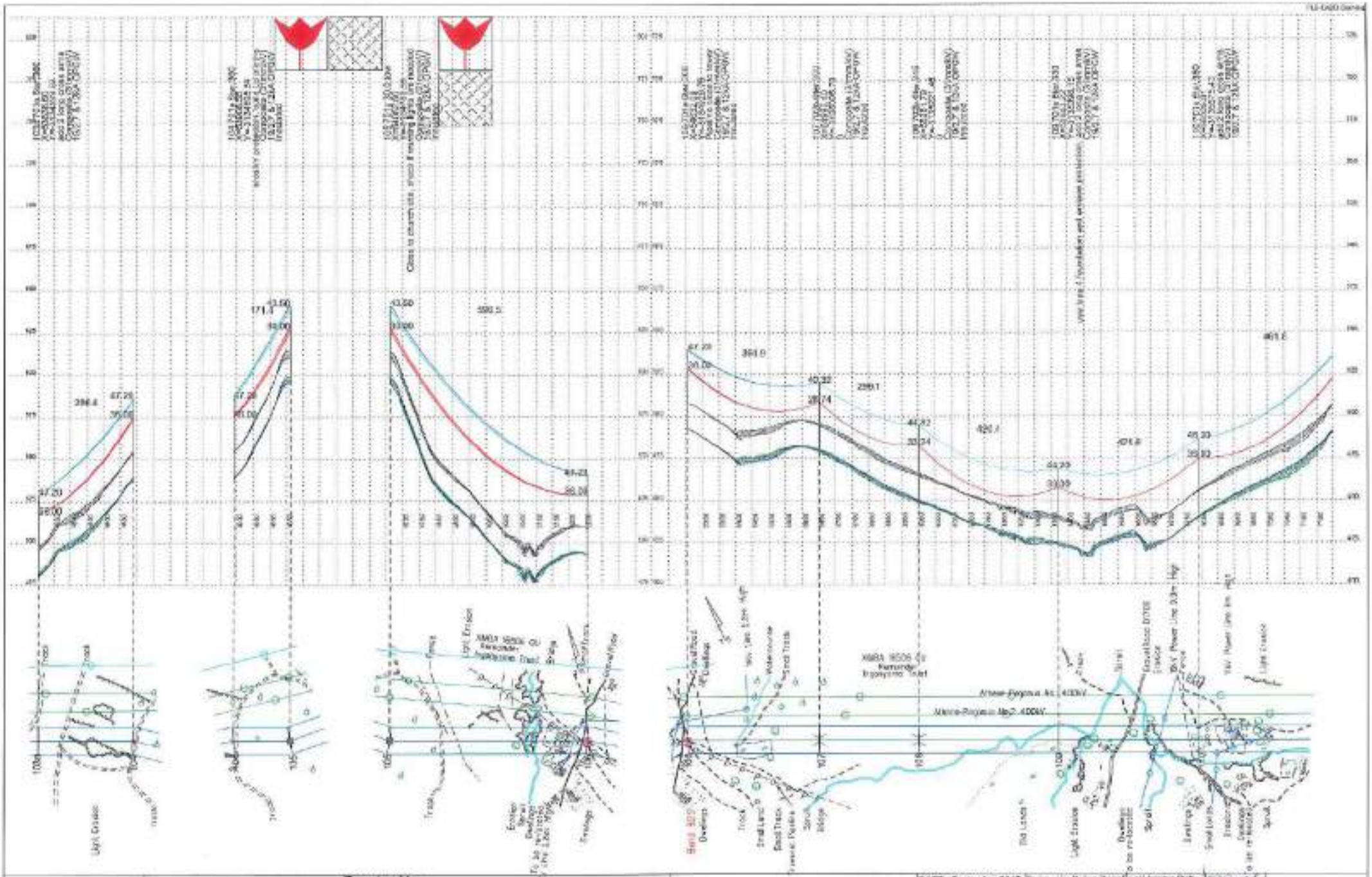
Conductor: 6 TERN, 4 TWIN

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 1/20

Project No.
Tx 203



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Horiz. Scale

20.0 m
Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 019

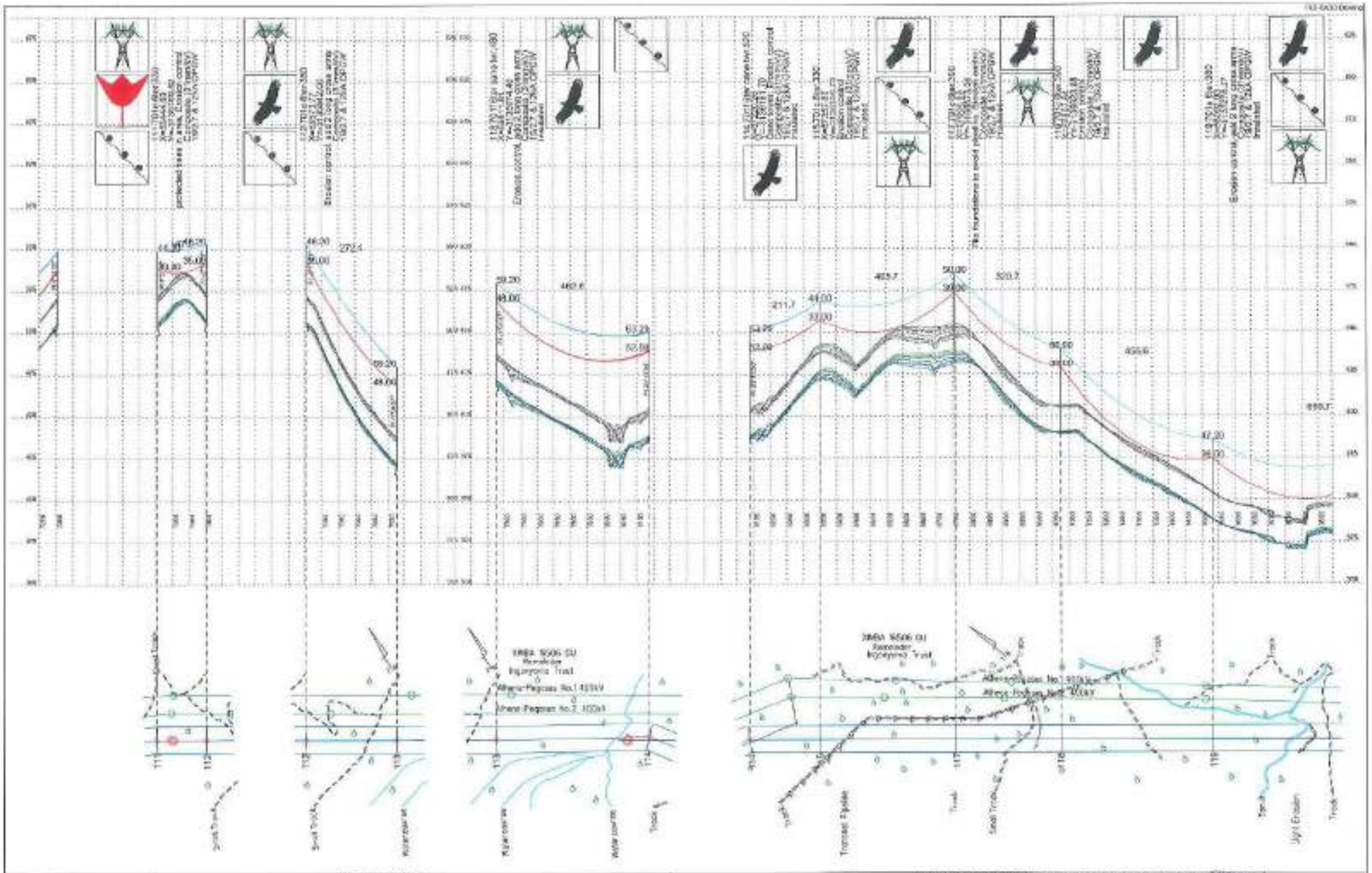
Conductor: 9 Twin, 4 Twin

Temp'erature Temperature: 70 Degrees

DATE: September 2017

Sheet 2/20

Project No.
Tx. 233



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Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 818

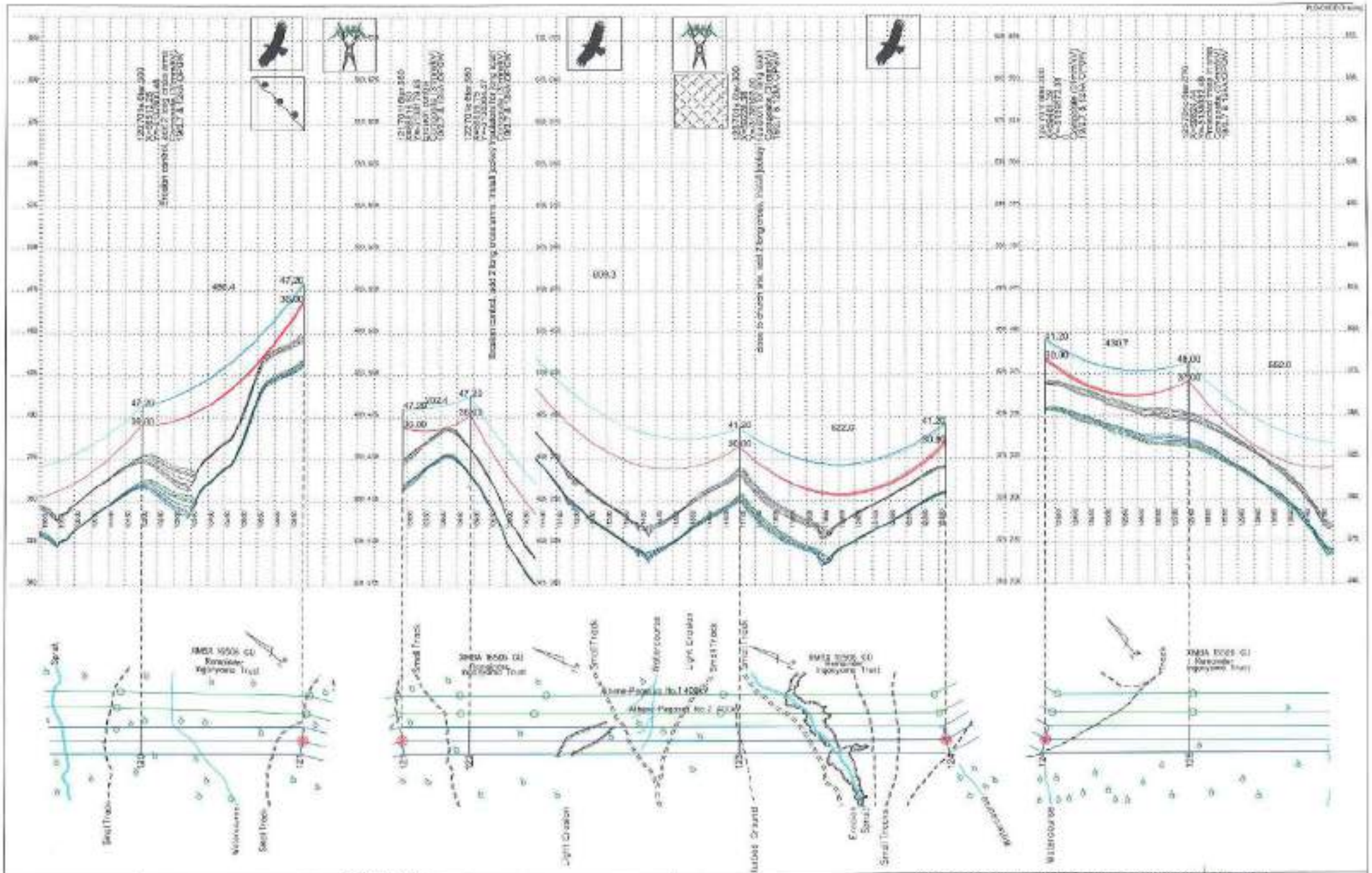
Conductor: 6 Turn, 4 Turn

Tensioning Temperature: 20 Degrees

DATE: September 2017

Sheet 3/20

Project No: Tx 303



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Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 708

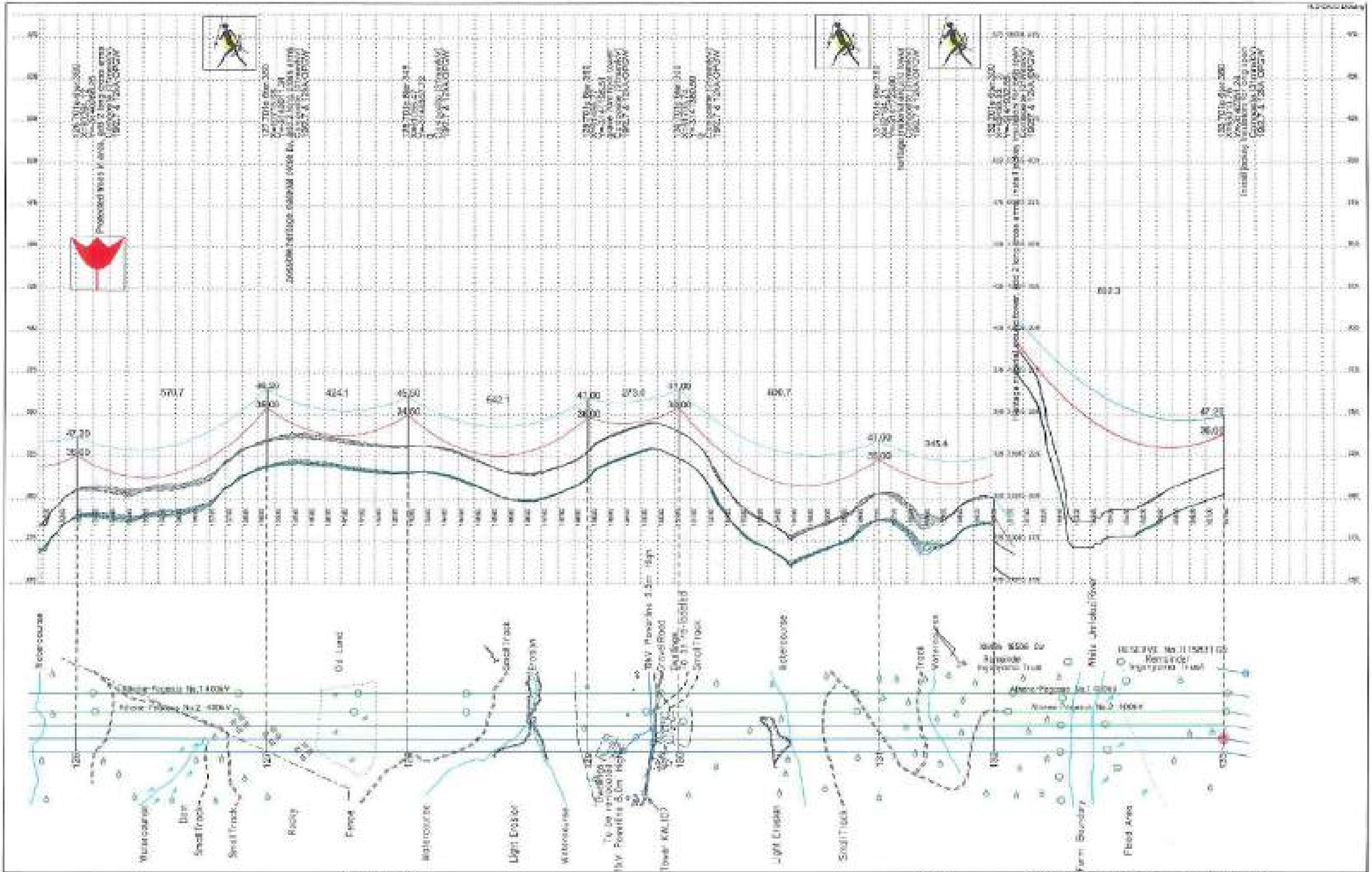
Construction: 0 Tons, 4 Tons

Foreshalling Temperature: 70 Degrees

DATE: September 2017

Sheet 4/20

Project No.
TX: 359



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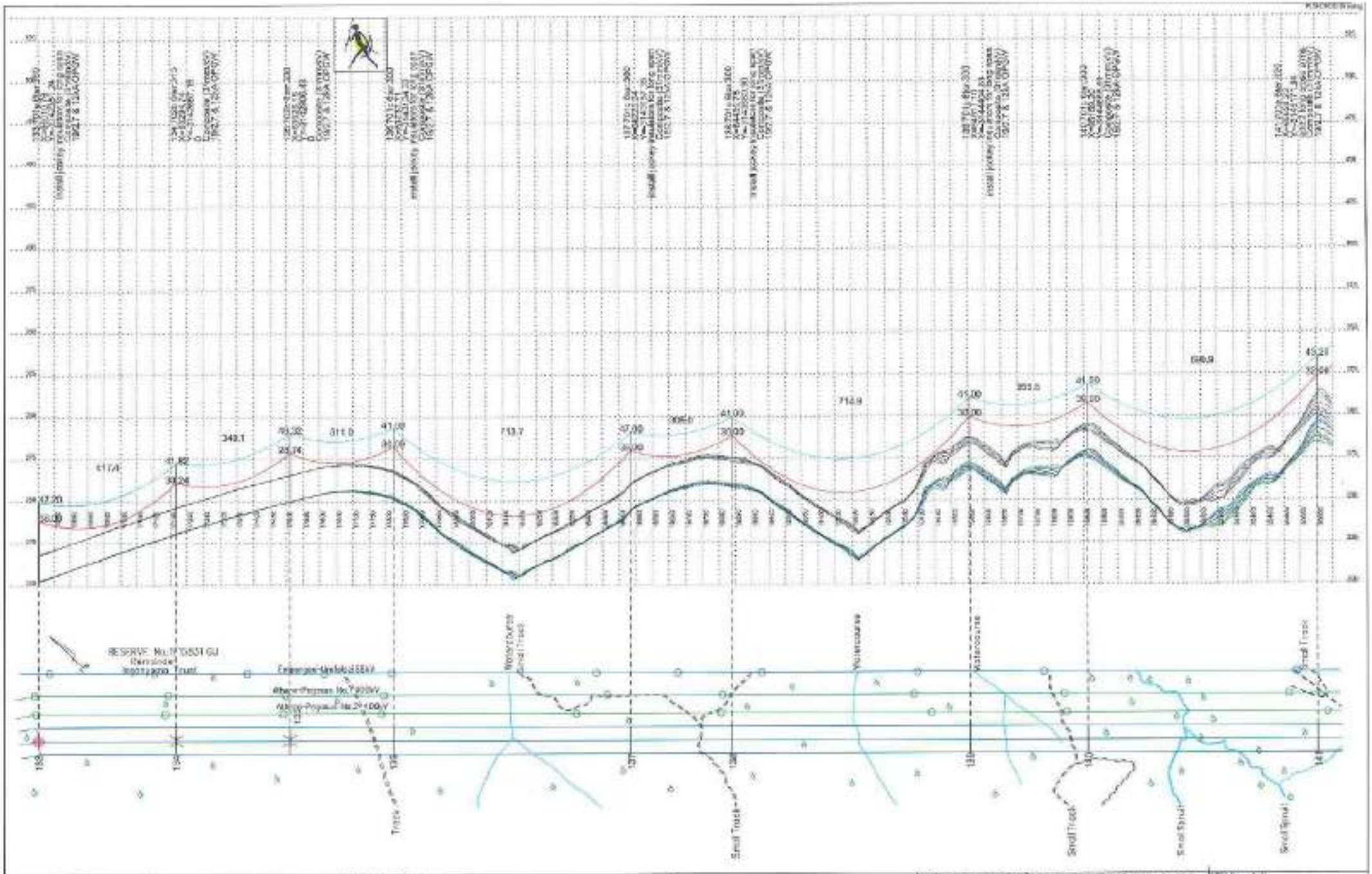
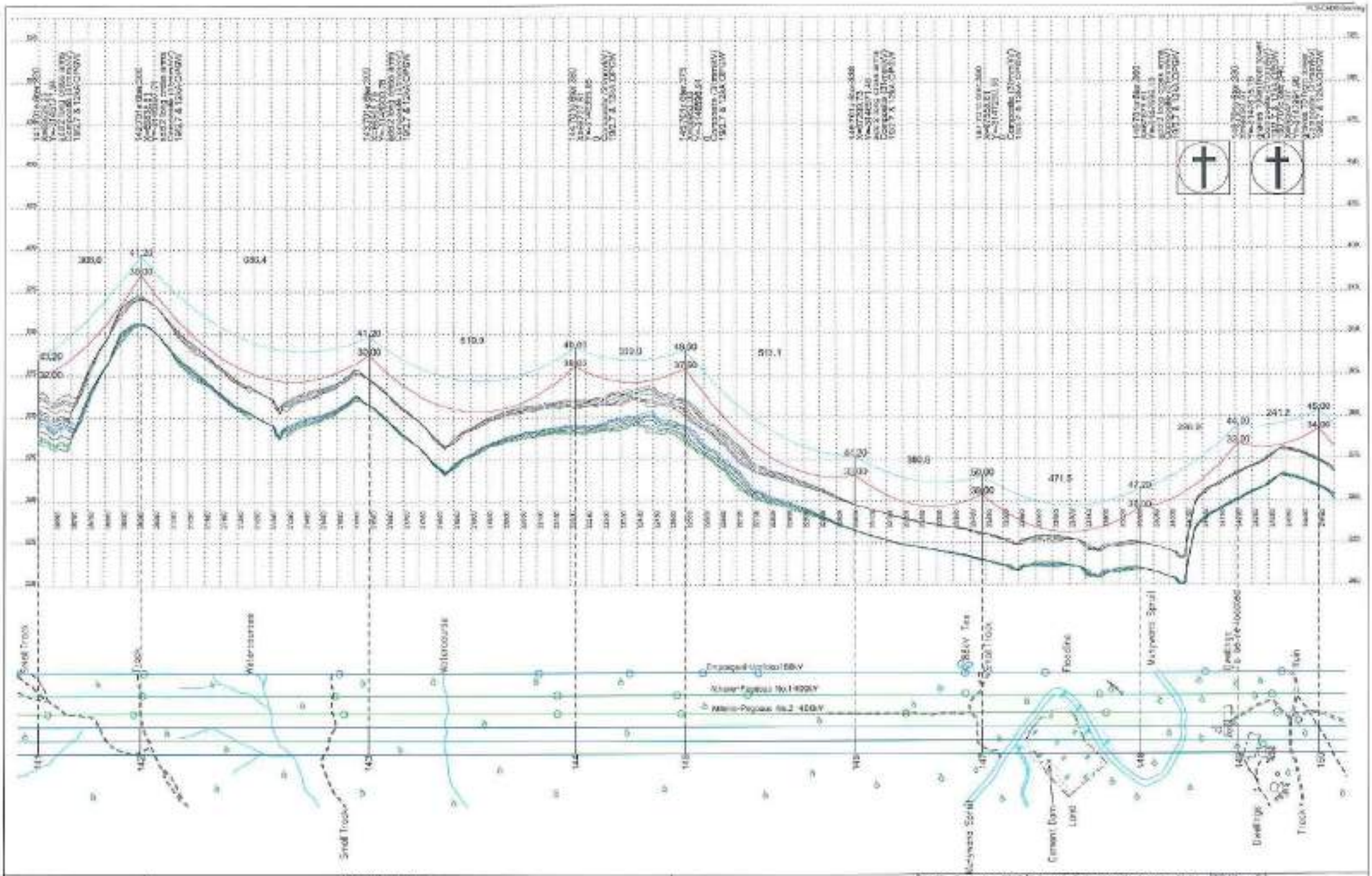


100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Deviation: 0 Tens, 4 Tens Templating Temperature: 70 Degrees	DATE: September 2017 Sheet 6/20	Engineer: [illegible] Project No. Tx 393



100.0 m
Horiz. Scale

20.0 m
Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umtolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

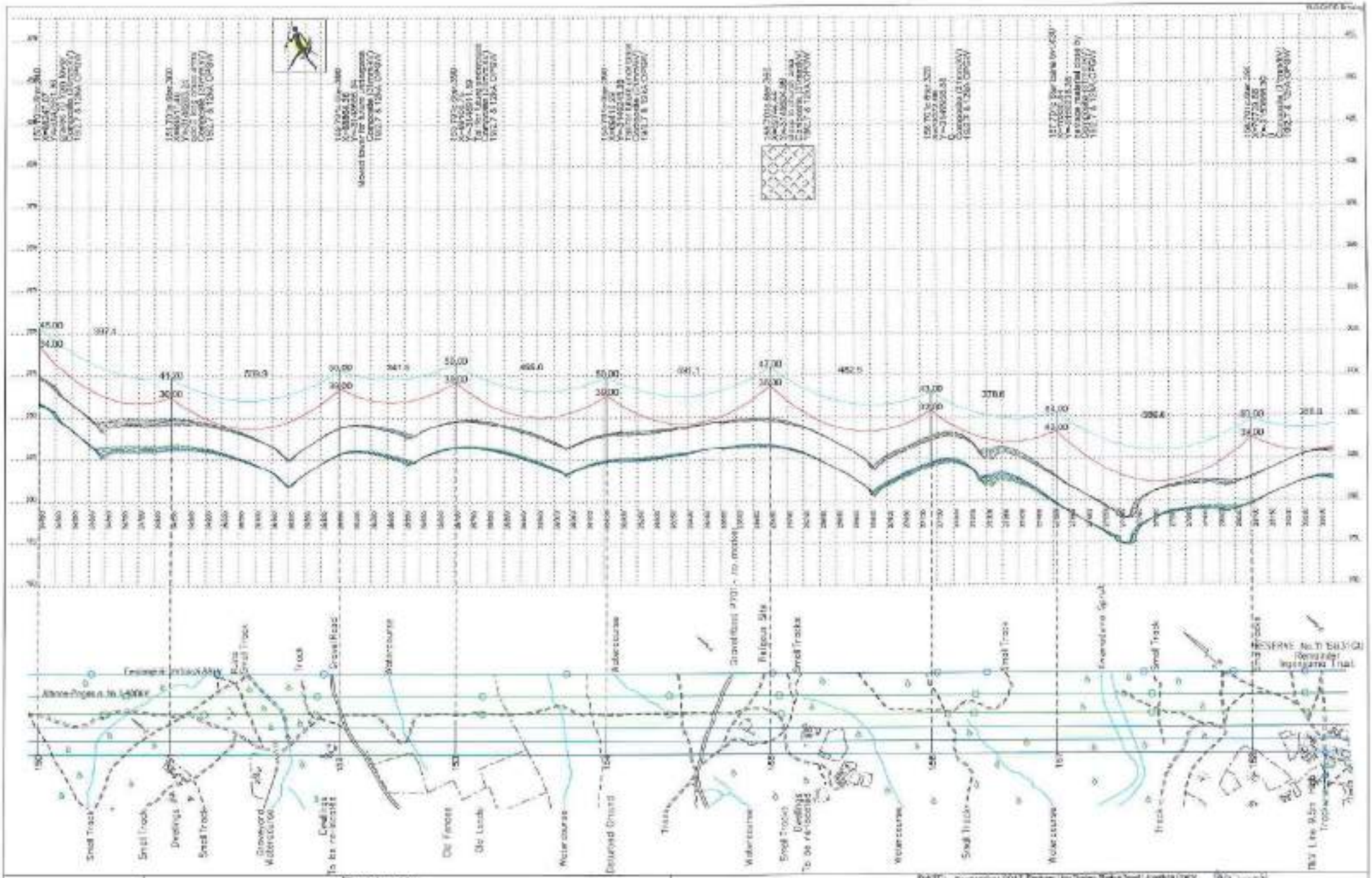
Conductor: 0 Tern, 4 Tern

Templating Temperature: 70 Degrees

DATE: September 2017

Sheet 7/20

Project No.
TX 331



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Description: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 918

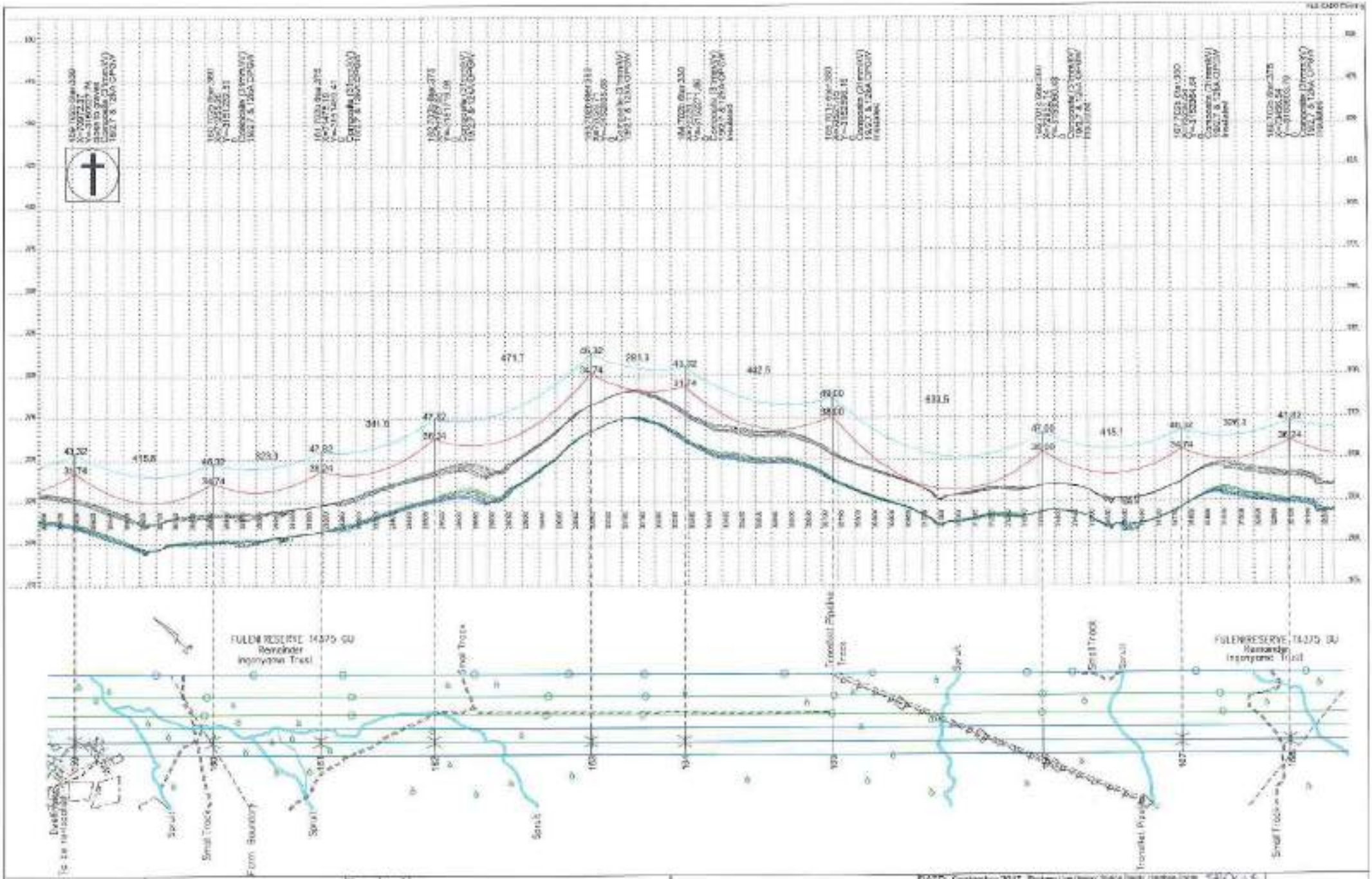
Construction: 6 Tons, 4 Tons

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 8/20

Project No: Tx 203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Limpopo - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 810

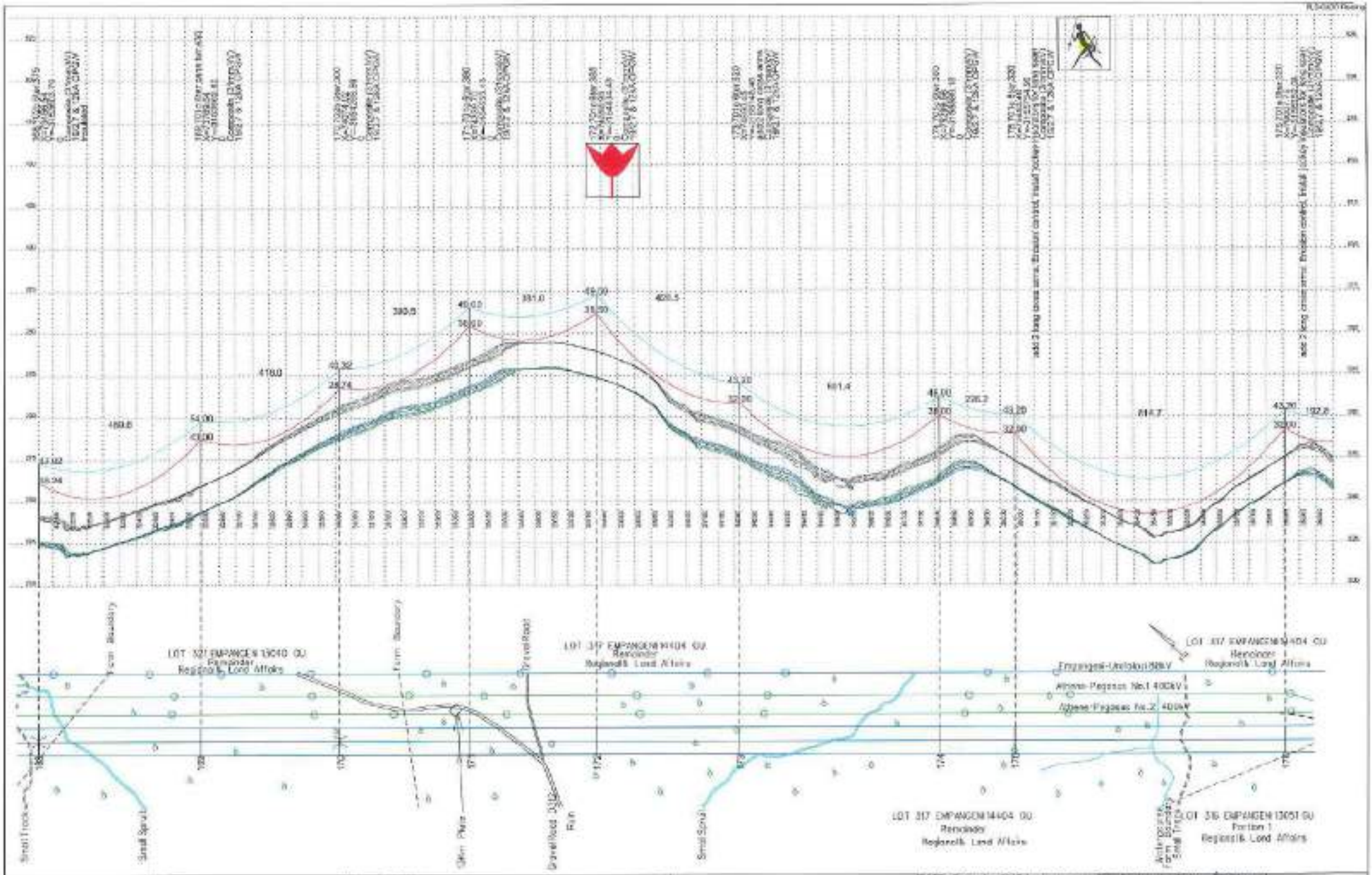
Conductor: 6 Tern, 4 Tern

Templating Temperature: 75 Degrees

DATE: September 2017

Sheet 9/20

Project No. Tx. 203



100.0 m Horiz. Scale

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Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 618

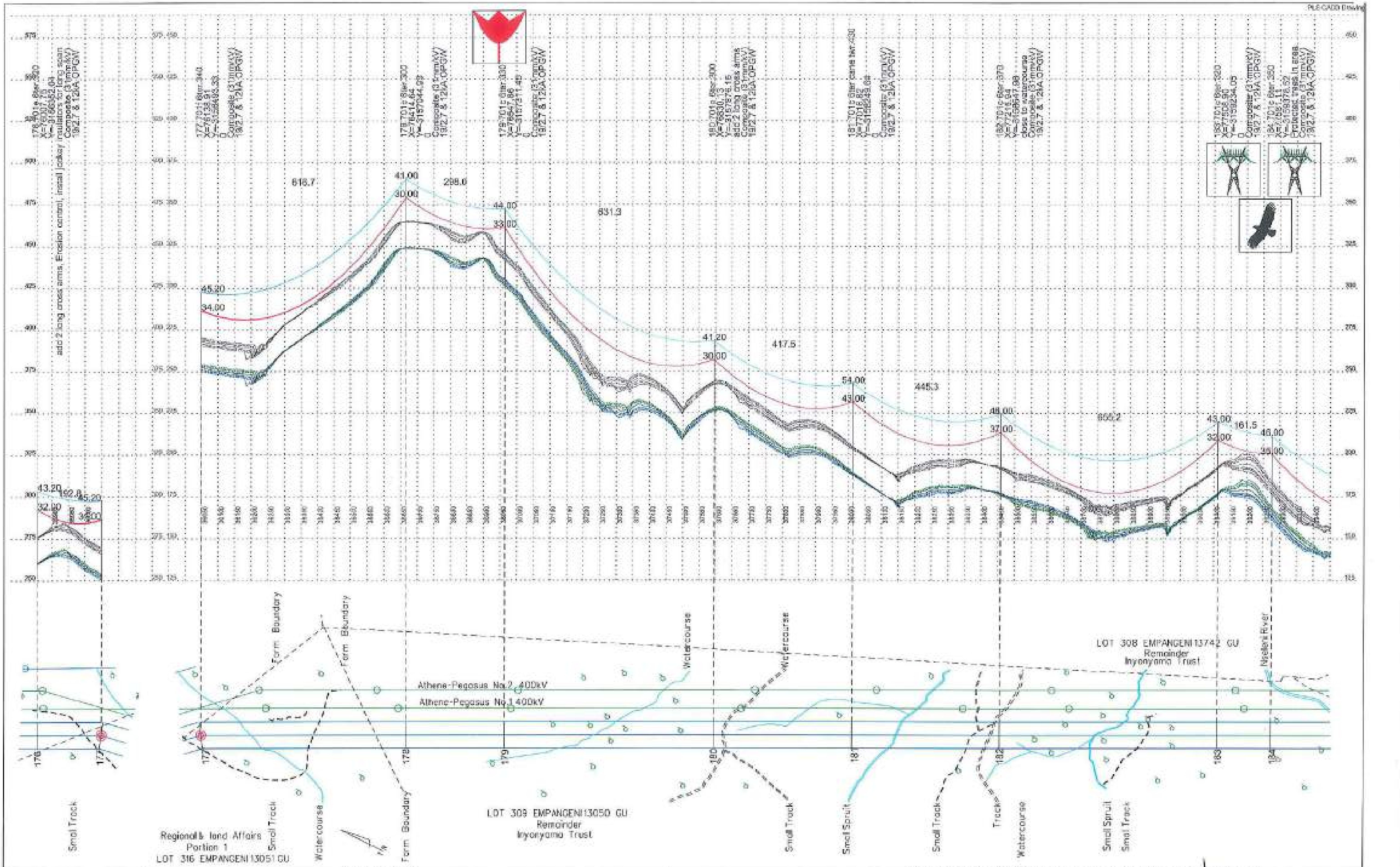
Conductor: 6 Twin, 4 Twin

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 10/20

Project No. Te. 203



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					Project No. Tx. 203

184.701c 6ter 350
X=77531.41
Y=-3159376.82
Protected tree in area
Composite (31mmkV)
19/2.7 & 12kA OPGW

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Y=-3159850.58
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Composite (31mmkV)
19/2.7 & 12kA OPGW

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0
Composite (31mmkV)
19/2.7 & 12kA OPGW

187.702b 6ter 350
X=78224.74
Y=-3160668.10
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

188.701c 6ter 300
X=78326.53
Y=-3160974.06
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

189.701c 6ter 340
X=78619.46
Y=-3161458.80
add 2 long cross arms
Composite (31mmkV)
19/2.7 & 12kA OPGW

190.701c 6ter 340
X=78871.10
Y=-3161859.34
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

191.701c 6ter 335
X=78976.18
Y=-3162209.25
Protected tree in area , add 2 long cross arms, install jockey , insulators for long span
Composite (31mmkV)
19/2.7 & 12kA OPGW

46.00
35.00
639.6
54.00
43.00
409.6
41.82
30.24
390.4
46.32
34.74
232.4
41.00
30.00
660.4
45.20
34.00
662.8
45.20
34.00
269.0
44.70
33.50
728.3

Kwaleni River
Farm Boundary
Small Track
Track
Watercourse
Trees
Land Building
Track
Watercourse
1kV Line 5.96m High
Dwellings
Gravel Road L1415
No Km Pickets
Tower 019004
Gravel Road L1415
1kV Line 6.07m
Tower EM420
Watercourse
Athene-Pegasus No2 400kV
Athene-Pegasus No1 400kV
Tower 019004
Dwellings to be re-located
Lands Mamelles
Farm Boundary
Dwellings
Spruit
Small Track
Farm Boundary

LOT 309 EMPANGENI 13050 GU
Remainder
Inyonyoma Trust

LOT 285 EMPANGENI 13400 GU
Remainder
Inyonyoma Trust

LOT 285 EMPANGENI 13400 GU
Remainder
Inyonyoma Trust

100.0 m Horiz. Scale
20.0 m Vert. Scale

Eskom

Drawing No:
CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518
Conductor: 6 Tern, 4 Tern
Templating Temperature: 70 Degrees

DATE: September 2017

Sheet 12/20

Engineer Line Design: Shuhra Dayal / Jonathon Chetty
Senior Environmental Advisor: Velaidam Thanyani
Field Environmental Data:
Negotiator: Wimpie Herning
Survey: Sanjeev Hiracharid
Mapping: Christo Badenhorst
Profiles Approved: Bruce Mthembu

Project No.
Tx. 203

PLS-CADD Drawing

192.701e 6ter 300
X=79237.76
Y=-3162884.48
add 2 long cross arms, install jickey insulators for long span
Composite (31mm)kV
192.7 & 120A OPGW

192.701e 6ter 340
X=79426.79
Y=-3163361.38
Protected tress in area, add 2 long cross arms
Composite (31mm)kV
192.7 & 120A OPGW

194.701c 6ter conx twr 430
X=79691.36
Y=-3163880.96
0
Composite (31mm)kV
192.7 & 120A OPGW

196.701e 6ter 360
X=79786.92
Y=-3164270.37
0
Composite (31mm)kV
192.7 & 120A OPGW

196.701c 6ter conx twr 440
X=79917.45
Y=-3164463.43
add 2 long cross arms
Composite (31mm)kV
192.7 & 120A OPGW

197.701c 6ter 375
X=80016.14
Y=-3164986.36
protected tress in area
Composite (31mm)kV
192.7 & 120A OPGW

198.701c 6ter 390
X=80410.21
Y=-3165192.52
Protected tress in area
Composite (31mm)kV
192.7 & 120A OPGW

198.701e 6ter 380
X=80172.92
Y=-3165639.81
0
Composite (31mm)kV
192.7 & 120A OPGW

41.20
30.00
513.2
45.20
34.00
834.0
54.00
43.00
343.5
47.20
36.00
47.20
36.00
233.1
55.20
44.00
919.0
48.50
37.50
361.1
50.00
39.00
540.1
48.00
38.00

LOT 285 EMPANGENI 13400 GU
Remainder
Inyonyoma Trust
Watercourse
Farm Boundary
Dwellings
Dwellings
Athene-Pegasus No2 400kV
Athene-Pegasus No1 400kV
Farm Boundary
192
193
194
195
Sugar Cane
Watercourse
Sugar Cane
Sprut
DUBE RIDGE 15220 GU
Portion 1
Tongaat
Sugar Cane
Farm Boundary
Watercourse

LOT 289 EMPANGEVI 13389 GU
Remainder
Watercourse
Dwellings
Farm Boundary
Fence
Watercourse
Small Track
Telephone 5.30m High
Dwellings
Dam
Athene-Pegasus No2 400kV
Athene-Pegasus No1 400kV
195
196
197
198
199
Sugar Cane
Sugar Cane
LOT 290 EMPANGEVI 13388 GU
Remainder
Tongaat
Sugar Cane

100.0 m Horiz. Scale
20.0 m Vert. Scale

Eskom

Drawing No:
CONSTRUCTION PROFILES
Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2
Structure Family: 701, 702, 705, 518
Conductor: 6 Tern, 4 Tern
Templating Temperature: 70 Degrees

DATE: September 2017
Sheet 13/20

Engineer Line Design: Shalina Daval / Jonathan Chetty
Senior Environmental Advisor: Vuledzani Thanyani
Field Environmental Data:
Negotiator: Wimpie Henning
Survey: Sanjeev Hiralchand
Mapping: Christo Badenhorst
Profiles Approved: Bruce Nkhumbha

Project No.
Tx. 203

FLS-CNDO Drawing

100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

Conductor: 6 Tern, 4 Tern

Templating Temprature: 70 Degrees

DATE: September 2017

Sheet 14/20

Engineer Line Design: Shalina Dayal / Jonathan Clarke

Senior Environmental Advisor: Vulledzani Thanyani

Field Environmental Data:

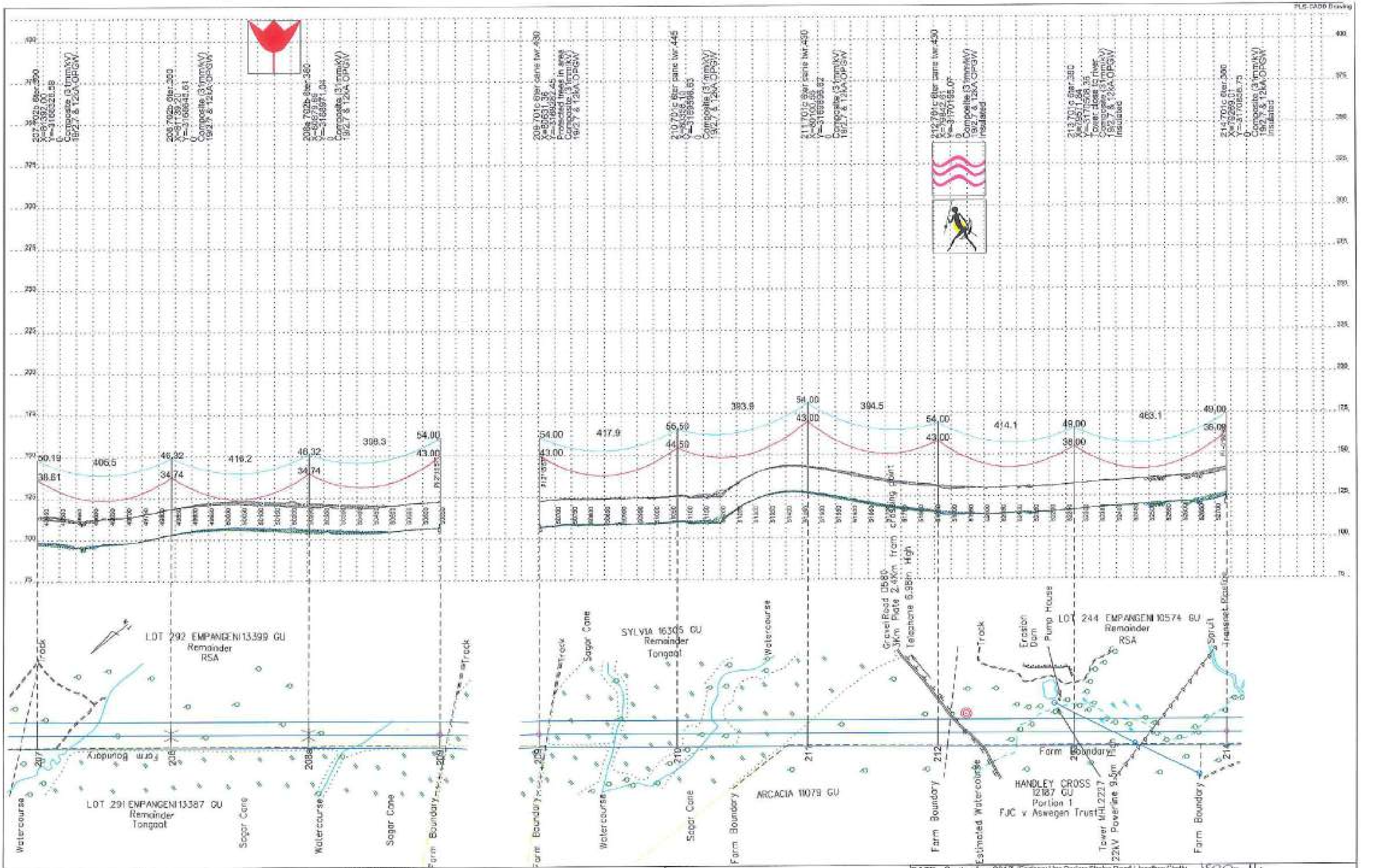
Negotiator: Wimpie Henning

Survey: Sanjeev Hiradhurd

Mapping: Christo Badenhorst

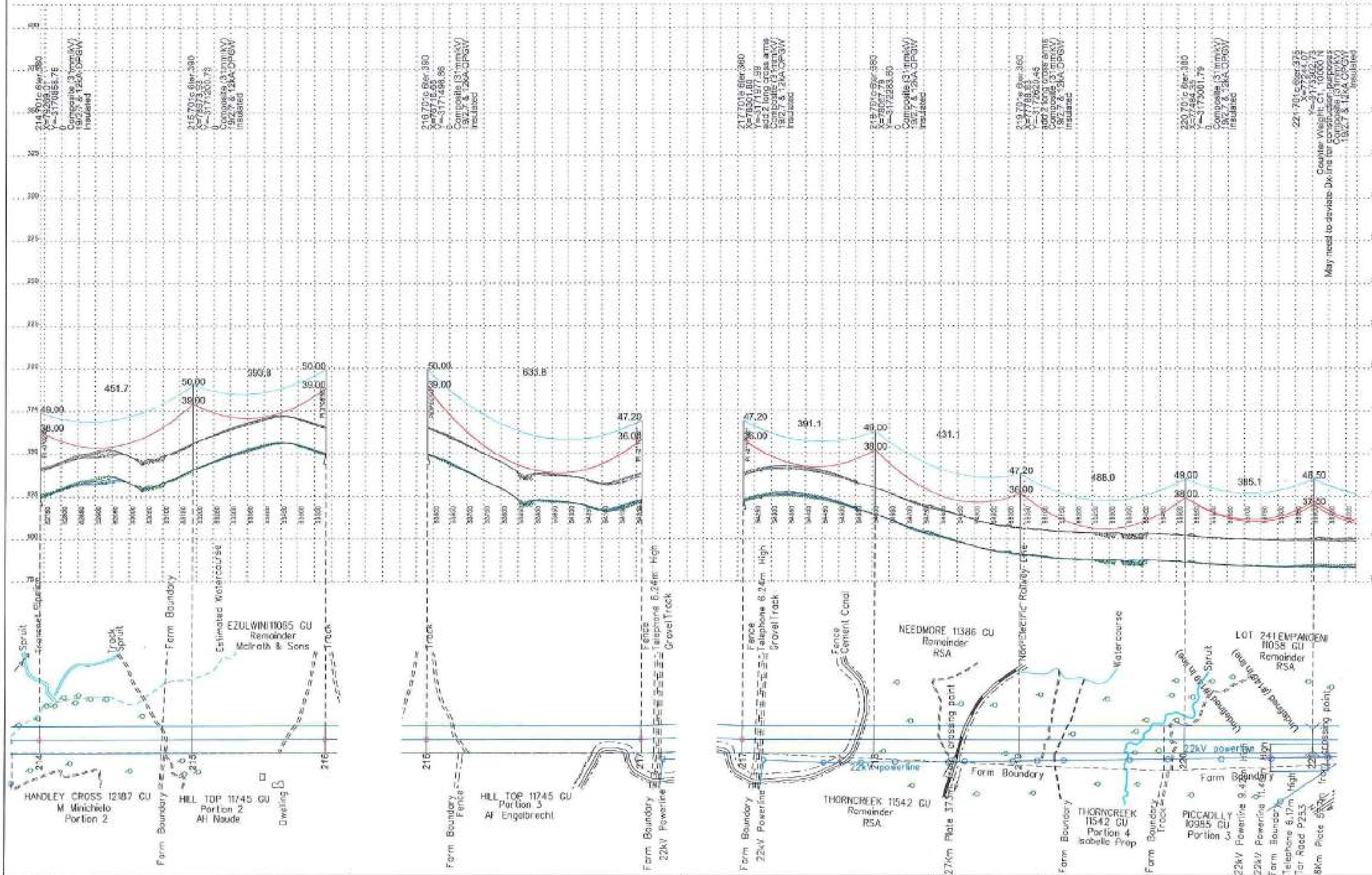
Profiles Approved: Bruce Mahuntsha

Project No. Tx 203



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempreature: 70 Degrees	DATE: September 2017 Sheet 15/20	Engineer Line Design: Shalin Dayal / Jonathan Chetty Senior Environmental Advisor: [illegible] Tharani Field Environmental Data: Negotiator: Wimpie Heining Survey: Sanjeev Rinchund Mapping: [illegible] Rutherford Profiles Approved: Bruce Ntshanisha

Project No.
Tx. 203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

Conductor: 6 Tern, 4 Tern

Templating Temprerature: 70 Degrees

DATE: September 2017

Sheet 16/20

Engineer Line Design: Shaina Dayal / Jonathan Chetty

Senior Environmental Advisor: Vuledzani Thenga

Field Environmental Date:

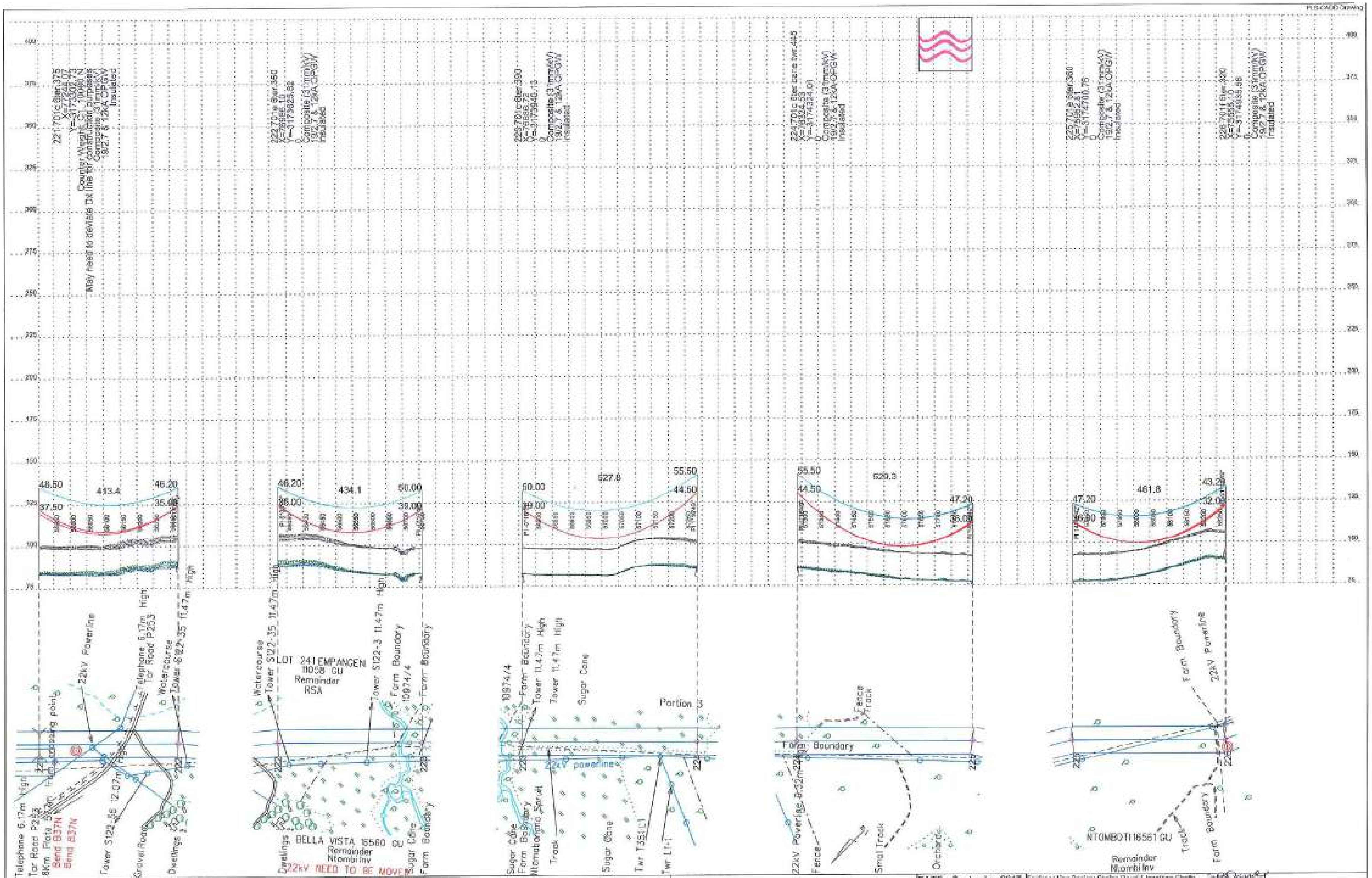
Negotiator: Wimpie Henning

Survey: Sanjeev Hiralland

Mapping: Christo Badenhorst

Profiles Approved: Bruce Mahembe

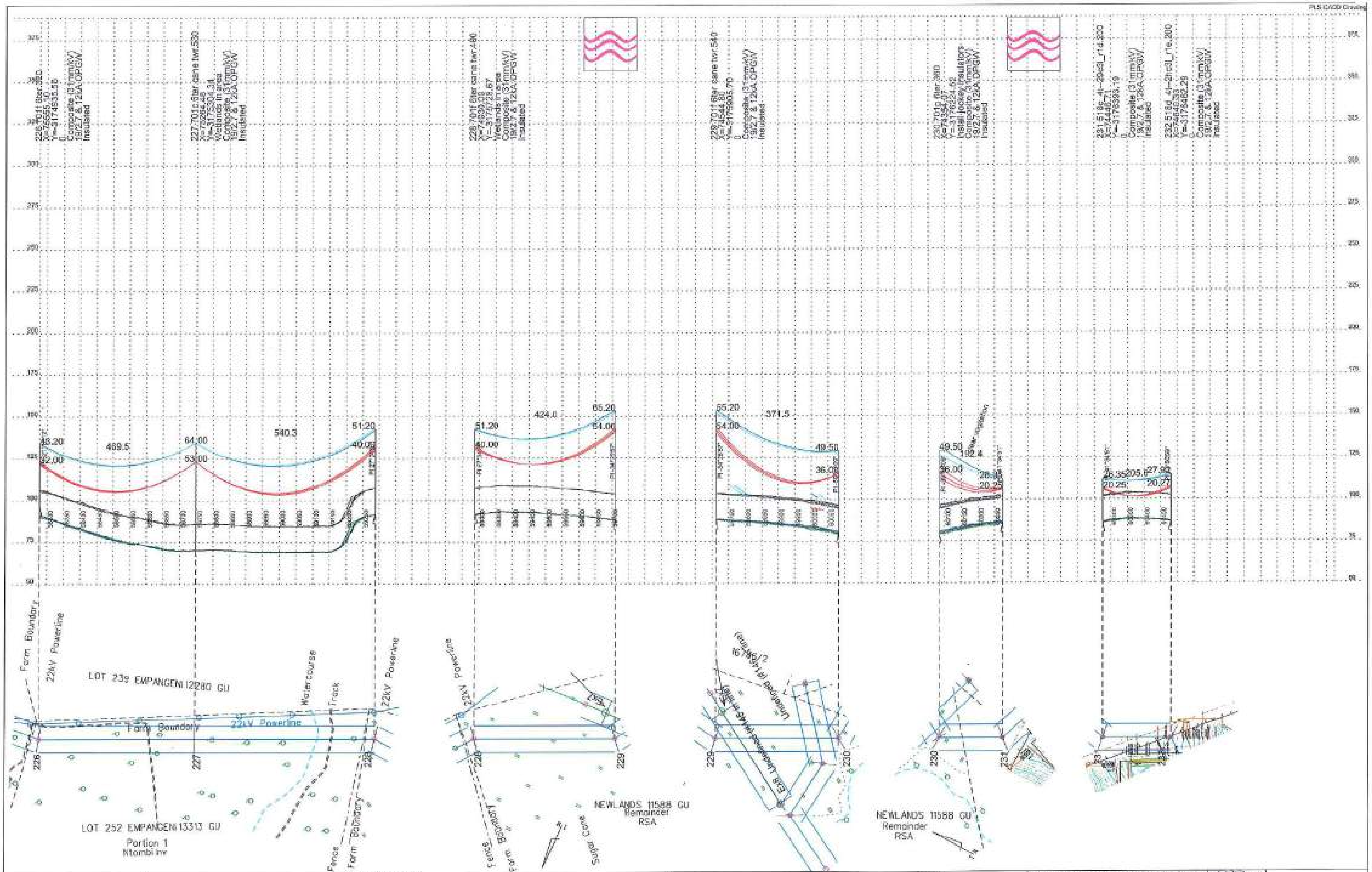
Project No. Tx. 203



100.0 m Horiz. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES	Umfolozi - Mbewu 765kV Part 2	DATE: September 2017
20.0 m Vert. Scale		Revision Information: Rev 1	Structure Family: 701, 702, 705, 510	Sheet 17/20
			Conductor: 6 Tern, 4 Tern	
			Templating Temprerature: 70 Degrees	

Engineer line Design: Shalina Dayal / Jonathan Chetty
Senior Environmental Advisor: Vulezizani Thanyani
Field Environmental Date:
Negotiator: Wimpie Henning
Survey: Sanjeev Hirachund
Mapping: Christa Badenhorst
Profiles Approved: Bruce Mahenteke

Project No. Tx. 203



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempreature: 70 Degrees	DATE: September 2017 Sheet 18/20

Engineer Line Design: Shalen Dayal / Jonathan Chetty
Senior Environmental Advisor: Vuledzani Thanyani
Field Environmental Date:
Negotiator: Wimpie Henning
Survey: Sanjeev Hiradhund
Mapping: Christo Badenhorst
Profiles Approved: Bruce Mshanisha

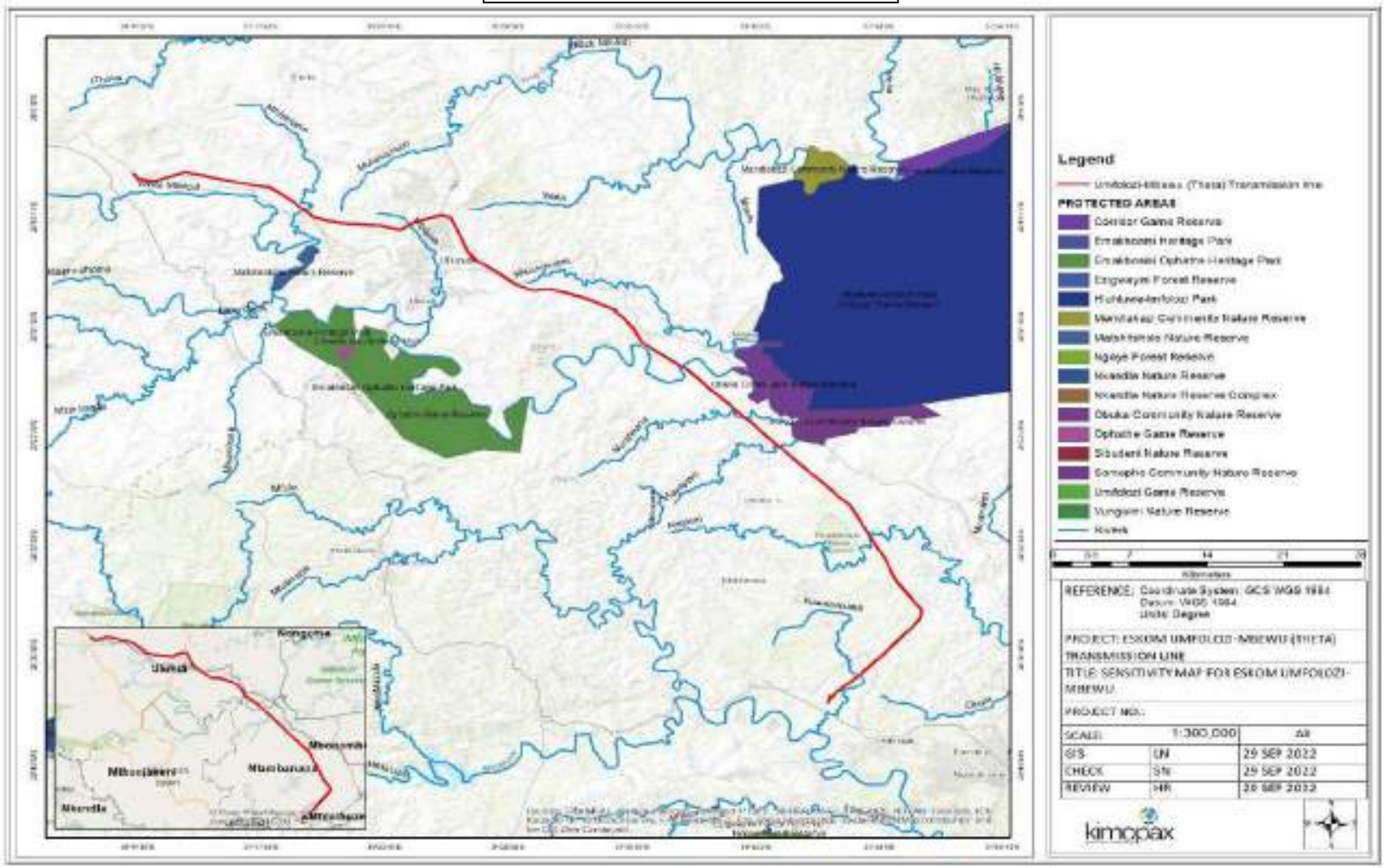
Project No. Tx. 203

100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempresture: 70 Degrees	DATE: September 2017 Sheet 19/20	Engineer Line Design: Shanil Dayal / Jonathan Chetty Senior Environmental Advisor: Velaidam Thamaga Field Environmental Data: Negotiator: Wimpie Herring Survey: Sanjeev Hirachund Mapping: Christo Badenhorst Profiles Approved: Bruce Nkhumbha	Project No. Tx. 203

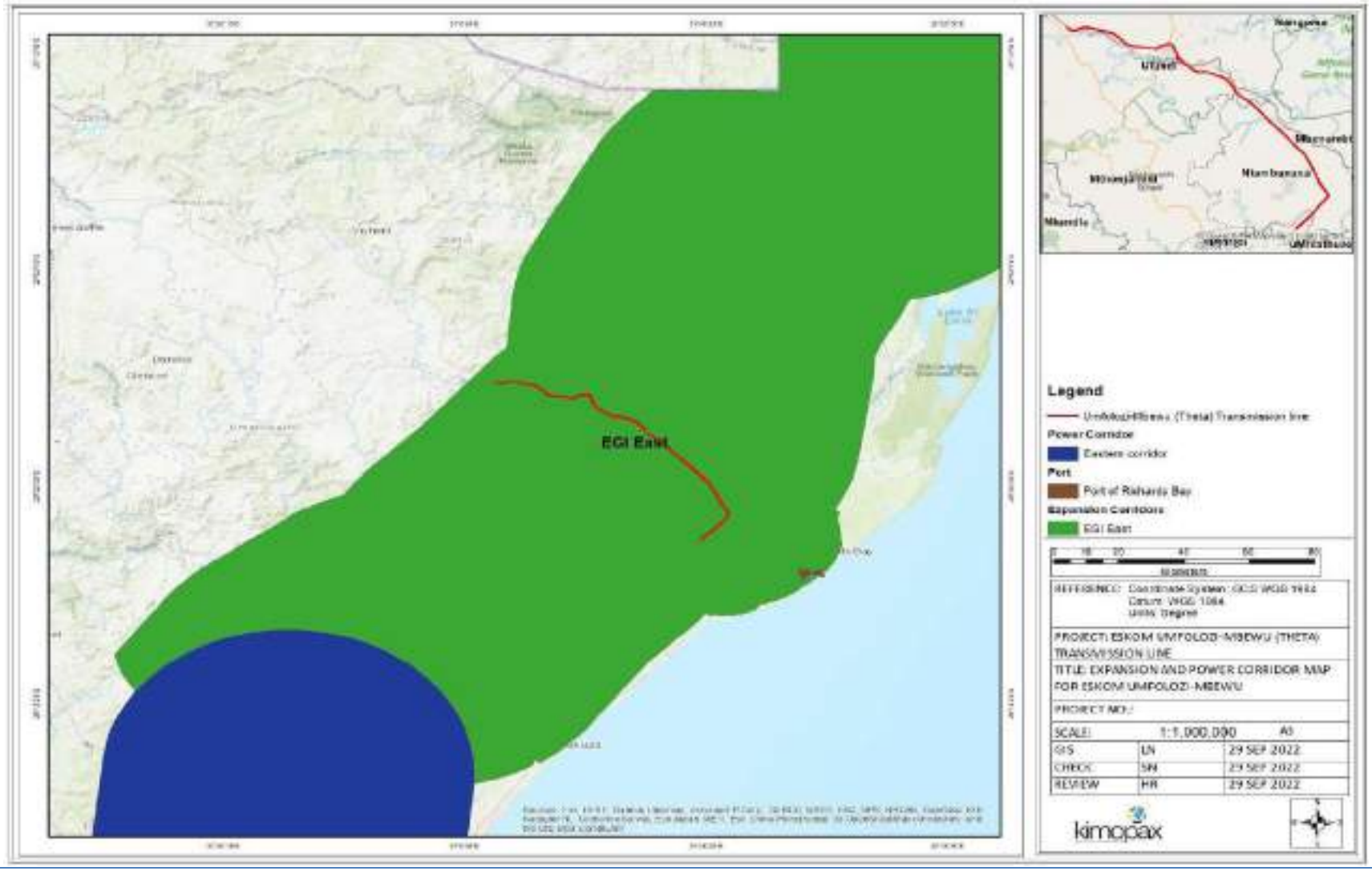
100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempreature: 70 Degrees	DATE: September 2017 Sheet 20/20	Engineer Line Design: Shaline Dayal / Jonathan Chetty Senior Environmental Advisor: Vuledzani Thanyani Field Environmental Data: Negotiator: Wimpie Henning Survey: Sanjeev Hirachund Mapping: Christo Badenhorst Profiles Approved: Bruce Mahambha

Project No. Tx 203

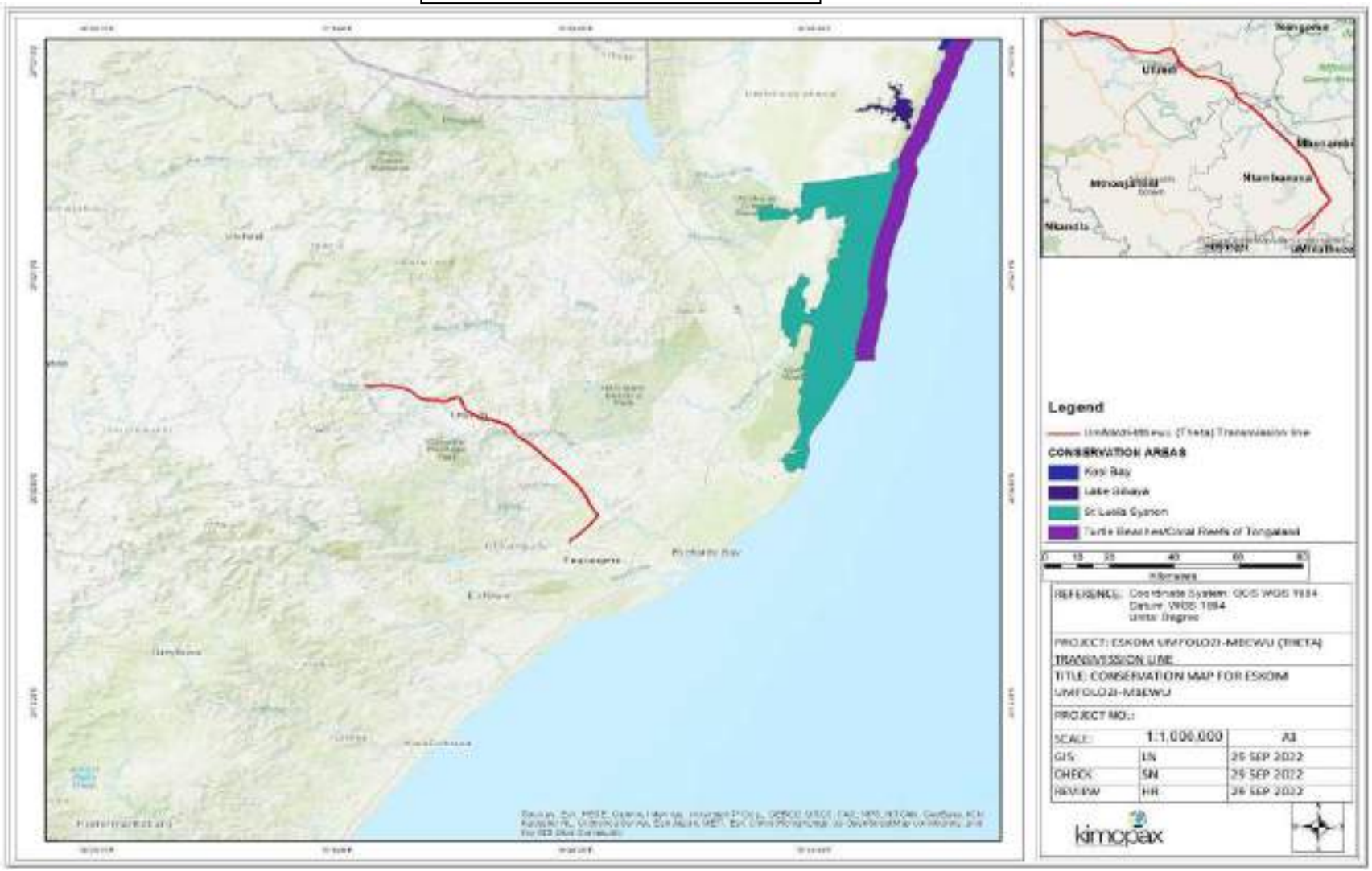
Appendix C-2: Site Sensitive Maps



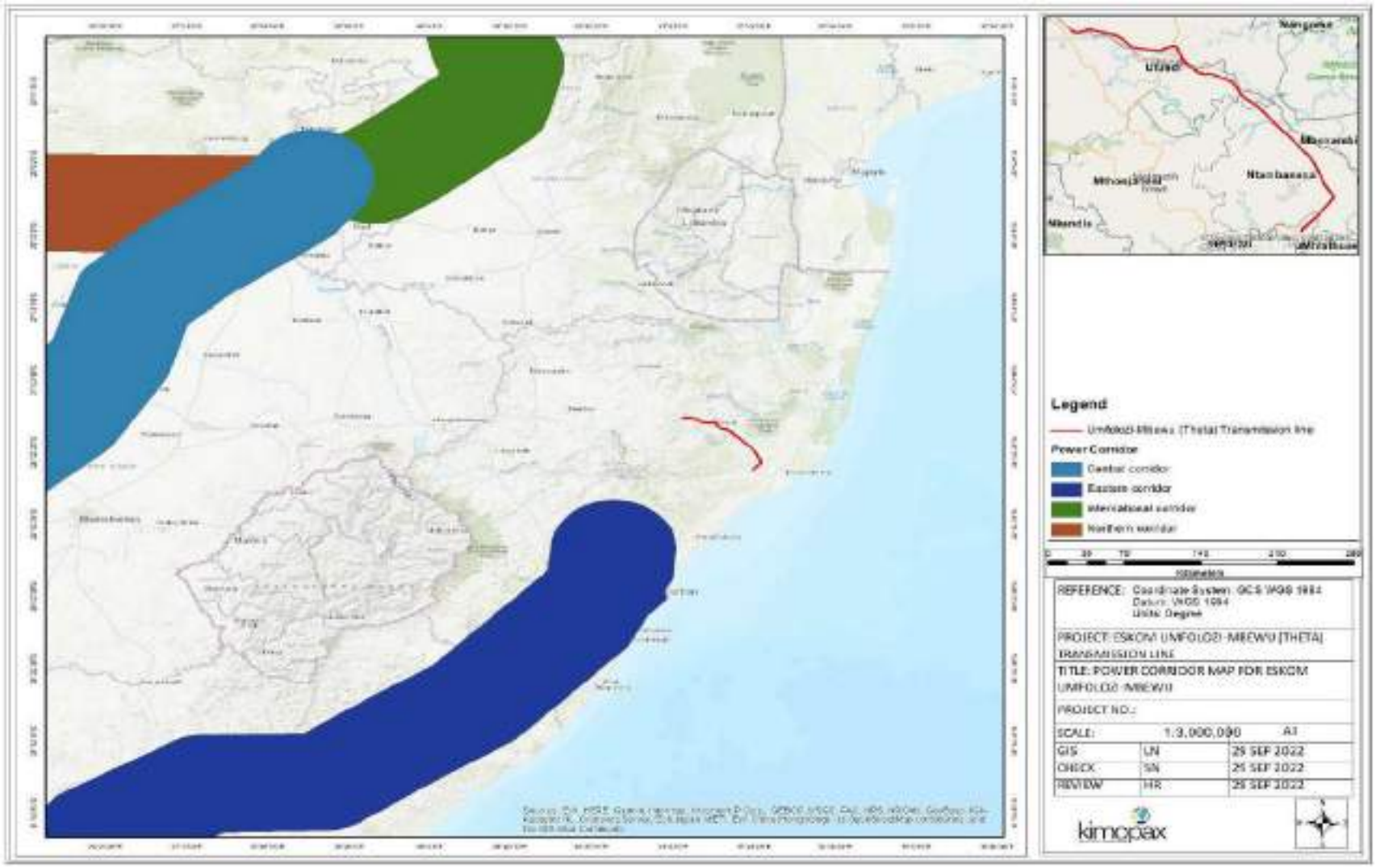
Appendix C-3: Expansion & Power Corridor



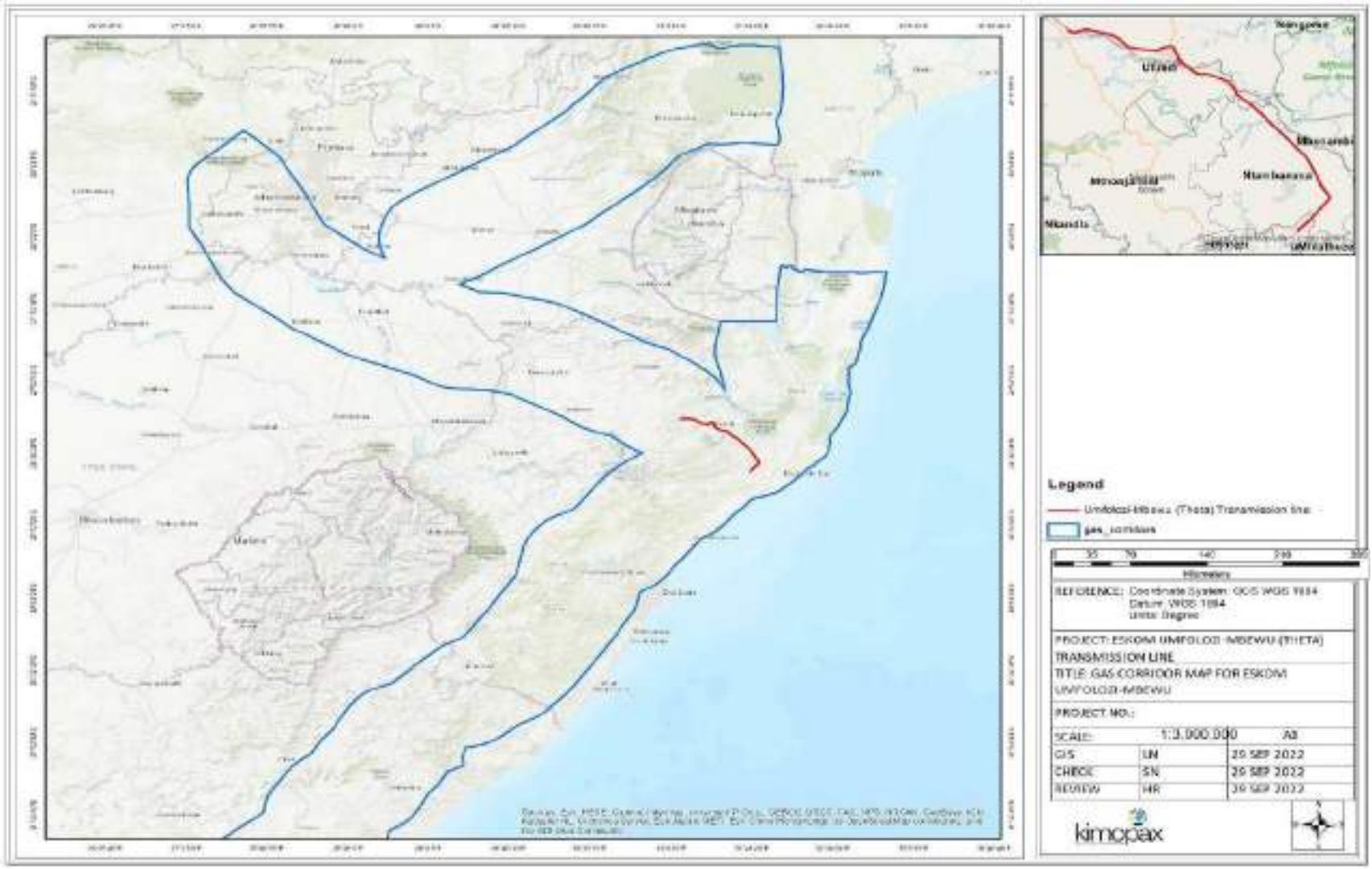
Appendix C-4: Conservation Map



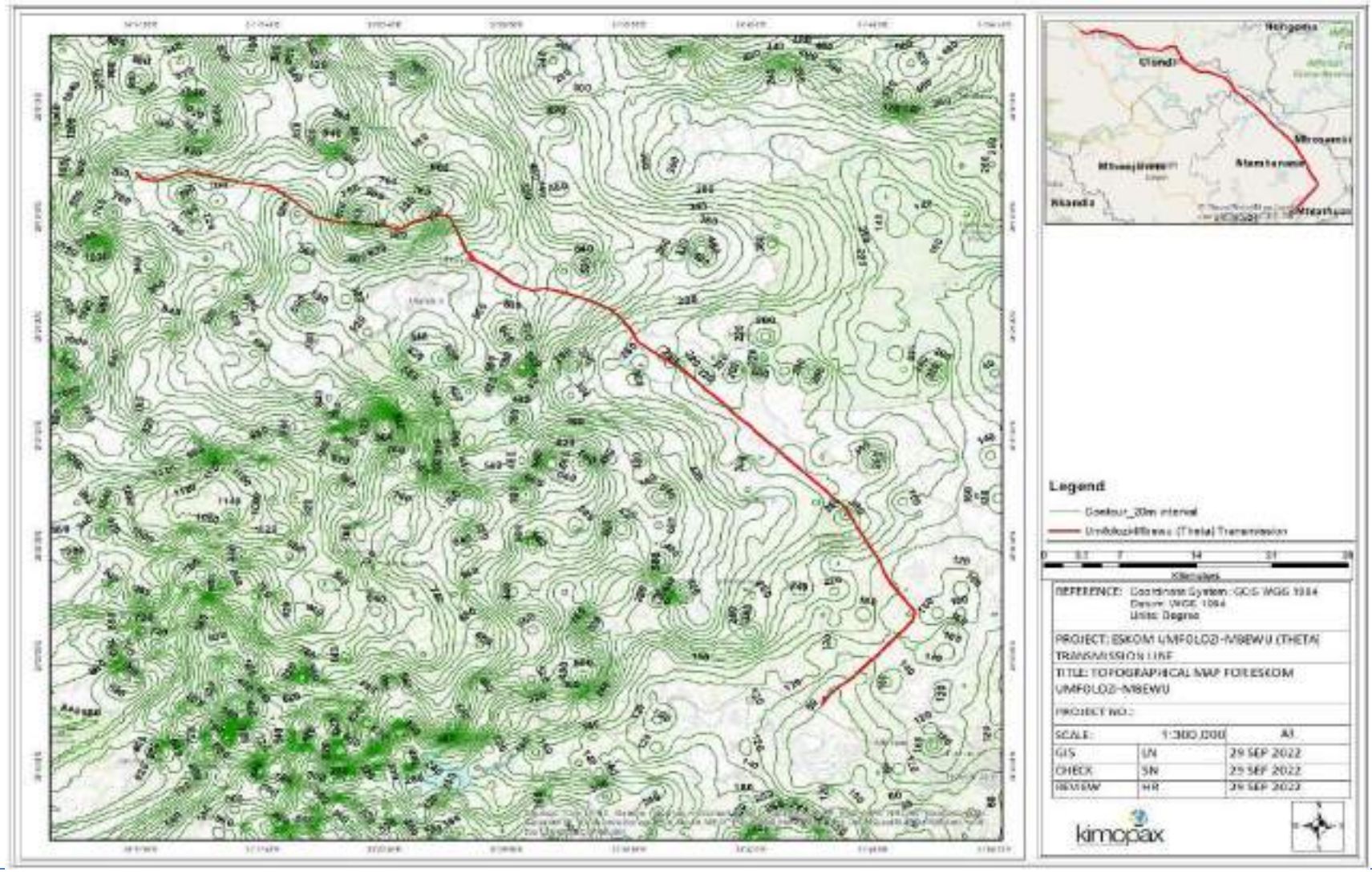
Appendix C-5: Power Corridor Map



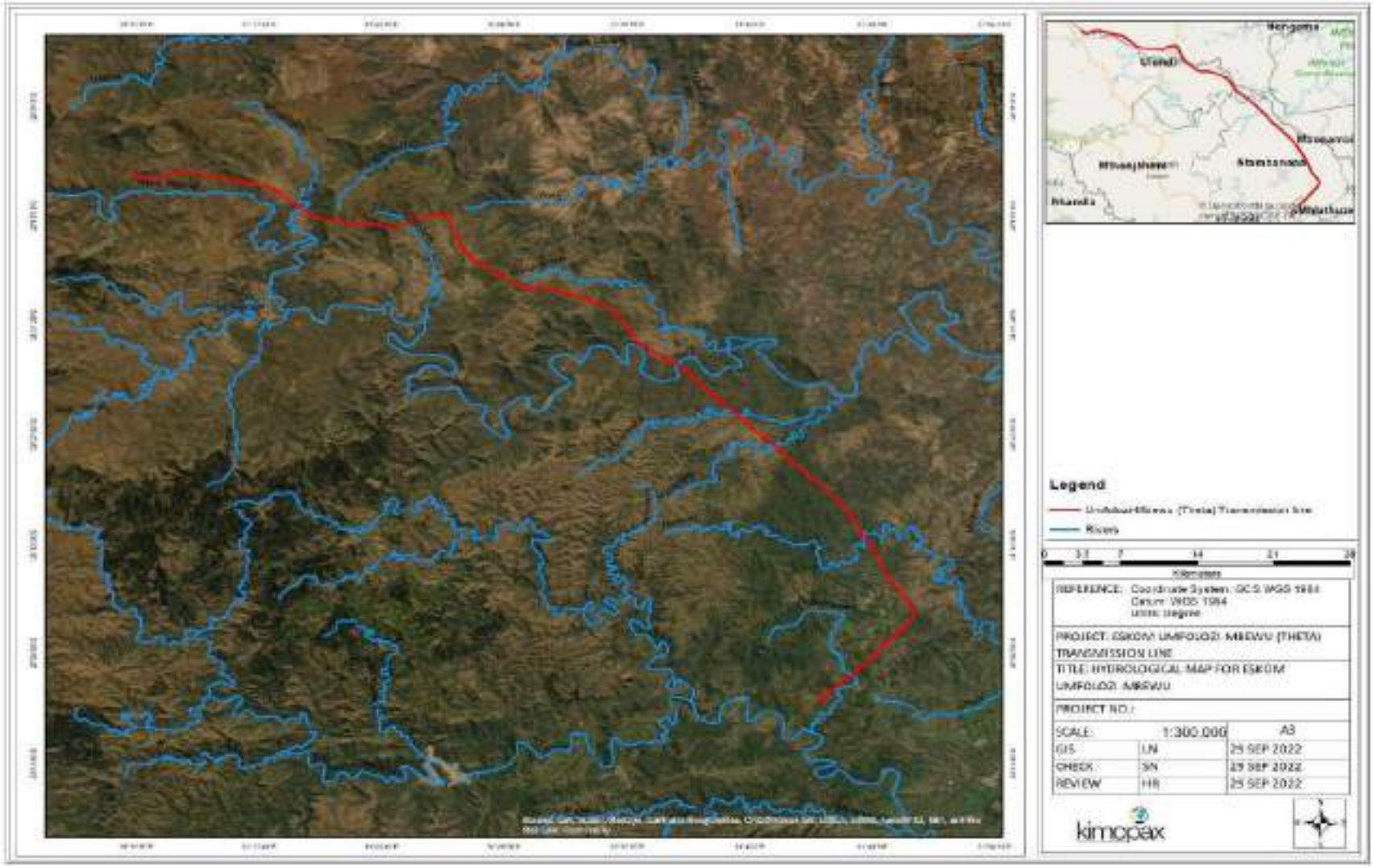
Appendix C-6: Gas Corridor Map



Appendix C-7: Topographical Map



Appendix C-8: Hydrological Map



Appendix D:

An addendum with co-ordinates taken every 250 meters along the route for each alternative alignment

Appendix C: Property Details

No	Farm Name	Farm/ Erf No	Portion	Latitude	Longitude	Property Type
1	ULUNDI C	2	0	28°17'10.75S	31°25'27.81E	Erven
2	ULUNDI B	4	0	28°17'5.68S	31°24'54.22E	Erven
3	ULUNDI B	21	0	28°17'8.59S	31°24'55.76E	Erven
4	ULUNDI B	2	0	28°17'4.7S	31°24'52.38E	Erven
5	ULUNDI B	3	0	28°17'5.1S	31°24'53.39E	Erven
6	ULUNDI B	7	0	28°17'7.33S	31°24'56.66E	Erven
7	ULUNDI B	17	0	28°17'10S	31°24'59.98E	Erven
8	ULUNDI B	23	0	28°17'7.37S	31°24'54.04E	Erven
9	ULUNDI C	14	0	28°17'16.55S	31°25'26E	Erven
10	ULUNDI B	8	0	28°17'7.65S	31°24'57.71E	Erven
11	ULUNDI B	11	0	28°17'8.49S	31°25'0.51E	Erven
12	ULUNDI B	14	0	28°17'8.59S	31°25'3.65E	Erven
13	ULUNDI B	15	0	28°17'9.78S	31°25'2.42E	Erven
14	ULUNDI B	16	0	28°17'10.07S	31°25'1.13E	Erven
15	ULUNDI C	16	0	28°17'17.38S	31°25'26.76E	Erven
16	ULUNDI C	9	0	28°17'13.2S	31°25'25.29E	Erven
17	ULUNDI C	13	0	28°17'16.19S	31°25'25.64E	Erven
18	ULUNDI C	17	0	28°17'17.73S	31°25'27.12E	Erven
19	ULUNDI C	18	0	28°17'18.17S	31°25'27.48E	Erven
20	ULUNDI C	4	0	28°17'9.49S	31°25'26.51E	Erven
21	ULUNDI C	12	0	28°17'15.58S	31°25'24.6E	Erven
22	ULUNDI B	20	0	28°17'9.21S	31°24'56.95E	Erven
23	ULUNDI C	21	0	28°17'19.39S	31°25'28.6E	Erven
24	ULUNDI C	20	0	28°17'18.96S	31°25'28.23E	Erven
25	ULUNDI B	24	0	28°17'6.83S	31°24'53.21E	Erven
26	ULUNDI B	29	0	28°17'3.59S	31°24'58.18E	Erven
27	ULUNDI B	31	0	28°17'4.17S	31°24'59.76E	Erven
28	ULUNDI B	32	0	28°17'4.49S	31°25'0.55E	Erven
29	ULUNDI B	33	0	28°17'4.78S	31°25'1.38E	Erven
30	ULUNDI B	34	0	28°17'5.03S	31°25'2.24E	Erven
31	ULUNDI B	41	0	28°17'5.79S	31°24'59.04E	Erven
32	ULUNDI C	3	0	28°17'10.11S	31°25'27.19E	Erven
33	ULUNDI B	5	0	28°17'6.22S	31°24'55.05E	Erven
34	ULUNDI C	6	0	28°17'10.9S	31°25'25.53E	Erven
35	ULUNDI B	10	0	28°17'8.23S	31°24'59.58E	Erven
36	ULUNDI B	13	0	28°17'8.52S	31°25'2.64E	Erven
37	ULUNDI C	15	0	28°17'16.98S	31°25'26.36E	Erven
38	ULUNDI C	1	0	28°17'11.44S	31°25'28.02E	Erven
39	ULUNDI C	5	0	28°17'10.07S	31°25'25.9E	Erven
40	ULUNDI B	6	0	28°17'6.75S	31°24'55.84E	Erven
41	ULUNDI C	7	0	28°17'11.83S	31°25'26.22E	Erven
42	ULUNDI C	8	0	28°17'12.34S	31°25'25.58E	Erven
43	ULUNDI B	9	0	28°17'7.94S	31°24'58.65E	Erven
44	ULUNDI C	10	0	28°17'13.96S	31°25'24.96E	Erven
45	ULUNDI C	11	0	28°17'14.78S	31°25'24.74E	Erven
46	ULUNDI B	12	0	28°17'8.63S	31°25'1.56E	Erven
47	ULUNDI B	18	0	28°17'9.78S	31°24'59.04E	Erven
48	ULUNDI B	27	0	28°17'2.79S	31°24'56.59E	Erven
49	ULUNDI B	35	0	28°17'5.6S	31°25'3.14E	Erven
50	ULUNDI B	19	0	28°17'9.49S	31°24'58.1E	Erven

51	ULUNDI B	22	0	28°17'7.94S	31°24'54.83E	Erven
52	ULUNDI C	24	0	28°17'20.62S	31°25'29.78E	Erven
53	ULUNDI B	30	0	28°17'3.8S	31°24'58.97E	Erven
54	ULUNDI B	36	0	28°17'6.72S	31°25'3.61E	Erven
55	ULUNDI B	39	0	28°17'6.29S	31°25'0.7E	Erven
56	ULUNDI B	44	0	28°17'4.7S	31°24'56.48E	Erven
57	ULUNDI B	54	0	28°17'3.84S	31°25'13.01E	Erven
58	MAHLABATINI	59	0	28°14'26.02S	31°27'42.77E	Erven
59	ULUNDI B	66	0	28°17'11.51S	31°25'11.92E	Erven
60	ULUNDI C	66	0	28°17'18.1S	31°25'29.1E	Erven
61	ULUNDI B	68	0	28°17'10.11S	31°25'13.15E	Erven
62	ULUNDI B	69	0	28°17'9.31S	31°25'13.62E	Erven
63	ULUNDI C	22	0	28°17'19.75S	31°25'28.99E	Erven
64	ULUNDI B	26	0	28°17'2.47S	31°24'55.51E	Erven
65	ULUNDI B	28	0	28°17'3.16S	31°24'57.42E	Erven
66	ULUNDI C	19	0	28°17'18.6S	31°25'27.84E	Erven
67	ULUNDI B	25	0	28°17'6.14S	31°24'52.24E	Erven
68	ULUNDI B	40	0	28°17'6.03S	31°24'59.87E	Erven
69	ULUNDI B	43	0	28°17'5.13S	31°24'57.38E	Erven
70	ULUNDI B	46	0	28°17'3.7S	31°24'54.94E	Erven
71	ULUNDI C	49	0	28°17'24.14S	31°25'28.71E	Erven
72	ULUNDI B	58	0	28°17'7.83S	31°25'11.35E	Erven
73	ULUNDI C	61	0	28°17'16.91S	31°25'28.95E	Erven
74	ULUNDI B	65	0	28°17'12.23S	31°25'11.31E	Erven
75	ULUNDI B	42	0	28°17'5.57S	31°24'58.18E	Erven
76	ULUNDI B	45	0	28°17'4.12S	31°24'55.69E	Erven
77	ULUNDI B	49	0	28°17'4.92S	31°25'8.33E	Erven
78	ULUNDI C	52	0	28°17'13.27S	31°25'28.63E	Erven
79	ULUNDI C	53	0	28°17'13.53S	31°25'28.05E	Erven
80	ULUNDI B	57	0	28°17'6.72S	31°25'11.89E	Erven
81	ULUNDI C	60	0	28°17'16.58S	31°25'28.63E	Erven
82	ULUNDI B	61	0	28°17'5.21S	31°25'10.63E	Erven
83	ULUNDI C	62	0	28°17'17.3S	31°25'29.32E	Erven
84	ULUNDI C	69	0	28°17'16.98S	31°25'28.05E	Erven
85	ULUNDI B	72	0	28°17'6.64S	31°25'14.73E	Erven
86	ULUNDI C	74	0	28°17'14.89S	31°25'26.51E	Erven
87	ULUNDI C	75	0	28°17'14.39S	31°25'26.69E	Erven
88	ULUNDI B	52	0	28°17'2.08S	31°25'9.3E	Erven
89	ULUNDI B	55	0	28°17'4.85S	31°25'12.72E	Erven
90	ULUNDI C	55	0	28°17'14.46S	31°25'27.41E	Erven
91	ULUNDI B	56	0	28°17'5.79S	31°25'12.29E	Erven
92	ULUNDI C	63	0	28°17'17.73S	31°25'29.67E	Erven
93	ULUNDI B	50	0	28°17'4.02S	31°25'8.76E	Erven
94	ULUNDI C	50	0	28°17'13.2S	31°25'29.82E	Erven
95	ULUNDI B	51	0	28°17'3.05S	31°25'9.08E	Erven
96	ULUNDI C	57	0	28°17'15.43S	31°25'27.59E	Erven
97	ULUNDI C	58	0	28°17'15.83S	31°25'27.91E	Erven
98	ULUNDI B	59	0	28°17'7.04S	31°25'9.98E	Erven
99	ULUNDI C	59	0	28°17'16.19S	31°25'28.27E	Erven
100	ULUNDI B	62	0	28°17'4.38S	31°25'11.07E	Erven
101	ULUNDI B	63	0	28°17'3.51S	31°25'11.28E	Erven
102	ULUNDI B	64	0	28°17'2.65S	31°25'11.5E	Erven
103	ULUNDI C	64	0	28°17'18.1S	31°25'30.04E	Erven
104	ULUNDI C	65	0	28°17'18.49S	31°25'29.5E	Erven
105	ULUNDI B	71	0	28°17'7.55S	31°25'14.38E	Erven
106	ULUNDI C	81	0	28°17'12.63S	31°25'29.14E	Erven
107	ULUNDI C	84	0	28°17'14.71S	31°25'29.85E	Erven
108	ULUNDI C	77	0	28°17'13.42S	31°25'27.04E	Erven

109	ULUNDI B	80	0	28°17'9.85S	31°25'15.31E	Erven
110	ULUNDI C	83	0	28°17'14.2S	31°25'29.82E	Erven
111	ULUNDI C	87	0	28°17'16.3S	31°25'30.68E	Erven
112	ULUNDI C	92	0	28°17'16.66S	31°25'30.14E	Erven
113	ULUNDI C	100	0	28°17'12.77S	31°25'33.06E	Erven
114	ULUNDI C	67	0	28°17'17.7S	31°25'28.78E	Erven
115	ULUNDI C	70	0	28°17'16.58S	31°25'27.7E	Erven
116	ULUNDI C	71	0	28°17'16.19S	31°25'27.37E	Erven
117	ULUNDI C	80	0	28°17'12.66S	31°25'28.6E	Erven
118	ULUNDI B	90	0	28°17'7.87S	31°25'18.55E	Erven
119	ULUNDI C	86	0	28°17'15.9S	31°25'30.4E	Erven
120	ULUNDI B	89	0	28°17'8.77S	31°25'18.23E	Erven
121	ULUNDI C	91	0	28°17'17.01S	31°25'30.51E	Erven
122	ULUNDI B	97	0	28°17'11.94S	31°25'18.91E	Erven
123	ULUNDI B	102	0	28°17'13.78S	31°25'20.96E	Erven
124	ULUNDI C	106	0	28°17'15.5S	31°25'34.21E	Erven
125	ULUNDI B	108	0	28°17'8.49S	31°25'22.84E	Erven
126	ULUNDI C	111	0	28°17'16.26S	31°25'36.77E	Erven
127	ULUNDI B	53	0	28°17'2.98S	31°25'13.22E	Erven
128	ULUNDI C	56	0	28°17'15S	31°25'27.23E	Erven
129	ULUNDI B	60	0	28°17'6.03S	31°25'10.31E	Erven
130	ULUNDI B	77	0	28°17'7.19S	31°25'16.35E	Erven
131	ULUNDI C	23	0	28°17'20.19S	31°25'29.32E	Erven
132	ULUNDI B	47	0	28°17'3.19S	31°24'54.11E	Erven
133	ULUNDI B	105	0	28°17'11.11S	31°25'21.83E	Erven
134	ULUNDI B	111	0	28°17'19.35S	31°24'35.89E	Erven
135	ULUNDI C	112	0	28°17'16.83S	31°25'37.06E	Erven
136	ULUNDI B	119	0	28°17'19.46S	31°24'32.26E	Erven
137	ULUNDI C	98	0	28°17'14.49S	31°25'29.03E	Erven
138	ULUNDI B	99	0	28°17'13.63S	31°25'17.73E	Erven
139	ULUNDI B	104	0	28°17'11.97S	31°25'21.5E	Erven
140	ULUNDI C	105	0	28°17'15.04S	31°25'34.03E	Erven
141	ULUNDI B	106	0	28°17'10.25S	31°25'22.15E	Erven
142	ULUNDI C	107	0	28°17'15.97S	31°25'34.43E	Erven
143	ULUNDI B	109	0	28°17'17.95S	31°24'34.12E	Erven
144	ULUNDI C	110	0	28°17'16.66S	31°25'36.01E	Erven
145	ULUNDI C	79	0	28°17'12.73S	31°25'27.99E	Erven
146	ULUNDI C	82	0	28°17'12.59S	31°25'29.78E	Erven
147	ULUNDI B	85	0	28°17'12.3S	31°25'16.54E	Erven
148	ULUNDI B	86	0	28°17'11.44S	31°25'17.11E	Erven
149	ULUNDI B	87	0	28°17'10.54S	31°25'17.54E	Erven
150	ULUNDI C	88	0	28°17'16.66S	31°25'31.04E	Erven
151	ULUNDI C	90	0	28°17'17.41S	31°25'30.9E	Erven
152	ULUNDI B	92	0	28°17'7.48S	31°25'20.67E	Erven
153	ULUNDI B	123	0	28°17'18.2S	31°24'40.72E	Erven
154	ULUNDI B	131	0	28°17'19.39S	31°24'39.45E	Erven
155	ULUNDI D	139	0	28°16'22.55S	31°26'15.36E	Erven
156	ULUNDI B	117	0	28°17'20.51S	31°24'34.38E	Erven
157	ULUNDI B	96	0	28°17'11.07S	31°25'19.31E	Erven
158	ULUNDI B	100	0	28°17'22.45S	31°25'16.79E	Erven
159	ULUNDI C	102	0	28°17'13.67S	31°25'33.42E	Erven
160	ULUNDI B	107	0	28°17'9.38S	31°25'22.51E	Erven
161	ULUNDI D	148	0	28°16'19.53S	31°26'15.98E	Erven
162	ULUNDI D	150	0	28°16'18.48S	31°26'16.73E	Erven
163	ULUNDI C	153	0	28°17'19.03S	31°25'32.23E	Erven
164	ULUNDI C	154	0	28°17'19.39S	31°25'31.69E	Erven
165	ULUNDI D	156	0	28°16'18.23S	31°26'14.89E	Erven
166	ULUNDI B	166	0	28°17'26.85S	31°24'26.28E	Erven

167	ULUNDI B	172	0	28°17'10.46S	31°24'42.87E	Erven
168	ULUNDI D	134	0	28°16'20.43S	31°26'16.69E	Erven
169	ULUNDI C	134	0	28°17'18.92S	31°25'34.6E	Erven
170	ULUNDI B	135	0	28°17'16.66S	31°24'36.29E	Erven
171	ULUNDI C	136	0	28°17'17.99S	31°25'33.71E	Erven
172	ULUNDI B	138	0	28°17'15.32S	31°24'34.78E	Erven
173	ULUNDI D	138	0	28°16'22.12S	31°26'15.61E	Erven
174	ULUNDI C	51	0	28°17'13.24S	31°25'29.24E	Erven
175	ULUNDI C	54	0	28°17'13.96S	31°25'27.59E	Erven
176	ULUNDI B	76	0	28°17'6.29S	31°25'16.72E	Erven
177	ULUNDI C	76	0	28°17'13.92S	31°25'26.83E	Erven
178	ULUNDI B	81	0	28°17'10.75S	31°25'14.84E	Erven
179	ULUNDI B	84	0	28°17'13.35S	31°25'16.07E	Erven
180	ULUNDI C	89	0	28°17'17.09S	31°25'31.47E	Erven
181	ULUNDI B	93	0	28°17'8.38S	31°25'20.32E	Erven
182	ULUNDI C	95	0	28°17'15.54S	31°25'29.14E	Erven
183	ULUNDI C	99	0	28°17'12.26S	31°25'32.88E	Erven
184	ULUNDI C	101	0	28°17'13.24S	31°25'33.24E	Erven
185	ULUNDI C	104	0	28°17'14.57S	31°25'33.89E	Erven
186	ULUNDI B	112	0	28°17'20.01S	31°24'36.75E	Erven
187	ULUNDI D	131	0	28°16'18.87S	31°26'17.55E	Erven
188	ULUNDI D	132	0	28°16'19.53S	31°26'17.23E	Erven
189	ULUNDI B	134	0	28°17'17.38S	31°24'37.01E	Erven
190	ULUNDI C	135	0	28°17'18.49S	31°25'34.21E	Erven
191	ULUNDI D	136	0	28°16'21.25S	31°26'16.15E	Erven
192	LOTTERY A	155	0	28°11'59.57S	31°17'34.41E	Erven
193	ULUNDI D	157	0	28°16'17.8S	31°26'15.25E	Erven
194	LOTTERY A	159	0	28°12'0.39S	31°17'36.74E	Erven
195	ULUNDI C	176	0	28°17'18.06S	31°25'32.05E	Erven
196	ULUNDI B	177	0	28°17'11.58S	31°24'48.82E	Erven
197	ULUNDI C	178	0	28°17'17.23S	31°25'33.03E	Erven
198	ULUNDI C	179	0	28°17'16.69S	31°25'32.56E	Erven
199	ULUNDI B	185	0	28°17'13.99S	31°24'56.59E	Erven
200	ULUNDI B	190	0	28°17'15.58S	31°24'56.16E	Erven
201	ULUNDI C	190	0	28°17'11.73S	31°25'34.54E	Erven
202	ULUNDI B	191	0	28°17'15.32S	31°24'55.05E	Erven
203	ULUNDI B	193	0	28°17'14.64S	31°24'53.03E	Erven
204	ULUNDI C	194	0	28°17'10.25S	31°25'36.41E	Erven
205	ULUNDI C	202	0	28°17'7.33S	31°25'39.72E	Erven
206	ULUNDI B	203	0	28°17'12.08S	31°24'43.02E	Erven
207	ULUNDI B	206	0	28°17'14.2S	31°24'44.31E	Erven
208	ULUNDI C	211	0	28°17'8.02S	31°25'40.84E	Erven
209	ULUNDI B	213	0	28°17'16.44S	31°24'51.37E	Erven
210	ULUNDI B	214	0	28°17'16.72S	31°24'52.38E	Erven
211	ULUNDI B	216	0	28°17'17.3S	31°24'54.39E	Erven
212	ULUNDI B	218	0	28°17'17.73S	31°24'56.59E	Erven
213	ULUNDI B	88	0	28°17'9.67S	31°25'17.91E	Erven
214	ULUNDI C	97	0	28°17'14.75S	31°25'28.42E	Erven
215	ULUNDI B	98	0	28°17'12.77S	31°25'18.48E	Erven
216	ULUNDI B	103	0	28°17'12.84S	31°25'21.18E	Erven
217	ULUNDI C	103	0	28°17'14.1S	31°25'33.67E	Erven
218	ULUNDI B	110	0	28°17'18.78S	31°24'34.92E	Erven
219	ULUNDI B	113	0	28°17'20.62S	31°24'37.69E	Erven
220	ULUNDI B	115	0	28°17'21.48S	31°24'36.61E	Erven
221	ULUNDI B	121	0	28°17'16.87S	31°24'39.1E	Erven
222	ULUNDI B	122	0	28°17'17.52S	31°24'39.89E	Erven
223	ULUNDI C	224	0	28°17'12.12S	31°25'35.33E	Erven
224	ULUNDI B	226	0	28°17'17.63S	31°24'48.63E	Erven

225	ULUNDI C	227	0	28°17'13.42S	31°25'34.65E	Erven
226	ULUNDI B	231	1	28°17'32.21S	31°24'43.99E	Erven
227	ULUNDI C	243	0	28°17'9.96S	31°25'40.08E	Erven
228	ULUNDI C	252	0	28°17'13.38S	31°25'36.66E	Erven
229	ULUNDI C	260	0	28°17'14.17S	31°25'37.45E	Erven
230	ULUNDI C	285	0	28°17'15.18S	31°25'36.59E	Erven
231	ULUNDI D	294	0	28°16'11.75S	31°26'32.43E	Erven
232	ULUNDI D	295	0	28°16'12.21S	31°26'32.53E	Erven
233	ULUNDI C	297	0	28°17'17.67S	31°25'38.79E	Erven
234	ULUNDI D	301	0	28°16'15.24S	31°26'32.89E	Erven
235	ULUNDI C	310	0	28°17'12.63S	31°25'42.38E	Erven
236	ULUNDI B	67	0	28°17'10.83S	31°25'12.58E	Erven
237	ULUNDI B	70	0	28°17'8.41S	31°25'13.98E	Erven
238	ULUNDI C	73	0	28°17'15.43S	31°25'26.62E	Erven
239	ULUNDI B	74	0	28°17'4.89S	31°25'15.5E	Erven
240	ULUNDI B	75	0	28°17'5.39S	31°25'17.07E	Erven
241	ULUNDI C	78	0	28°17'13.09S	31°25'27.52E	Erven
242	ULUNDI B	82	0	28°17'11.58S	31°25'14.2E	Erven
243	ULUNDI B	83	0	28°17'12.87S	31°25'13.44E	Erven
244	ULUNDI C	68	0	28°17'17.34S	31°25'28.42E	Erven
245	ULUNDI C	72	0	28°17'15.83S	31°25'27.04E	Erven
246	ULUNDI B	73	0	28°17'5.79S	31°25'15.13E	Erven
247	ULUNDI B	78	0	28°17'8.09S	31°25'16.03E	Erven
248	ULUNDI B	79	0	28°17'8.95S	31°25'15.67E	Erven
249	ULUNDI C	85	0	28°17'15.36S	31°25'29.93E	Erven
250	ULUNDI C	93	0	28°17'16.3S	31°25'29.82E	Erven
251	ULUNDI B	94	0	28°17'9.27S	31°25'19.96E	Erven
252	ULUNDI C	94	0	28°17'15.9S	31°25'29.46E	Erven
253	ULUNDI B	95	0	28°17'10.17S	31°25'19.63E	Erven
254	ULUNDI B	91	0	28°17'6.97S	31°25'18.87E	Erven
255	ULUNDI C	96	0	28°17'15.18S	31°25'28.78E	Erven
256	ULUNDI C	108	0	28°17'16.48S	31°25'34.6E	Erven
257	ULUNDI C	109	0	28°17'16.91S	31°25'35.37E	Erven
258	ULUNDI B	116	0	28°17'21.01S	31°24'35.35E	Erven
259	ULUNDI B	120	0	28°17'16.11S	31°24'37.94E	Erven
260	ULUNDI B	124	0	28°17'18.85S	31°24'41.51E	Erven
261	ULUNDI C	113	0	28°17'17.45S	31°25'37.31E	Erven
262	ULUNDI B	114	0	28°17'21.52S	31°24'38.59E	Erven
263	ULUNDI D	130	0	28°16'18.59S	31°26'10.5E	Erven
264	ULUNDI B	132	0	28°17'18.71S	31°24'38.63E	Erven
265	ULUNDI D	133	0	28°16'19.99S	31°26'16.94E	Erven
266	ULUNDI C	133	0	28°17'19.32S	31°25'34.93E	Erven
267	ULUNDI D	137	0	28°16'21.68S	31°26'15.9E	Erven
268	ULUNDI D	142	0	28°16'22.08S	31°26'14.39E	Erven
269	ULUNDI D	140	0	28°16'23.02S	31°26'15.07E	Erven
270	ULUNDI D	144	0	28°16'21.22S	31°26'14.93E	Erven
271	ULUNDI D	146	0	28°16'20.35S	31°26'15.47E	Erven
272	ULUNDI D	149	0	28°16'19.05S	31°26'16.26E	Erven
273	ULUNDI B	153	0	28°17'17.67S	31°25'1.7E	Erven
274	ULUNDI D	159	0	28°16'17.11S	31°26'16.08E	Erven
275	ULUNDI C	151	0	28°17'18.39S	31°25'33.09E	Erven
276	LOTTERY A	154	0	28°11'59.14S	31°17'33.94E	Erven
277	ULUNDI C	155	0	28°17'19.97S	31°25'31.69E	Erven
278	LOTTERY A	163	0	28°12'1.4S	31°17'39.01E	Erven
279	ULUNDI B	169	0	28°17'22.24S	31°24'26.42E	Erven
280	ULUNDI B	170	0	28°17'20.76S	31°24'26.89E	Erven
281	LOTTERY A	168	0	28°12'0.57S	31°17'41.92E	Erven
282	ULUNDI C	188	0	28°17'12.48S	31°25'30.86E	Erven

283	ULUNDI C	189	0	28°17'11.9S	31°25'34.03E	Erven
284	ULUNDI C	191	0	28°17'11.47S	31°25'35.26E	Erven
285	ULUNDI C	195	0	28°17'9.89S	31°25'36.77E	Erven
286	ULUNDI B	201	0	28°17'12.23S	31°24'45.21E	Erven
287	ULUNDI C	201	0	28°17'7.65S	31°25'39E	Erven
288	ULUNDI C	209	0	28°17'8.16S	31°25'41.92E	Erven
289	ULUNDI C	218	0	28°17'9.93S	31°25'37.67E	Erven
290	ULUNDI B	221	0	28°17'18.89S	31°24'53.78E	Erven
291	ULUNDI C	253	0	28°17'13.67S	31°25'35.94E	Erven
292	ULUNDI C	264	0	28°17'12.59S	31°25'38.96E	Erven
293	ULUNDI C	271	0	28°17'10.03S	31°25'41.45E	Erven
294	ULUNDI C	273	0	28°17'11.01S	31°25'42.42E	Erven
295	ULUNDI D	289	0	28°16'9.08S	31°26'32.24E	Erven
296	ULUNDI D	292	0	28°16'10.7S	31°26'32.32E	Erven
297	ULUNDI D	293	0	28°16'11.25S	31°26'32.32E	Erven
298	ULUNDI D	297	0	28°16'13.19S	31°26'32.78E	Erven
299	ULUNDI D	313	0	28°16'11.57S	31°26'35.34E	Erven
300	ULUNDI C	315	0	28°17'11.65S	31°25'45.16E	Erven
301	ULUNDI D	316	0	28°16'13.01S	31°26'35.56E	Erven
302	ULUNDI D	317	0	28°16'13.48S	31°26'35.66E	Erven
303	ULUNDI C	320	0	28°17'9.27S	31°25'44.26E	Erven
304	ULUNDI C	321	0	28°17'8.81S	31°25'44.07E	Erven
305	ULUNDI C	323	0	28°17'7.76S	31°25'43.93E	Erven
306	ULUNDI D	324	0	28°16'16.93S	31°26'35.56E	Erven
307	ULUNDI D	326	0	28°16'17.47S	31°26'34.29E	Erven
308	ULUNDI C	326	0	28°17'9.06S	31°25'44.87E	Erven
309	ULUNDI D	332	0	28°16'14.45S	31°26'34.58E	Erven
310	ULUNDI C	332	0	28°17'16.05S	31°25'43.61E	Erven
311	MAHLABATINI	336	0	28°14'26.16S	31°27'46.87E	Erven
312	ULUNDI D	337	0	28°16'11.71S	31°26'34.23E	Erven
313	ULUNDI D	339	0	28°16'10.74S	31°26'34.08E	Erven
314	ULUNDI D	359	0	28°16'8.22S	31°26'36.64E	Erven
315	ULUNDI D	366	0	28°16'9.34S	31°26'40.63E	Erven
316	ULUNDI D	367	0	28°16'9.69S	31°26'40.99E	Erven
317	ULUNDI D	370	0	28°16'10.78S	31°26'42.18E	Erven
318	MAHLABATINI	372	0	28°14'25.41S	31°27'45.58E	Erven
319	ULUNDI D	374	0	28°16'12.65S	31°26'42.97E	Erven
320	ULUNDI D	375	0	28°16'13.08S	31°26'43.19E	Erven
321	ULUNDI D	376	0	28°16'13.55S	31°26'43.37E	Erven
322	ULUNDI D	378	0	28°16'14.56S	31°26'43.69E	Erven
323	ULUNDI C	172	0	28°17'19.39S	31°25'30.22E	Erven
324	ULUNDI C	174	0	28°17'18.71S	31°25'31.08E	Erven
325	ULUNDI C	175	0	28°17'18.35S	31°25'31.58E	Erven
326	ULUNDI B	176	0	28°17'11.29S	31°24'47.84E	Erven
327	ULUNDI C	177	0	28°17'17.73S	31°25'32.48E	Erven
328	ULUNDI C	181	0	28°17'15.94S	31°25'31.87E	Erven
329	ULUNDI B	182	0	28°17'13.13S	31°24'53.64E	Erven
330	ULUNDI C	182	0	28°17'15.58S	31°25'31.51E	Erven
331	ULUNDI B	187	0	28°17'14.35S	31°24'58.61E	Erven
332	ULUNDI D	403	0	28°16'9.12S	31°26'37.14E	Erven
333	ULUNDI D	417	0	28°16'15.02S	31°26'40.85E	Erven
334	ULUNDI C	198	0	28°17'8.81S	31°25'37.89E	Erven
335	ULUNDI B	202	0	28°17'12.08S	31°24'44.14E	Erven
336	ULUNDI B	205	0	28°17'14.14S	31°24'43.09E	Erven
337	ULUNDI B	208	0	28°17'14.82S	31°24'46.37E	Erven
338	ULUNDI D	428	0	28°16'15.82S	31°26'36.99E	Erven
339	ULUNDI D	432	0	28°16'15.89S	31°26'39.19E	Erven
340	ULUNDI C	223	0	28°17'11.79S	31°25'35.87E	Erven

341	ULUNDI B	227	0	28°17'17.23S	31°24'47.67E	Erven
342	ULUNDI B	228	0	28°17'16.83S	31°24'46.69E	Erven
343	ULUNDI B	230	0	28°17'15.68S	31°24'44.46E	Erven
344	ULUNDI C	230	0	28°17'12.87S	31°25'36.27E	Erven
345	ULUNDI D	443	0	28°16'19.66S	31°26'43.76E	Erven
346	ULUNDI D	446	0	28°16'18.95S	31°26'41.85E	Erven
347	ULUNDI D	447	0	28°16'18.62S	31°26'41.46E	Erven
348	ULUNDI D	451	0	28°16'17.33S	31°26'39.8E	Erven
349	ULUNDI C	235	0	28°17'11.01S	31°25'38.1E	Erven
350	ULUNDI C	246	0	28°17'11.04S	31°25'39E	Erven
351	ULUNDI C	259	0	28°17'14.42S	31°25'36.88E	Erven
352	ULUNDI D	475	0	28°16'19.38S	31°26'39.91E	Erven
353	ULUNDI D	482	0	28°16'21.14S	31°26'43.51E	Erven
354	ULUNDI C	152	0	28°17'18.71S	31°25'32.66E	Erven
355	ULUNDI D	154	0	28°16'19.13S	31°26'14.35E	Erven
356	LOTTERY A	157	0	28°11'59.96S	31°17'35.55E	Erven
357	LOTTERY A	161	0	28°12'0.9S	31°17'37.94E	Erven
358	LOTTERY A	162	0	28°12'1.12S	31°17'38.47E	Erven
359	ULUNDI B	168	0	28°17'23.75S	31°24'25.92E	Erven
360	ULUNDI C	261	0	28°17'13.7S	31°25'37.89E	Erven
361	ULUNDI C	262	0	28°17'13.35S	31°25'38.24E	Erven
362	ULUNDI C	266	0	28°17'11.87S	31°25'39.64E	Erven
363	ULUNDI C	270	0	28°17'10.39S	31°25'41.12E	Erven
364	ULUNDI C	272	0	28°17'9.45S	31°25'42.45E	Erven
365	ULUNDI C	274	0	28°17'11.58S	31°25'41.23E	Erven
366	ULUNDI B	171	0	28°17'10.64S	31°24'41.44E	Erven
367	ULUNDI B	175	0	28°17'10.93S	31°24'46.8E	Erven
368	ULUNDI B	180	0	28°17'12.52S	31°24'51.7E	Erven
369	ULUNDI C	183	0	28°17'15.07S	31°25'31.12E	Erven
370	ULUNDI D	141	0	28°16'22.55S	31°26'14.13E	Erven
371	ULUNDI D	143	0	28°16'21.65S	31°26'14.68E	Erven
372	ULUNDI D	153	0	28°16'19.56S	31°26'14.1E	Erven
373	ULUNDI D	488	0	28°16'23.38S	31°26'41.96E	Erven
374	ULUNDI D	512	0	28°16'26.9S	31°26'42.47E	Erven
375	ULUNDI C	280	0	28°17'13.78S	31°25'38.79E	Erven
376	ULUNDI D	296	0	28°16'12.72S	31°26'32.67E	Erven
377	ULUNDI D	306	0	28°16'17.76S	31°26'32.43E	Erven
378	ULUNDI C	170	0	28°17'20.36S	31°25'31.23E	Erven
379	ULUNDI C	171	0	28°17'19.93S	31°25'30.83E	Erven
380	ULUNDI B	173	0	28°17'10.46S	31°24'44.31E	Erven
381	ULUNDI C	173	0	28°17'19S	31°25'30.68E	Erven
382	ULUNDI B	179	0	28°17'12.19S	31°24'50.76E	Erven
383	ULUNDI B	184	0	28°17'13.78S	31°24'55.58E	Erven
384	ULUNDI B	186	0	28°17'14.17S	31°24'57.6E	Erven
385	ULUNDI C	187	0	28°17'13.06S	31°25'30.9E	Erven
386	ULUNDI C	114	0	28°17'18.06S	31°25'37.56E	Erven
387	ULUNDI B	118	0	28°17'20.08S	31°24'33.34E	Erven
388	ULUNDI B	133	0	28°17'18.02S	31°24'37.83E	Erven
389	ULUNDI B	196	0	28°17'13.74S	31°24'50.11E	Erven
390	ULUNDI C	196	0	28°17'9.53S	31°25'37.17E	Erven
391	ULUNDI B	197	0	28°17'13.42S	31°24'49.14E	Erven
392	ULUNDI C	203	0	28°17'7.41S	31°25'40.41E	Erven
393	ULUNDI B	204	0	28°17'12.19S	31°24'41.94E	Erven
394	ULUNDI C	207	0	28°17'7.65S	31°25'42.6E	Erven
395	ULUNDI C	208	0	28°17'8.23S	31°25'42.53E	Erven
396	LOTTERY A	158	0	28°12'0.22S	31°17'36.1E	Erven
397	ULUNDI B	167	0	28°17'25.29S	31°24'26.1E	Erven
398	ULUNDI B	174	0	28°17'10.64S	31°24'45.61E	Erven

399	ULUNDI B	178	0	28°17'11.9S	31°24'49.79E	Erven
400	ULUNDI D	533	0	28°16'29.03S	31°26'37.54E	Erven
401	ULUNDI C	311	0	28°17'12.48S	31°25'42.93E	Erven
402	ULUNDI C	317	0	28°17'10.64S	31°25'44.79E	Erven
403	ULUNDI B	198	0	28°17'13.13S	31°24'48.2E	Erven
404	ULUNDI B	209	0	28°17'15.18S	31°24'47.38E	Erven
405	ULUNDI B	215	0	28°17'17.05S	31°24'53.39E	Erven
406	ULUNDI C	215	0	28°17'8.81S	31°25'38.79E	Erven
407	ULUNDI C	217	0	28°17'9.56S	31°25'38.07E	Erven
408	ULUNDI D	135	0	28°16'20.86S	31°26'16.44E	Erven
409	ULUNDI C	137	0	28°17'19.46S	31°25'33.67E	Erven
410	ULUNDI B	140	0	28°17'16.37S	31°24'32.9E	Erven
411	ULUNDI D	145	0	28°16'20.78S	31°26'15.18E	Erven
412	ULUNDI D	151	0	28°16'21.14S	31°26'13.09E	Erven
413	ULUNDI D	152	0	28°16'19.95S	31°26'13.81E	Erven
414	ULUNDI D	539	0	28°16'31.87S	31°26'38.69E	Erven
415	ULUNDI D	553	0	28°16'34.14S	31°26'38.33E	Erven
416	ULUNDI D	562	0	28°16'29.85S	31°26'36.78E	Erven
417	ULUNDI D	567	0	28°16'27.37S	31°26'35.99E	Erven
418	ULUNDI D	336	0	28°16'12.18S	31°26'34.33E	Erven
419	ULUNDI D	338	0	28°16'11.25S	31°26'34.15E	Erven
420	ULUNDI D	341	0	28°16'9.77S	31°26'33.94E	Erven
421	ULUNDI C	219	0	28°17'10.28S	31°25'37.31E	Erven
422	ULUNDI B	220	0	28°17'19.07S	31°24'55.62E	Erven
423	ULUNDI C	221	0	28°17'11.01S	31°25'36.62E	Erven
424	ULUNDI C	236	0	28°17'10.64S	31°25'38.46E	Erven
425	ULUNDI D	360	0	28°16'7.97S	31°26'37.18E	Erven
426	MAHLABATINI	366	0	28°14'23.85S	31°27'47.95E	Erven
427	MAHLABATINI	368	0	28°14'24.51S	31°27'46.94E	Erven
428	ULUNDI D	381	0	28°16'16.03S	31°26'43.8E	Erven
429	ULUNDI D	385	0	28°16'16S	31°26'42.61E	Erven
430	ULUNDI D	386	0	28°16'15.74S	31°26'42.11E	Erven
431	ULUNDI D	570	0	28°16'28.06S	31°26'39.99E	Erven
432	ULUNDI D	572	0	28°16'28.2S	31°26'41.1E	Erven
433	ULUNDI B	130	0	28°17'20.04S	31°24'40.25E	Erven
434	ULUNDI B	139	0	28°17'15.79S	31°24'33.8E	Erven
435	ULUNDI C	263	0	28°17'12.95S	31°25'38.6E	Erven
436	ULUNDI D	147	0	28°16'19.95S	31°26'15.72E	Erven
437	ULUNDI B	148	0	28°17'14.49S	31°24'32.83E	Erven
438	ULUNDI B	149	0	28°17'13.96S	31°24'33.88E	Erven
439	ULUNDI C	150	0	28°17'19.82S	31°25'33.09E	Erven
440	ULUNDI B	154	0	28°17'18.78S	31°25'7.36E	Erven
441	ULUNDI D	155	0	28°16'18.7S	31°26'14.6E	Erven
442	LOTTERY A	156	0	28°11'59.75S	31°17'35.02E	Erven
443	ULUNDI D	158	0	28°16'17.47S	31°26'15.65E	Erven
444	LOTTERY A	160	0	28°12'0.72S	31°17'37.32E	Erven
445	ULUNDI C	276	0	28°17'12.3S	31°25'40.26E	Erven
446	ULUNDI C	279	0	28°17'13.38S	31°25'39.11E	Erven
447	ULUNDI C	286	0	28°17'15.36S	31°25'36.08E	Erven
448	ULUNDI D	290	0	28°16'9.69S	31°26'32.24E	Erven
449	LOTTERY A	164	0	28°12'1.4S	31°17'39.69E	Erven
450	LOTTERY A	165	0	28°12'1.15S	31°17'40.31E	Erven
451	ULUNDI B	181	0	28°17'12.8S	31°24'52.67E	Erven
452	ULUNDI C	184	0	28°17'14.49S	31°25'31.04E	Erven
453	ULUNDI C	185	0	28°17'14.03S	31°25'31.01E	Erven
454	ULUNDI C	186	0	28°17'13.53S	31°25'30.94E	Erven
455	LOTTERY A	166	0	28°12'0.97S	31°17'40.85E	Erven
456	LOTTERY A	167	0	28°12'0.76S	31°17'41.39E	Erven

457	ULUNDI D	298	0	28°16'13.69S	31°26'32.93E	Erven
458	ULUNDI C	301	0	28°17'15.72S	31°25'38.42E	Erven
459	ULUNDI C	302	0	28°17'15.32S	31°25'38.82E	Erven
460	ULUNDI D	310	0	28°16'10.13S	31°26'35.05E	Erven
461	ULUNDI C	313	0	28°17'12.16S	31°25'43.97E	Erven
462	ULUNDI B	192	0	28°17'14.97S	31°24'54E	Erven
463	ULUNDI C	192	0	28°17'10.97S	31°25'35.69E	Erven
464	ULUNDI C	193	0	28°17'10.61S	31°25'36.05E	Erven
465	ULUNDI B	195	0	28°17'14.03S	31°24'51.09E	Erven
466	ULUNDI B	199	0	28°17'12.8S	31°24'47.23E	Erven
467	ULUNDI B	200	0	28°17'12.48S	31°24'46.26E	Erven
468	ULUNDI C	180	0	28°17'16.3S	31°25'32.23E	Erven
469	ULUNDI B	188	0	28°17'15.94S	31°24'58.36E	Erven
470	ULUNDI B	194	0	28°17'14.35S	31°24'52.05E	Erven
471	ULUNDI C	214	0	28°17'8.45S	31°25'39.11E	Erven
472	ULUNDI C	225	0	28°17'12.3S	31°25'34.79E	Erven
473	ULUNDI B	229	0	28°17'16.4S	31°24'45.76E	Erven
474	ULUNDI D	325	0	28°16'17.47S	31°26'35.48E	Erven
475	ULUNDI D	330	0	28°16'15.42S	31°26'34.55E	Erven
476	ULUNDI D	331	0	28°16'14.95S	31°26'34.55E	Erven
477	ULUNDI B	183	0	28°17'13.42S	31°24'54.61E	Erven
478	ULUNDI B	189	0	28°17'15.76S	31°24'57.28E	Erven
479	ULUNDI C	197	0	28°17'9.16S	31°25'37.52E	Erven
480	ULUNDI C	199	0	28°17'8.41S	31°25'38.24E	Erven
481	ULUNDI C	206	0	28°17'7.55S	31°25'41.95E	Erven
482	ULUNDI D	335	0	28°16'12.68S	31°26'34.4E	Erven
483	ULUNDI D	345	0	28°16'6.71S	31°26'40.2E	Erven
484	ULUNDI D	354	0	28°16'11.53S	31°26'44.45E	Erven
485	ULUNDI D	362	0	28°16'7.79S	31°26'38.65E	Erven
486	ULUNDI D	369	0	28°16'10.42S	31°26'41.74E	Erven
487	MAHLABATINI	371	0	28°14'24.54S	31°27'44.82E	Erven
488	ULUNDI D	372	0	28°16'11.75S	31°26'42.58E	Erven
489	ULUNDI D	379	0	28°16'15.06S	31°26'43.73E	Erven
490	ULUNDI D	384	0	28°16'16.57S	31°26'42.93E	Erven
491	ULUNDI D	389	0	28°16'13.91S	31°26'42.36E	Erven
492	MAHLABATINI	390	0	28°13'22.87S	31°28'2.67E	Erven
493	ULUNDI D	392	0	28°16'12.54S	31°26'41.74E	Erven
494	ULUNDI D	394	0	28°16'11.57S	31°26'41.35E	Erven
495	ULUNDI D	398	0	28°16'9.98S	31°26'39.84E	Erven
496	ULUNDI D	402	0	28°16'8.8S	31°26'37.65E	Erven
497	ULUNDI D	410	0	28°16'11.49S	31°26'39.16E	Erven
498	ULUNDI D	437	0	28°16'17.25S	31°26'41.35E	Erven
499	ULUNDI D	439	0	28°16'17.87S	31°26'42.18E	Erven
500	ULUNDI C	200	0	28°17'8.05S	31°25'38.57E	Erven
501	ULUNDI C	204	0	28°17'7.41S	31°25'40.91E	Erven
502	ULUNDI C	205	0	28°17'7.48S	31°25'41.45E	Erven
503	ULUNDI B	207	0	28°17'14.46S	31°24'45.39E	Erven
504	ULUNDI C	210	0	28°17'8.09S	31°25'41.37E	Erven
505	ULUNDI D	481	0	28°16'21.04S	31°26'42.93E	Erven
506	ULUNDI D	486	0	28°16'23.02S	31°26'40.38E	Erven
507	ULUNDI D	496	0	28°16'24.09S	31°26'40.02E	Erven
508	ULUNDI D	503	0	28°16'24.42S	31°26'38.08E	Erven
509	ULUNDI C	216	0	28°17'9.21S	31°25'38.39E	Erven
510	ULUNDI B	217	0	28°17'17.56S	31°24'55.47E	Erven
511	ULUNDI B	219	0	28°17'17.88S	31°24'57.75E	Erven
512	ULUNDI B	231	0	28°17'36.17S	31°25'5.23E	Erven
513	ULUNDI B	231	0	28°17'36.99S	31°25'2.21E	Erven
514	ULUNDI C	245	0	28°17'10.68S	31°25'39.36E	Erven

515	ULUNDI C	255	0	28°17'13.96S	31°25'34.86E	Erven
516	ULUNDI D	507	0	28°16'25.65S	31°26'40.41E	Erven
517	ULUNDI D	508	0	28°16'25.71S	31°26'40.96E	Erven
518	ULUNDI D	524	0	28°16'24.49S	31°26'36.49E	Erven
519	ULUNDI D	640	0	28°16'41.81S	31°26'38.22E	Erven
520	ULUNDI C	265	0	28°17'12.23S	31°25'39.32E	Erven
521	ULUNDI C	269	0	28°17'10.75S	31°25'40.76E	Erven
522	ULUNDI C	278	0	28°17'13.02S	31°25'39.51E	Erven
523	ULUNDI D	538	0	28°16'31.41S	31°26'38.51E	Erven
524	ULUNDI D	552	0	28°16'34.61S	31°26'38.47E	Erven
525	ULUNDI D	560	0	28°16'30.8S	31°26'37.14E	Erven
526	ULUNDI C	222	0	28°17'11.4S	31°25'36.23E	Erven
527	ULUNDI B	223	0	28°17'18.39S	31°24'51.7E	Erven
528	ULUNDI B	224	0	28°17'18.13S	31°24'50.69E	Erven
529	ULUNDI B	225	0	28°17'17.88S	31°24'49.64E	Erven
530	ULUNDI C	229	0	28°17'13.06S	31°25'35.69E	Erven
531	ULUNDI C	231	0	28°17'12.48S	31°25'36.7E	Erven
532	ULUNDI C	232	0	28°17'12.12S	31°25'37.02E	Erven
533	ULUNDI C	237	0	28°17'10.25S	31°25'38.82E	Erven
534	ULUNDI D	291	0	28°16'10.2S	31°26'32.28E	Erven
535	ULUNDI D	303	0	28°16'16.29S	31°26'32.85E	Erven
536	ULUNDI D	652	0	28°16'43.68S	31°26'37.5E	Erven
537	ULUNDI D	665	0	28°16'43.32S	31°26'36.03E	Erven
538	ULUNDI D	667	0	28°16'42.24S	31°26'35.41E	Erven
539	ULUNDI D	668	0	28°16'41.63S	31°26'35.23E	Erven
540	ULUNDI D	671	0	28°16'43.07S	31°26'33.97E	Erven
541	ULUNDI D	680	0	28°16'46.81S	31°26'36.99E	Erven
542	ULUNDI D	564	0	28°16'28.92S	31°26'36.46E	Erven
543	ULUNDI D	586	0	28°16'29.93S	31°26'39.73E	Erven
544	ULUNDI D	587	0	28°16'29.46S	31°26'39.55E	Erven
545	ULUNDI C	239	0	28°17'9.53S	31°25'39.54E	Erven
546	ULUNDI C	241	0	28°17'9.02S	31°25'40.7E	Erven
547	ULUNDI C	242	0	28°17'9.6S	31°25'40.48E	Erven
548	ULUNDI C	257	0	28°17'14.71S	31°25'35.87E	Erven
549	ULUNDI B	210	0	28°17'15.5S	31°24'48.39E	Erven
550	ULUNDI B	211	0	28°17'15.83S	31°24'49.35E	Erven
551	ULUNDI B	212	0	28°17'16.15S	31°24'50.36E	Erven
552	ULUNDI C	212	0	28°17'7.98S	31°25'40.3E	Erven
553	ULUNDI C	213	0	28°17'7.98S	31°25'39.61E	Erven
554	ULUNDI C	220	0	28°17'10.64S	31°25'36.95E	Erven
555	ULUNDI B	222	0	28°17'18.67S	31°24'52.74E	Erven
556	ULUNDI C	226	0	28°17'12.45S	31°25'34.25E	Erven
557	ULUNDI C	228	0	28°17'13.24S	31°25'35.22E	Erven
558	ULUNDI C	238	0	28°17'9.89S	31°25'39.14E	Erven
559	ULUNDI C	244	0	28°17'10.32S	31°25'39.72E	Erven
560	ULUNDI C	248	0	28°17'11.79S	31°25'38.24E	Erven
561	ULUNDI C	249	0	28°17'12.16S	31°25'37.89E	Erven
562	ULUNDI C	250	0	28°17'12.52S	31°25'37.56E	Erven
563	ULUNDI C	251	0	28°17'12.91S	31°25'37.2E	Erven
564	ULUNDI C	254	0	28°17'13.78S	31°25'35.44E	Erven
565	ULUNDI C	309	0	28°17'12.77S	31°25'41.88E	Erven
566	ULUNDI D	312	0	28°16'11.06S	31°26'35.23E	Erven
567	ULUNDI C	312	0	28°17'12.34S	31°25'43.5E	Erven
568	ULUNDI C	316	0	28°17'11.11S	31°25'44.97E	Erven
569	ULUNDI D	322	0	28°16'15.96S	31°26'35.59E	Erven
570	ULUNDI D	688	0	28°16'38.64S	31°26'32.43E	Erven
571	ULUNDI D	695	0	28°16'36.66S	31°26'34.58E	Erven
572	ULUNDI D	699	0	28°16'38.53S	31°26'35.27E	Erven

573	ULUNDI D	708	0	28°16'38.82S	31°26'34.18E	Erven
574	ULUNDI D	629	0	28°16'37.96S	31°26'37.25E	Erven
575	ULUNDI D	632	0	28°16'37.67S	31°26'39.91E	Erven
576	ULUNDI D	648	0	28°16'41.92S	31°26'36.46E	Erven
577	ULUNDI D	654	0	28°16'44.54S	31°26'38.26E	Erven
578	MAHLABATINI	338	0	28°14'25.3S	31°27'48.49E	Erven
579	ULUNDI D	658	0	28°16'45.98S	31°26'39.12E	Erven
580	ULUNDI D	662	0	28°16'44.65S	31°26'36.81E	Erven
581	ULUNDI D	672	0	28°16'43.5S	31°26'34.23E	Erven
582	ULUNDI D	679	0	28°16'46.42S	31°26'36.49E	Erven
583	ULUNDI D	683	0	28°16'41.02S	31°26'33.25E	Erven
584	ULUNDI D	685	0	28°16'40.01S	31°26'32.89E	Erven
585	MAHLABATINI	341	0	28°14'24S	31°27'50.47E	Erven
586	ULUNDI D	348	0	28°16'8.22S	31°26'41.96E	Erven
587	ULUNDI D	349	0	28°16'8.69S	31°26'42.47E	Erven
588	ULUNDI D	353	0	28°16'10.92S	31°26'44.2E	Erven
589	ULUNDI D	694	0	28°16'36.19S	31°26'34.44E	Erven
590	ULUNDI D	697	0	28°16'37.59S	31°26'34.91E	Erven
591	ULUNDI D	700	0	28°16'38.97S	31°26'35.41E	Erven
592	ULUNDI D	702	0	28°16'39.9S	31°26'35.74E	Erven
593	ULUNDI D	715	0	28°16'25.68S	31°26'30.23E	Erven
594	ULUNDI D	725	0	28°16'30.51S	31°26'28.9E	Erven
595	ULUNDI D	729	0	28°16'32.41S	31°26'28.36E	Erven
596	ULUNDI D	401	0	28°16'8.83S	31°26'38.44E	Erven
597	ULUNDI D	408	0	28°16'10.78S	31°26'38.4E	Erven
598	MAHLABATINI	364	0	28°14'22.74S	31°27'49.07E	Erven
599	ULUNDI D	365	0	28°16'8.97S	31°26'40.28E	Erven
600	ULUNDI D	368	0	28°16'10.06S	31°26'41.39E	Erven
601	ULUNDI D	371	0	28°16'11.28S	31°26'42.4E	Erven
602	ULUNDI D	373	0	28°16'12.18S	31°26'42.8E	Erven
603	ULUNDI D	742	0	28°16'29.13S	31°26'33.72E	Erven
604	ULUNDI D	753	0	28°16'26.61S	31°26'33.94E	Erven
605	ULUNDI D	766	0	28°16'32.81S	31°26'36.13E	Erven
606	ULUNDI C	771	0	28°17'5.1S	31°25'45.19E	Erven
607	ULUNDI D	393	0	28°16'12.07S	31°26'41.57E	Erven
608	ULUNDI D	400	0	28°16'9.23S	31°26'39.05E	Erven
609	ULUNDI D	418	0	28°16'14.38S	31°26'39.16E	Erven
610	ULUNDI D	419	0	28°16'14.52S	31°26'37.47E	Erven
611	ULUNDI D	427	0	28°16'11.93S	31°26'36.85E	Erven
612	ULUNDI D	430	0	28°16'15.85S	31°26'38.08E	Erven
613	ULUNDI D	442	0	28°16'18.73S	31°26'43.91E	Erven
614	ULUNDI C	781	0	28°16'58.08S	31°25'44.94E	Erven
615	ULUNDI D	798	0	28°16'20.67S	31°26'31.63E	Erven
616	ULUNDI C	799	0	28°16'58.8S	31°25'32.85E	Erven
617	ULUNDI C	803	0	28°17'0.93S	31°25'33.71E	Erven
618	ULUNDI C	804	0	28°17'1.25S	31°25'34.14E	Erven
619	ULUNDI C	806	0	28°17'1.82S	31°25'35.04E	Erven
620	ULUNDI D	811	0	28°16'26.51S	31°26'27.92E	Erven
621	ULUNDI D	413	0	28°16'12.87S	31°26'40.13E	Erven
622	ULUNDI D	416	0	28°16'14.3S	31°26'40.81E	Erven
623	ULUNDI D	420	0	28°16'13.91S	31°26'37.43E	Erven
624	ULUNDI D	448	0	28°16'18.3S	31°26'41.03E	Erven
625	ULUNDI D	456	0	28°16'16.75S	31°26'36.92E	Erven
626	ULUNDI D	474	0	28°16'19.05S	31°26'39.48E	Erven
627	ULUNDI D	435	0	28°16'16.61S	31°26'40.52E	Erven
628	ULUNDI D	440	0	28°16'18.2S	31°26'42.58E	Erven
629	ULUNDI D	441	0	28°16'18.62S	31°26'43.12E	Erven
630	ULUNDI D	718	0	28°16'27.19S	31°26'29.8E	Erven

631	ULUNDI D	720	0	28°16'28.13S	31°26'29.54E	Erven
632	ULUNDI D	721	0	28°16'28.63S	31°26'29.4E	Erven
633	ULUNDI D	722	0	28°16'29.1S	31°26'29.29E	Erven
634	ULUNDI D	724	0	28°16'30.03S	31°26'29E	Erven
635	ULUNDI C	256	0	28°17'14.93S	31°25'35.29E	Erven
636	ULUNDI C	267	0	28°17'11.47S	31°25'40.08E	Erven
637	ULUNDI C	268	0	28°17'11.11S	31°25'40.41E	Erven
638	ULUNDI C	812	0	28°17'4.23S	31°25'37.31E	Erven
639	ULUNDI D	814	0	28°16'26.51S	31°26'25.58E	Erven
640	ULUNDI D	820	0	28°16'27.01S	31°26'21.02E	Erven
641	ULUNDI C	823	0	28°16'55.89S	31°25'40.19E	Erven
642	ULUNDI D	828	0	28°16'28.56S	31°26'19E	Erven
643	ULUNDI D	829	0	28°16'27.99S	31°26'19.28E	Erven
644	ULUNDI C	831	0	28°16'58.94S	31°25'43.36E	Erven
645	ULUNDI D	836	0	28°16'25.1S	31°26'23.03E	Erven
646	ULUNDI D	841	0	28°16'25.57S	31°26'26.62E	Erven
647	ULUNDI C	852	0	28°16'57.72S	31°25'40.73E	Erven
648	ULUNDI C	854	0	28°16'56.96S	31°25'39.93E	Erven
649	ULUNDI C	864	0	28°16'57.86S	31°25'38.42E	Erven
650	ULUNDI D	866	0	28°16'32.41S	31°26'3.91E	Erven
651	ULUNDI D	870	0	28°16'35.26S	31°26'3.7E	Erven
652	ULUNDI D	878	0	28°16'25.32S	31°26'6.36E	Erven
653	ULUNDI D	476	0	28°16'19.66S	31°26'40.31E	Erven
654	ULUNDI D	487	0	28°16'23.3S	31°26'41.17E	Erven
655	ULUNDI D	490	0	28°16'23.56S	31°26'43.08E	Erven
656	ULUNDI C	282	0	28°17'14.49S	31°25'38.07E	Erven
657	ULUNDI C	299	0	28°17'16.77S	31°25'38.39E	Erven
658	ULUNDI C	233	0	28°17'11.76S	31°25'37.38E	Erven
659	ULUNDI C	234	0	28°17'11.36S	31°25'37.74E	Erven
660	ULUNDI C	240	0	28°17'9.06S	31°25'39.97E	Erven
661	ULUNDI C	247	0	28°17'11.44S	31°25'38.6E	Erven
662	ULUNDI D	449	0	28°16'17.98S	31°26'40.6E	Erven
663	ULUNDI C	258	0	28°17'14.6S	31°25'36.33E	Erven
664	ULUNDI C	275	0	28°17'11.94S	31°25'40.7E	Erven
665	ULUNDI C	277	0	28°17'12.63S	31°25'39.86E	Erven
666	ULUNDI C	283	0	28°17'14.86S	31°25'37.63E	Erven
667	ULUNDI C	880	0	28°17'4.6S	31°25'43.57E	Erven
668	ULUNDI C	885	0	28°17'2.72S	31°25'41.77E	Erven
669	ULUNDI C	892	0	28°17'0.09S	31°25'39.29E	Erven
670	ULUNDI C	894	0	28°16'59.37S	31°25'38.57E	Erven
671	ULUNDI C	898	0	28°16'58.04S	31°25'36.88E	Erven
672	ULUNDI C	899	0	28°16'57.75S	31°25'36.41E	Erven
673	ULUNDI D	907	0	28°16'30.43S	31°25'58.23E	Erven
674	ULUNDI D	908	0	28°16'30.94S	31°25'57.76E	Erven
675	ULUNDI C	922	0	28°17'6.25S	31°25'42.1E	Erven
676	ULUNDI C	924	0	28°17'4.7S	31°25'39.97E	Erven
677	ULUNDI C	929	0	28°17'2.83S	31°25'38.18E	Erven
678	ULUNDI C	938	0	28°16'59.7S	31°25'34.68E	Erven
679	ULUNDI D	746	0	28°16'27.3S	31°26'32.46E	Erven
680	ULUNDI D	761	0	28°16'30.51S	31°26'35.3E	Erven
681	ULUNDI D	762	0	28°16'30.97S	31°26'35.45E	Erven
682	ULUNDI D	763	0	28°16'31.44S	31°26'35.63E	Erven
683	ULUNDI D	768	0	28°16'34.54S	31°26'36.75E	Erven
684	ULUNDI D	770	0	28°16'35.47S	31°26'37.07E	Erven
685	ULUNDI D	510	0	28°16'25.86S	31°26'42.07E	Erven
686	ULUNDI C	942	0	28°17'9.6S	31°25'57.94E	Erven
687	ULUNDI D	947	0	28°16'33.1S	31°26'2E	Erven
688	ULUNDI C	960	0	28°17'11.94S	31°25'49.98E	Erven

689	ULUNDI C	971	0	28°17'12.66S	31°25'59.09E	Erven
690	ULUNDI D	527	0	28°16'26.37S	31°26'36.42E	Erven
691	ULUNDI D	529	0	28°16'27.01S	31°26'37.25E	Erven
692	ULUNDI D	535	0	28°16'30.03S	31°26'38E	Erven
693	ULUNDI D	541	0	28°16'32.81S	31°26'39.01E	Erven
694	ULUNDI D	549	0	28°16'36.08S	31°26'39.3E	Erven
695	ULUNDI D	483	0	28°16'21.94S	31°26'39.05E	Erven
696	ULUNDI D	569	0	28°16'27.99S	31°26'39.41E	Erven
697	ULUNDI D	573	0	28°16'28.28S	31°26'41.64E	Erven
698	ULUNDI D	582	0	28°16'31.94S	31°26'40.38E	Erven
699	ULUNDI D	502	0	28°16'24.09S	31°26'37.68E	Erven
700	ULUNDI D	513	0	28°16'26.83S	31°26'41.89E	Erven
701	ULUNDI D	635	0	28°16'39.43S	31°26'37.32E	Erven
702	ULUNDI C	773	0	28°17'3.8S	31°25'46.31E	Erven
703	ULUNDI D	775	0	28°16'35.76S	31°26'36.03E	Erven
704	ULUNDI C	784	0	28°16'56.21S	31°25'43.17E	Erven
705	ULUNDI D	787	0	28°16'31.65S	31°26'30.26E	Erven
706	ULUNDI C	794	0	28°16'55.38S	31°25'35.94E	Erven
707	ULUNDI D	794	0	28°16'28.31S	31°26'31.2E	Erven
708	ULUNDI C	800	0	28°16'59.81S	31°25'32.13E	Erven
709	ULUNDI C	802	0	28°17'0.64S	31°25'33.28E	Erven
710	ULUNDI C	817	0	28°17'6.54S	31°25'38.75E	Erven
711	ULUNDI C	818	0	28°17'6.54S	31°25'32.19E	Erven
712	ULUNDI D	520	0	28°16'25.82S	31°26'38.18E	Erven
713	ULUNDI D	542	0	28°16'33.38S	31°26'39.19E	Erven
714	ULUNDI D	647	0	28°16'41.38S	31°26'36.24E	Erven
715	ULUNDI D	651	0	28°16'43.25S	31°26'37.25E	Erven
716	ULUNDI D	655	0	28°16'44.91S	31°26'38.83E	Erven
717	ULUNDI D	669	0	28°16'42.1S	31°26'33.65E	Erven
718	ULUNDI D	545	0	28°16'35.04S	31°26'40.17E	Erven
719	ULUNDI D	551	0	28°16'35.07S	31°26'38.65E	Erven
720	ULUNDI D	557	0	28°16'32.16S	31°26'37.61E	Erven
721	ULUNDI D	558	0	28°16'31.69S	31°26'37.47E	Erven
722	ULUNDI D	563	0	28°16'29.39S	31°26'36.64E	Erven
723	ULUNDI D	713	0	28°16'36.48S	31°26'33.4E	Erven
724	ULUNDI D	743	0	28°16'28.6S	31°26'33.47E	Erven
725	ULUNDI D	637	0	28°16'40.37S	31°26'37.65E	Erven
726	ULUNDI D	642	0	28°16'42.67S	31°26'38.76E	Erven
727	ULUNDI D	646	0	28°16'43.82S	31°26'40.74E	Erven
728	ULUNDI D	759	0	28°16'29.57S	31°26'34.98E	Erven
729	ULUNDI D	764	0	28°16'31.91S	31°26'35.81E	Erven
730	ULUNDI D	771	0	28°16'35.94S	31°26'37.21E	Erven
731	ULUNDI D	776	0	28°16'35.29S	31°26'35.85E	Erven
732	ULUNDI D	783	0	28°16'31.41S	31°26'31.45E	Erven
733	ULUNDI C	785	0	28°16'55.6S	31°25'42.56E	Erven
734	ULUNDI C	787	0	28°16'54.44S	31°25'41.09E	Erven
735	ULUNDI D	657	0	28°16'45.26S	31°26'40.49E	Erven
736	ULUNDI D	661	0	28°16'45.05S	31°26'37.25E	Erven
737	ULUNDI D	674	0	28°16'44.36S	31°26'34.76E	Erven
738	ULUNDI D	675	0	28°16'44.76S	31°26'35.05E	Erven
739	ULUNDI D	676	0	28°16'45.19S	31°26'35.3E	Erven
740	ULUNDI D	796	0	28°16'19.71S	31°26'31.88E	Erven
741	ULUNDI D	797	0	28°16'20.21S	31°26'31.74E	Erven
742	ULUNDI D	806	0	28°16'24.53S	31°26'30.55E	Erven
743	ULUNDI C	807	0	28°17'2.26S	31°25'35.4E	Erven
744	ULUNDI D	809	0	28°16'25.57S	31°26'28.18E	Erven
745	ULUNDI C	814	0	28°17'5.03S	31°25'38.07E	Erven
746	ULUNDI D	815	0	28°16'26.37S	31°26'24.87E	Erven

747	ULUNDI C	826	0	28°16'57.07S	31°25'41.59E	Erven
748	ULUNDI C	303	0	28°17'14.93S	31°25'39.22E	Erven
749	ULUNDI C	304	0	28°17'14.53S	31°25'39.61E	Erven
750	ULUNDI C	305	0	28°17'14.17S	31°25'39.97E	Erven
751	ULUNDI D	309	0	28°16'9.63S	31°26'34.98E	Erven
752	ULUNDI D	314	0	28°16'12.04S	31°26'35.41E	Erven
753	ULUNDI C	281	0	28°17'14.1S	31°25'38.42E	Erven
754	ULUNDI D	687	0	28°16'39.11S	31°26'32.57E	Erven
755	ULUNDI D	692	0	28°16'36.77S	31°26'31.74E	Erven
756	ULUNDI D	714	0	28°16'36.01S	31°26'33.22E	Erven
757	ULUNDI D	716	0	28°16'26.26S	31°26'30.09E	Erven
758	ULUNDI D	726	0	28°16'30.97S	31°26'28.75E	Erven
759	ULUNDI D	731	0	28°16'33.24S	31°26'35.16E	Erven
760	ULUNDI D	736	0	28°16'32.27S	31°26'33E	Erven
761	ULUNDI D	752	0	28°16'26.43S	31°26'33.25E	Erven
762	ULUNDI D	774	0	28°16'36.23S	31°26'36.17E	Erven
763	ULUNDI C	775	0	28°17'2.51S	31°25'47.53E	Erven
764	ULUNDI C	780	0	28°16'58.69S	31°25'45.55E	Erven
765	ULUNDI D	780	0	28°16'30S	31°26'31.85E	Erven
766	ULUNDI D	784	0	28°16'31.87S	31°26'31.34E	Erven
767	ULUNDI C	791	0	28°16'53.08S	31°25'37.99E	Erven
768	ULUNDI D	795	0	28°16'19.24S	31°26'32.03E	Erven
769	ULUNDI C	798	0	28°16'58.12S	31°25'33.46E	Erven
770	ULUNDI D	802	0	28°16'22.55S	31°26'31.09E	Erven
771	ULUNDI C	809	0	28°17'3.01S	31°25'36.23E	Erven
772	ULUNDI D	817	0	28°16'26.22S	31°26'23.28E	Erven
773	ULUNDI C	827	0	28°16'57.47S	31°25'41.95E	Erven
774	ULUNDI C	833	0	28°16'59.7S	31°25'44.07E	Erven
775	ULUNDI C	835	0	28°17'0.42S	31°25'44.76E	Erven
776	ULUNDI C	838	0	28°17'1.68S	31°25'45.91E	Erven
777	ULUNDI C	840	0	28°17'2.18S	31°25'44.97E	Erven
778	ULUNDI D	840	0	28°16'25.39S	31°26'25.87E	Erven
779	ULUNDI D	852	0	28°16'26.18S	31°26'7.69E	Erven
780	ULUNDI C	857	0	28°16'56.06S	31°25'38.6E	Erven
781	ULUNDI C	860	0	28°16'56.64S	31°25'36.7E	Erven
782	ULUNDI C	866	0	28°16'58.73S	31°25'39.43E	Erven
783	ULUNDI C	877	0	28°17'2.79S	31°25'43.36E	Erven
784	ULUNDI D	881	0	28°16'27.09S	31°26'5.21E	Erven
785	ULUNDI C	888	0	28°17'1.6S	31°25'40.7E	Erven
786	ULUNDI D	889	0	28°16'25.5S	31°26'4.95E	Erven
787	ULUNDI C	893	0	28°16'59.74S	31°25'38.93E	Erven
788	ULUNDI D	900	0	28°16'26.72S	31°26'1.5E	Erven
789	ULUNDI D	923	0	28°16'31.62S	31°25'59.63E	Erven
790	ULUNDI C	287	0	28°17'15.5S	31°25'35.55E	Erven
791	ULUNDI C	284	0	28°17'15S	31°25'37.09E	Erven
792	ULUNDI C	298	0	28°17'17.23S	31°25'38.57E	Erven
793	ULUNDI D	300	0	28°16'14.73S	31°26'32.93E	Erven
794	ULUNDI C	300	0	28°17'16.22S	31°25'38.1E	Erven
795	ULUNDI D	302	0	28°16'15.71S	31°26'32.85E	Erven
796	ULUNDI D	318	0	28°16'13.98S	31°26'35.74E	Erven
797	ULUNDI C	319	0	28°17'9.71S	31°25'44.44E	Erven
798	ULUNDI C	325	0	28°17'8.52S	31°25'44.68E	Erven
799	MAHLABATINI	340	0	28°14'24.43S	31°27'49.83E	Erven
800	ULUNDI C	318	0	28°17'10.17S	31°25'44.62E	Erven
801	ULUNDI D	320	0	28°16'14.99S	31°26'35.66E	Erven
802	ULUNDI D	305	0	28°16'17.29S	31°26'32.57E	Erven
803	ULUNDI C	307	0	28°17'13.35S	31°25'40.76E	Erven
804	ULUNDI C	308	0	28°17'12.98S	31°25'41.34E	Erven

805	ULUNDI D	311	0	28°16'10.59S	31°26'35.16E	Erven
806	ULUNDI C	314	0	28°17'11.97S	31°25'44.47E	Erven
807	ULUNDI D	321	0	28°16'15.49S	31°26'35.63E	Erven
808	ULUNDI D	327	0	28°16'16.9S	31°26'34.4E	Erven
809	ULUNDI C	330	0	28°17'10.9S	31°25'45.63E	Erven
810	MAHLABATINI	335	0	28°14'24.83S	31°27'51.45E	Erven
811	MAHLABATINI	337	0	28°14'25.76S	31°27'47.81E	Erven
812	ULUNDI D	340	0	28°16'10.27S	31°26'34.01E	Erven
813	ULUNDI D	343	0	28°16'6.1S	31°26'35.19E	Erven
814	ULUNDI D	346	0	28°16'7.17S	31°26'40.92E	Erven
815	ULUNDI D	342	0	28°16'9.08S	31°26'33.9E	Erven
816	ULUNDI D	344	0	28°16'6.38S	31°26'39.41E	Erven
817	ULUNDI D	350	0	28°16'9.16S	31°26'42.97E	Erven
818	ULUNDI D	355	0	28°16'12.15S	31°26'44.74E	Erven
819	ULUNDI D	356	0	28°16'12.76S	31°26'44.99E	Erven
820	ULUNDI D	357	0	28°16'13.4S	31°26'45.32E	Erven
821	ULUNDI D	358	0	28°16'8.51S	31°26'36.09E	Erven
822	ULUNDI D	364	0	28°16'8.51S	31°26'39.8E	Erven
823	ULUNDI C	327	0	28°17'9.53S	31°25'45.05E	Erven
824	ULUNDI D	328	0	28°16'16.39S	31°26'34.47E	Erven
825	ULUNDI D	329	0	28°16'15.92S	31°26'34.51E	Erven
826	ULUNDI C	331	0	28°17'11.47S	31°25'45.84E	Erven
827	ULUNDI D	333	0	28°16'13.8S	31°26'34.62E	Erven
828	MAHLABATINI	339	0	28°14'24.86S	31°27'49.17E	Erven
829	ULUNDI D	363	0	28°16'8.12S	31°26'39.22E	Erven
830	MAHLABATINI	369	0	28°14'23.5S	31°27'45.97E	Erven
831	ULUNDI D	388	0	28°16'14.45S	31°26'42.61E	Erven
832	ULUNDI D	390	0	28°16'13.44S	31°26'42.14E	Erven
833	ULUNDI D	396	0	28°16'10.7S	31°26'40.56E	Erven
834	ULUNDI C	828	0	28°16'57.83S	31°25'42.27E	Erven
835	ULUNDI C	829	0	28°16'58.19S	31°25'42.64E	Erven
836	ULUNDI C	830	0	28°16'58.58S	31°25'43E	Erven
837	ULUNDI D	833	0	28°16'25.47S	31°26'20.76E	Erven
838	ULUNDI C	834	0	28°17'0.06S	31°25'44.44E	Erven
839	ULUNDI C	841	0	28°17'1.82S	31°25'44.62E	Erven
840	ULUNDI D	843	0	28°16'31.65S	31°26'19.57E	Erven
841	ULUNDI C	853	0	28°16'57.36S	31°25'40.37E	Erven
842	ULUNDI C	855	0	28°16'56.67S	31°25'39.47E	Erven
843	ULUNDI C	858	0	28°16'55.78S	31°25'38.18E	Erven
844	ULUNDI D	862	0	28°16'30.47S	31°26'5.06E	Erven
845	ULUNDI C	863	0	28°16'57.54S	31°25'37.99E	Erven
846	ULUNDI D	352	0	28°16'10.24S	31°26'43.94E	Erven
847	MAHLABATINI	365	0	28°14'23.1S	31°27'48.38E	Erven
848	MAHLABATINI	370	0	28°14'23.75S	31°27'44.24E	Erven
849	ULUNDI D	380	0	28°16'15.57S	31°26'43.76E	Erven
850	ULUNDI D	864	0	28°16'31.37S	31°26'4.49E	Erven
851	ULUNDI C	867	0	28°16'59.08S	31°25'39.79E	Erven
852	ULUNDI C	872	0	28°17'0.96S	31°25'41.55E	Erven
853	ULUNDI C	873	0	28°17'1.32S	31°25'41.92E	Erven
854	ULUNDI C	878	0	28°17'3.19S	31°25'43.68E	Erven
855	ULUNDI D	883	0	28°16'28.2S	31°26'4.45E	Erven
856	ULUNDI C	884	0	28°17'3.08S	31°25'42.1E	Erven
857	ULUNDI D	885	0	28°16'28.06S	31°26'2.9E	Erven
858	ULUNDI C	890	0	28°17'0.85S	31°25'39.97E	Erven
859	ULUNDI C	891	0	28°17'0.49S	31°25'39.61E	Erven
860	ULUNDI D	896	0	28°16'24.67S	31°26'3.33E	Erven
861	ULUNDI D	899	0	28°16'26.22S	31°26'1.97E	Erven
862	ULUNDI D	903	0	28°16'28.28S	31°26'0.13E	Erven

863	ULUNDI B	1028	0	28°17'6.64S	31°25'1.99E	Erven
864	ULUNDI B	1049	0	28°17'25.98S	31°24'42.98E	Erven
865	ULUNDI B	1069	0	28°17'27.35S	31°24'36.75E	Erven
866	ULUNDI D	1088	0	28°16'43.5S	31°26'12.51E	Erven
867	ULUNDI D	1092	0	28°16'43.5S	31°26'14.71E	Erven
868	ULUNDI D	1099	0	28°16'45.81S	31°26'18.1E	Erven
869	ULUNDI D	1107	0	28°16'44.44S	31°26'14.93E	Erven
870	ULUNDI C	1108	0	28°17'11.4S	31°25'35.61E	Erven
871	ULUNDI C	1109	0	28°17'10.86S	31°25'36.08E	Erven
872	ULUNDI C	1113	0	28°17'8.88S	31°25'37.99E	Erven
873	ULUNDI D	1115	0	28°16'44.51S	31°26'10.32E	Erven
874	ULUNDI D	1121	0	28°16'45.95S	31°26'9.24E	Erven
875	ULUNDI C	1122	0	28°17'8.49S	31°25'40.01E	Erven
876	ULUNDI C	1123	0	28°17'9.06S	31°25'39.32E	Erven
877	ULUNDI C	1124	0	28°17'9.53S	31°25'38.85E	Erven
878	ULUNDI D	1125	0	28°16'45.95S	31°26'11.44E	Erven
879	ULUNDI B	1127	0	28°17'22.09S	31°24'50.4E	Erven
880	ULUNDI C	1127	0	28°17'11.01S	31°25'37.41E	Erven
881	ULUNDI C	905	0	28°16'59.85S	31°25'36.73E	Erven
882	ULUNDI C	907	0	28°17'0.71S	31°25'37.63E	Erven
883	ULUNDI C	908	0	28°17'1.07S	31°25'37.99E	Erven
884	ULUNDI C	921	0	28°17'6.25S	31°25'42.82E	Erven
885	ULUNDI D	922	0	28°16'32.13S	31°25'59.16E	Erven
886	ULUNDI D	926	0	28°16'30.07S	31°26'0.96E	Erven
887	ULUNDI D	927	0	28°16'29.46S	31°26'1.53E	Erven
888	ULUNDI D	929	0	28°16'30.83S	31°26'2.4E	Erven
889	ULUNDI D	932	0	28°16'32.31S	31°26'0.64E	Erven
890	ULUNDI D	933	0	28°16'32.81S	31°26'0.17E	Erven
891	ULUNDI C	966	0	28°17'10.35S	31°25'55.24E	Erven
892	ULUNDI C	967	0	28°17'10.57S	31°25'56.17E	Erven
893	ULUNDI C	970	0	28°17'12.16S	31°25'58.37E	Erven
894	ULUNDI C	1143	0	28°17'11.11S	31°25'41.92E	Erven
895	ULUNDI B	1144	0	28°17'12.59S	31°25'6.42E	Erven
896	ULUNDI D	1146	0	28°16'41.09S	31°26'9.75E	Erven
897	ULUNDI D	1148	0	28°16'41.09S	31°26'10.86E	Erven
898	ULUNDI D	1149	0	28°16'41.09S	31°26'11.4E	Erven
899	ULUNDI B	1150	0	28°17'8.66S	31°25'8.69E	Erven
900	ULUNDI B	1152	0	28°17'6.79S	31°25'7.86E	Erven
901	ULUNDI B	1157	0	28°17'15.36S	31°25'15.63E	Erven
902	ULUNDI B	1160	0	28°17'15.47S	31°25'18.66E	Erven
903	ULUNDI C	1161	0	28°17'11.22S	31°25'45.59E	Erven
904	ULUNDI D	1162	0	28°16'42.92S	31°26'17.55E	Erven
905	ULUNDI D	1170	0	28°16'42.06S	31°26'12.51E	Erven
906	ULUNDI C	1173	0	28°17'13.53S	31°25'40.8E	Erven
907	ULUNDI D	1181	0	28°16'40.91S	31°26'19.14E	Erven
908	ULUNDI B	1183	0	28°17'32.68S	31°24'43.45E	Erven
909	ULUNDI C	1190	0	28°17'20.01S	31°25'29.17E	Erven
910	ULUNDI D	1204	0	28°16'44.4S	31°26'30.23E	Erven
911	ULUNDI D	382	0	28°16'16.53S	31°26'43.84E	Erven
912	ULUNDI D	391	0	28°16'13.01S	31°26'41.96E	Erven
913	ULUNDI D	1215	0	28°16'44.76S	31°26'27.31E	Erven
914	ULUNDI D	1220	0	28°16'45.34S	31°26'24.79E	Erven
915	ULUNDI C	1221	0	28°17'17.27S	31°25'28.31E	Erven
916	ULUNDI C	1224	0	28°17'15.54S	31°25'26.69E	Erven
917	ULUNDI C	1228	0	28°17'12.8S	31°25'27.88E	Erven
918	ULUNDI D	1230	0	28°16'48.79S	31°26'27.31E	Erven
919	ULUNDI D	1231	0	28°16'48.9S	31°26'27.85E	Erven
920	ULUNDI D	1236	0	28°16'49.51S	31°26'25.98E	Erven

921	ULUNDI D	1237	0	28°16'49.37S	31°26'25.44E	Erven
922	ULUNDI C	1238	0	28°17'16.22S	31°25'29.71E	Erven
923	ULUNDI D	1258	0	28°16'45.05S	31°26'32.71E	Erven
924	ULUNDI D	1262	0	28°16'47.21S	31°26'32.1E	Erven
925	ULUNDI D	1282	0	28°16'49.66S	31°26'39.44E	Erven
926	ULUNDI C	1285	0	28°17'15.68S	31°25'31.58E	Erven
927	ULUNDI C	1287	0	28°17'14.17S	31°25'31.01E	Erven
928	ULUNDI C	1288	0	28°17'13.42S	31°25'30.94E	Erven
929	ULUNDI D	1290	0	28°16'52.03S	31°26'42.58E	Erven
930	ULUNDI C	1292	0	28°17'13.59S	31°25'33.42E	Erven
931	ULUNDI D	1293	0	28°16'53.65S	31°26'42.58E	Erven
932	ULUNDI D	1294	0	28°16'54.3S	31°26'42.61E	Erven
933	ULUNDI D	1300	0	28°16'56.03S	31°26'40.02E	Erven
934	ULUNDI D	1319	0	28°16'49.55S	31°26'34.69E	Erven
935	ULUNDI D	818	0	28°16'26.37S	31°26'22.56E	Erven
936	ULUNDI D	819	0	28°16'26.43S	31°26'21.73E	Erven
937	ULUNDI C	819	0	28°16'54.7S	31°25'38.42E	Erven
938	ULUNDI C	825	0	28°16'56.64S	31°25'41.2E	Erven
939	ULUNDI C	837	0	28°17'1.18S	31°25'45.48E	Erven
940	ULUNDI D	838	0	28°16'25.1S	31°26'24.47E	Erven
941	ULUNDI C	846	0	28°16'59.95S	31°25'42.85E	Erven
942	ULUNDI D	860	0	28°16'29.61S	31°26'5.57E	Erven
943	ULUNDI D	1325	0	28°16'50.91S	31°26'38.11E	Erven
944	ULUNDI D	1339	0	28°16'51.2S	31°26'35.85E	Erven
945	ULUNDI D	1346	0	28°16'51.24S	31°26'32.64E	Erven
946	ULUNDI D	1350	0	28°16'52.32S	31°26'34.66E	Erven
947	ULUNDI D	1352	0	28°16'52.75S	31°26'35.63E	Erven
948	ULUNDI D	1359	0	28°16'53.62S	31°26'39.77E	Erven
949	ULUNDI D	1360	0	28°16'53.62S	31°26'40.49E	Erven
950	ULUNDI D	1365	0	28°16'54.55S	31°26'38.87E	Erven
951	ULUNDI D	1369	0	28°16'54.12S	31°26'36.64E	Erven
952	ULUNDI D	1376	0	28°16'52.71S	31°26'33.18E	Erven
953	ULUNDI D	1377	0	28°16'52.53S	31°26'32.67E	Erven
954	ULUNDI D	1388	0	28°16'59.41S	31°26'32.43E	Erven
955	ULUNDI D	1393	0	28°17'1.89S	31°26'32.71E	Erven
956	ULUNDI D	1398	0	28°16'59.99S	31°26'31.38E	Erven
957	ULUNDI D	1404	0	28°16'56.96S	31°26'30.95E	Erven
958	ULUNDI D	1428	0	28°16'57.79S	31°26'38.9E	Erven
959	ULUNDI D	1443	0	28°17'0.03S	31°26'38.11E	Erven
960	ULUNDI D	1454	0	28°16'58.19S	31°26'42.69E	Erven
961	ULUNDI D	1460	0	28°17'2.04S	31°26'41.42E	Erven
962	ULUNDI D	1466	0	28°17'2.98S	31°26'36.81E	Erven
963	ULUNDI D	1472	0	28°17'3.41S	31°26'32.46E	Erven
964	ULUNDI D	1473	0	28°17'3.48S	31°26'31.74E	Erven
965	ULUNDI D	1479	0	28°17'3.95S	31°26'27.17E	Erven
966	ULUNDI D	1483	0	28°17'4.23S	31°26'24.25E	Erven
967	ULUNDI D	1484	0	28°17'4.31S	31°26'23.54E	Erven
968	ULUNDI D	1486	0	28°17'4.45S	31°26'22.06E	Erven
969	ULUNDI D	299	0	28°16'14.23S	31°26'32.96E	Erven
970	ULUNDI D	304	0	28°16'16.82S	31°26'32.67E	Erven
971	ULUNDI C	306	0	28°17'13.74S	31°25'40.37E	Erven
972	ULUNDI D	308	0	28°16'8.97S	31°26'34.76E	Erven
973	ULUNDI D	315	0	28°16'12.5S	31°26'35.48E	Erven
974	ULUNDI C	865	0	28°16'58.23S	31°25'39E	Erven
975	ULUNDI D	865	0	28°16'31.87S	31°26'4.2E	Erven
976	ULUNDI C	876	0	28°17'2.44S	31°25'43E	Erven
977	ULUNDI D	877	0	28°16'24.49S	31°26'6.94E	Erven
978	ULUNDI C	881	0	28°17'4.2S	31°25'43.17E	Erven

979	ULUNDI D	888	0	28°16'26.04S	31°26'4.52E	Erven
980	ULUNDI D	893	0	28°16'23.16S	31°26'4.67E	Erven
981	ULUNDI C	903	0	28°16'59.19S	31°25'35.83E	Erven
982	ULUNDI C	906	0	28°17'0.27S	31°25'37.23E	Erven
983	ULUNDI D	906	0	28°16'29.93S	31°25'58.66E	Erven
984	ULUNDI D	319	0	28°16'14.52S	31°26'35.7E	Erven
985	ULUNDI C	322	0	28°17'8.34S	31°25'43.86E	Erven
986	ULUNDI D	323	0	28°16'16.46S	31°26'35.56E	Erven
987	ULUNDI C	324	0	28°17'7.83S	31°25'44.65E	Erven
988	ULUNDI C	328	0	28°17'9.96S	31°25'45.26E	Erven
989	ULUNDI C	329	0	28°17'10.46S	31°25'45.45E	Erven
990	ULUNDI D	334	0	28°16'13.16S	31°26'34.47E	Erven
991	ULUNDI D	1495	0	28°17'0.27S	31°26'19.06E	Erven
992	ULUNDI D	1496	0	28°16'59.77S	31°26'19.32E	Erven
993	ULUNDI D	1498	0	28°16'58.87S	31°26'19.68E	Erven
994	ULUNDI D	1502	0	28°16'56.96S	31°26'20.65E	Erven
995	ULUNDI D	1514	0	28°16'51.02S	31°26'26.12E	Erven
996	ULUNDI D	1520	0	28°16'56.82S	31°26'29.51E	Erven
997	ULUNDI D	1521	0	28°16'57.29S	31°26'29.58E	Erven
998	ULUNDI D	1522	0	28°16'57.9S	31°26'29.43E	Erven
999	ULUNDI D	1523	0	28°16'58.41S	31°26'29.51E	Erven
1000	ULUNDI D	1531	0	28°17'2.11S	31°26'29.14E	Erven
1001	ULUNDI D	1544	0	28°17'2.79S	31°26'22.06E	Erven
1002	ULUNDI D	1548	0	28°17'1.89S	31°26'21.37E	Erven
1003	ULUNDI D	1557	0	28°17'1.39S	31°26'26.3E	Erven
1004	ULUNDI D	1562	0	28°16'59.95S	31°26'28.61E	Erven
1005	ULUNDI D	1569	0	28°16'59.41S	31°26'21.63E	Erven
1006	ULUNDI D	1570	0	28°16'59.37S	31°26'22.16E	Erven
1007	ULUNDI D	1581	0	28°16'59.88S	31°26'26.67E	Erven
1008	ULUNDI D	1585	0	28°17'0.13S	31°26'24.47E	Erven
1009	ULUNDI D	1586	0	28°17'0.17S	31°26'23.93E	Erven
1010	ULUNDI D	1603	0	28°17'2.58S	31°26'17.09E	Erven
1011	ULUNDI D	1608	0	28°17'5.6S	31°26'16.3E	Erven
1012	ULUNDI D	1610	0	28°17'6.25S	31°26'15.03E	Erven
1013	ULUNDI D	1621	0	28°17'0.56S	31°26'15.43E	Erven
1014	ULUNDI D	1639	0	28°16'59.56S	31°26'14.28E	Erven
1015	ULUNDI D	1640	0	28°16'59.08S	31°26'14.53E	Erven
1016	ULUNDI D	1650	0	28°16'49.15S	31°26'21.63E	Erven
1017	ULUNDI D	1661	0	28°16'44.11S	31°26'20.51E	Erven
1018	ULUNDI D	1690	0	28°16'46.67S	31°26'19.5E	Erven
1019	ULUNDI D	1701	0	28°16'48.39S	31°26'9.78E	Erven
1020	ULUNDI D	1708	0	28°16'48.39S	31°26'13.63E	Erven
1021	ULUNDI C	913	0	28°17'2.94S	31°25'39.75E	Erven
1022	ULUNDI C	923	0	28°17'5.75S	31°25'40.7E	Erven
1023	ULUNDI D	930	0	28°16'31.55S	31°26'2.22E	Erven
1024	ULUNDI C	935	0	28°17'0.6S	31°25'36.01E	Erven
1025	ULUNDI C	940	0	28°17'7.3S	31°25'50.09E	Erven
1026	ULUNDI C	944	0	28°17'10.61S	31°25'59.38E	Erven
1027	ULUNDI C	990	0	28°17'12.69S	31°25'56.75E	Erven
1028	ULUNDI C	991	0	28°17'12.19S	31°25'56.03E	Erven
1029	ULUNDI C	996	0	28°17'12.77S	31°25'51.45E	Erven
1030	ULUNDI D	347	0	28°16'7.75S	31°26'41.46E	Erven
1031	ULUNDI D	351	0	28°16'9.63S	31°26'43.51E	Erven
1032	ULUNDI D	361	0	28°16'7.83S	31°26'37.89E	Erven
1033	ULUNDI C	962	0	28°17'11.26S	31°25'51.74E	Erven
1034	ULUNDI C	968	0	28°17'11.15S	31°25'56.93E	Erven
1035	ULUNDI C	969	0	28°17'11.65S	31°25'57.65E	Erven
1036	ULUNDI C	993	0	28°17'11.76S	31°25'54.08E	Erven

1037	ULUNDI C	998	0	28°17'14.78S	31°25'51.31E	Erven
1038	MAHLABATINI	367	0	28°14'23.13S	31°27'47.2E	Erven
1039	ULUNDI D	377	0	28°16'14.05S	31°26'43.65E	Erven
1040	ULUNDI D	395	0	28°16'11.1S	31°26'41.03E	Erven
1041	ULUNDI D	409	0	28°16'11.14S	31°26'38.76E	Erven
1042	ULUNDI D	387	0	28°16'15.06S	31°26'42.58E	Erven
1043	ULUNDI D	397	0	28°16'10.35S	31°26'40.2E	Erven
1044	ULUNDI D	399	0	28°16'9.66S	31°26'39.44E	Erven
1045	ULUNDI D	404	0	28°16'9.41S	31°26'36.53E	Erven
1046	ULUNDI D	405	0	28°16'10.96S	31°26'36.78E	Erven
1047	ULUNDI D	406	0	28°16'10.59S	31°26'37.39E	Erven
1048	ULUNDI D	407	0	28°16'10.31S	31°26'38E	Erven
1049	ULUNDI D	411	0	28°16'11.89S	31°26'39.59E	Erven
1050	ULUNDI D	414	0	28°16'13.33S	31°26'40.34E	Erven
1051	ULUNDI D	421	0	28°16'13.33S	31°26'37.32E	Erven
1052	ULUNDI D	423	0	28°16'13.16S	31°26'38.98E	Erven
1053	ULUNDI D	426	0	28°16'11.57S	31°26'37.57E	Erven
1054	ULUNDI B	1066	0	28°17'28.21S	31°24'32.4E	Erven
1055	ULUNDI B	1071	0	28°17'29.43S	31°24'35.68E	Erven
1056	ULUNDI D	1082	0	28°16'43.54S	31°26'9.2E	Erven
1057	ULUNDI D	1087	0	28°16'43.54S	31°26'11.98E	Erven
1058	ULUNDI D	1091	0	28°16'43.5S	31°26'14.17E	Erven
1059	ULUNDI D	1102	0	28°16'47.43S	31°26'17.59E	Erven
1060	ULUNDI D	1104	0	28°16'45.52S	31°26'16.73E	Erven
1061	ULUNDI C	1110	0	28°17'10.35S	31°25'36.55E	Erven
1062	ULUNDI D	1110	0	28°16'44.47S	31°26'13.09E	Erven
1063	ULUNDI D	1113	0	28°16'44.51S	31°26'11.44E	Erven
1064	ULUNDI D	450	0	28°16'17.65S	31°26'40.2E	Erven
1065	ULUNDI D	452	0	28°16'16.9S	31°26'39.27E	Erven
1066	ULUNDI D	453	0	28°16'16.86S	31°26'38.58E	Erven
1067	ULUNDI C	992	0	28°17'11.62S	31°25'55.2E	Erven
1068	ULUNDI C	1002	0	28°17'13.49S	31°25'54.81E	Erven
1069	ULUNDI C	1019	0	28°17'13.85S	31°25'48.9E	Erven
1070	ULUNDI C	1020	0	28°17'14.6S	31°25'49.26E	Erven
1071	ULUNDI B	1033	0	28°17'15.47S	31°24'31.39E	Erven
1072	ULUNDI B	1061	0	28°17'31.67S	31°24'30.78E	Erven
1073	ULUNDI B	1063	0	28°17'30.38S	31°24'28.69E	Erven
1074	ULUNDI B	1067	0	28°17'27.92S	31°24'33.91E	Erven
1075	ULUNDI B	1118	0	28°17'11.04S	31°24'39.24E	Erven
1076	ULUNDI B	1119	0	28°17'11.94S	31°24'39.64E	Erven
1077	ULUNDI C	1120	0	28°17'8.7S	31°25'41.81E	Erven
1078	ULUNDI B	1124	0	28°17'20.08S	31°24'49.5E	Erven
1079	ULUNDI B	1126	0	28°17'21.81S	31°24'49.14E	Erven
1080	ULUNDI B	1128	0	28°17'21.81S	31°24'51.48E	Erven
1081	ULUNDI C	1129	0	28°17'12.01S	31°25'36.44E	Erven
1082	ULUNDI C	1131	0	28°17'12.73S	31°25'35.22E	Erven
1083	ULUNDI D	1131	0	28°16'46.02S	31°26'14.97E	Erven
1084	ULUNDI C	1134	0	28°17'14.1S	31°25'35.8E	Erven
1085	ULUNDI B	1136	0	28°17'9.64S	31°24'50.4E	Erven
1086	ULUNDI C	1138	0	28°17'12.48S	31°25'38.21E	Erven
1087	ULUNDI B	1139	0	28°17'7.91S	31°25'5.48E	Erven
1088	ULUNDI C	1141	0	28°17'11.01S	31°25'39.64E	Erven
1089	ULUNDI D	1145	0	28°16'41.09S	31°26'9.2E	Erven
1090	ULUNDI B	1154	0	28°17'9.74S	31°25'6.74E	Erven
1091	ULUNDI B	1163	0	28°17'17.05S	31°25'15.17E	Erven
1092	ULUNDI C	1169	0	28°17'12.48S	31°25'43.72E	Erven
1093	ULUNDI D	473	0	28°16'18.73S	31°26'39.08E	Erven
1094	ULUNDI D	477	0	28°16'19.99S	31°26'40.74E	Erven

1095	ULUNDI D	1089	0	28°16'43.5S	31°26'13.06E	Erven
1096	ULUNDI D	1094	0	28°16'43.68S	31°26'16.12E	Erven
1097	ULUNDI D	1097	0	28°16'44.8S	31°26'17.34E	Erven
1098	ULUNDI D	1105	0	28°16'45.15S	31°26'16.19E	Erven
1099	ULUNDI C	1106	0	28°17'12.01S	31°25'34.14E	Erven
1100	ULUNDI C	1107	0	28°17'11.79S	31°25'34.93E	Erven
1101	ULUNDI D	1109	0	28°16'44.47S	31°26'13.63E	Erven
1102	ULUNDI C	1119	0	28°17'7.69S	31°25'41.88E	Erven
1103	ULUNDI B	1121	0	28°17'18.96S	31°24'46.22E	Erven
1104	ULUNDI C	1121	0	28°17'8.59S	31°25'41.02E	Erven
1105	ULUNDI B	1123	0	28°17'19.86S	31°24'48.35E	Erven
1106	ULUNDI D	1123	0	28°16'45.95S	31°26'10.32E	Erven
1107	ULUNDI D	1124	0	28°16'45.95S	31°26'10.86E	Erven
1108	ULUNDI B	1125	0	28°17'21.05S	31°24'48.28E	Erven
1109	ULUNDI C	1125	0	28°17'10.03S	31°25'38.39E	Erven
1110	ULUNDI D	1127	0	28°16'45.95S	31°26'12.51E	Erven
1111	ULUNDI B	1131	0	28°17'21.09S	31°24'53.32E	Erven
1112	ULUNDI B	1138	0	28°17'6.86S	31°25'5.42E	Erven
1113	ULUNDI B	1143	0	28°17'12.63S	31°25'5.27E	Erven
1114	ULUNDI C	1146	0	28°17'12.63S	31°25'39.54E	Erven
1115	ULUNDI B	1148	0	28°17'9.67S	31°25'10.59E	Erven
1116	ULUNDI C	1148	0	28°17'13.59S	31°25'38.57E	Erven
1117	ULUNDI C	999	0	28°17'14.42S	31°25'52.21E	Erven
1118	ULUNDI B	1038	0	28°17'18.2S	31°24'30.71E	Erven
1119	ULUNDI B	1056	0	28°17'31.95S	31°24'36.97E	Erven
1120	ULUNDI B	1057	0	28°17'32.93S	31°24'36.03E	Erven
1121	ULUNDI B	1065	0	28°17'28.65S	31°24'31.18E	Erven
1122	ULUNDI B	1074	0	28°17'26.56S	31°24'34.7E	Erven
1123	ULUNDI D	485	0	28°16'22.62S	31°26'39.91E	Erven
1124	ULUNDI D	492	0	28°16'24.42S	31°26'42.32E	Erven
1125	ULUNDI D	500	0	28°16'22.66S	31°26'38.33E	Erven
1126	ULUNDI B	1151	0	28°17'7.83S	31°25'8.29E	Erven
1127	ULUNDI D	1155	0	28°16'41.09S	31°26'14.71E	Erven
1128	ULUNDI D	1156	0	28°16'41.09S	31°26'15.25E	Erven
1129	ULUNDI D	1157	0	28°16'41.05S	31°26'15.83E	Erven
1130	ULUNDI D	1161	0	28°16'42.24S	31°26'18.31E	Erven
1131	ULUNDI C	1162	0	28°17'11.87S	31°25'45.8E	Erven
1132	ULUNDI D	1165	0	28°16'42.06S	31°26'15.25E	Erven
1133	ULUNDI C	1167	0	28°17'9.71S	31°25'43.83E	Erven
1134	ULUNDI C	1170	0	28°17'12.66S	31°25'43E	Erven
1135	ULUNDI C	1171	0	28°17'12.87S	31°25'42.31E	Erven
1136	ULUNDI C	1184	0	28°17'16.26S	31°25'25.71E	Erven
1137	ULUNDI B	1185	0	28°17'28.79S	31°24'43.27E	Erven
1138	ULUNDI D	1189	0	28°16'43.61S	31°26'22.31E	Erven
1139	ULUNDI D	1190	0	28°16'43.96S	31°26'22.85E	Erven
1140	ULUNDI D	1203	0	28°16'44.29S	31°26'29.69E	Erven
1141	ULUNDI D	1206	0	28°16'44.87S	31°26'31.2E	Erven
1142	ULUNDI C	1215	0	28°17'16.3S	31°25'28.34E	Erven
1143	ULUNDI C	1217	0	28°17'17.45S	31°25'29.39E	Erven
1144	ULUNDI D	1218	0	28°16'44.29S	31°26'25.48E	Erven
1145	ULUNDI C	1219	0	28°17'18.46S	31°25'29.39E	Erven
1146	ULUNDI C	1223	0	28°17'16.15S	31°25'27.26E	Erven
1147	ULUNDI D	1224	0	28°16'47.71S	31°26'24.04E	Erven
1148	ULUNDI D	1225	0	28°16'48.25S	31°26'24.39E	Erven
1149	ULUNDI D	1083	0	28°16'43.54S	31°26'9.78E	Erven
1150	ULUNDI D	1100	0	28°16'46.42S	31°26'17.88E	Erven
1151	ULUNDI D	1103	0	28°16'46.63S	31°26'16.69E	Erven
1152	ULUNDI C	1114	0	28°17'8.41S	31°25'38.5E	Erven

1153	ULUNDI C	1115	0	28°17'7.91S	31°25'38.96E	Erven
1154	ULUNDI C	1117	0	28°17'7.55S	31°25'40.41E	Erven
1155	ULUNDI D	1117	0	28°16'44.51S	31°26'9.2E	Erven
1156	ULUNDI B	1122	0	28°17'19.61S	31°24'47.16E	Erven
1157	ULUNDI D	1129	0	28°16'45.95S	31°26'13.63E	Erven
1158	ULUNDI C	1132	0	28°17'12.95S	31°25'34.54E	Erven
1159	ULUNDI D	1132	0	28°16'46.88S	31°26'14.97E	Erven
1160	ULUNDI B	1133	0	28°17'22.71S	31°24'57.6E	Erven
1161	ULUNDI D	1134	0	28°16'46.92S	31°26'13.63E	Erven
1162	ULUNDI D	1138	0	28°16'46.92S	31°26'11.44E	Erven
1163	ULUNDI D	1141	0	28°16'46.92S	31°26'9.78E	Erven
1164	ULUNDI C	1145	0	28°17'12.16S	31°25'40.01E	Erven
1165	ULUNDI D	1147	0	28°16'41.09S	31°26'10.32E	Erven
1166	ULUNDI C	1152	0	28°17'15.04S	31°25'36.19E	Erven
1167	ULUNDI B	1153	0	28°17'5.79S	31°25'7.89E	Erven
1168	ULUNDI D	509	0	28°16'25.79S	31°26'41.53E	Erven
1169	ULUNDI D	514	0	28°16'26.76S	31°26'41.35E	Erven
1170	ULUNDI D	516	0	28°16'26.58S	31°26'40.28E	Erven
1171	ULUNDI D	518	0	28°16'26.51S	31°26'39.08E	Erven
1172	ULUNDI D	1227	0	28°16'48.44S	31°26'25.69E	Erven
1173	ULUNDI D	1228	0	28°16'48.54S	31°26'26.23E	Erven
1174	ULUNDI C	1229	0	28°17'12.66S	31°25'28.74E	Erven
1175	ULUNDI C	1237	0	28°17'16.8S	31°25'30.22E	Erven
1176	ULUNDI C	1239	0	28°17'15.65S	31°25'29.17E	Erven
1177	ULUNDI C	1244	0	28°17'18.82S	31°25'31.01E	Erven
1178	ULUNDI D	1248	0	28°16'46.96S	31°26'30.41E	Erven
1179	ULUNDI C	1262	0	28°17'19.46S	31°25'33.64E	Erven
1180	ULUNDI D	1268	0	28°16'49.37S	31°26'29.87E	Erven
1181	ULUNDI D	1270	0	28°16'50.09S	31°26'29.14E	Erven
1182	ULUNDI D	1275	0	28°16'48.39S	31°26'35.66E	Erven
1183	ULUNDI D	1277	0	28°16'48.86S	31°26'36.67E	Erven
1184	ULUNDI C	1282	0	28°17'17.38S	31°25'33.14E	Erven
1185	ULUNDI C	1284	0	28°17'16.26S	31°25'32.13E	Erven
1186	ULUNDI C	1290	0	28°17'12.26S	31°25'32.85E	Erven
1187	ULUNDI C	1293	0	28°17'14.28S	31°25'33.71E	Erven
1188	ULUNDI C	1294	0	28°17'14.97S	31°25'33.99E	Erven
1189	ULUNDI D	1313	0	28°16'54.09S	31°26'32.61E	Erven
1190	ULUNDI D	1318	0	28°16'49.11S	31°26'34.08E	Erven
1191	ULUNDI D	1322	0	28°16'50.34S	31°26'36.35E	Erven
1192	ULUNDI D	1331	0	28°16'52.14S	31°26'40.09E	Erven
1193	ULUNDI C	1156	0	28°17'8.02S	31°25'44.65E	Erven
1194	ULUNDI C	1157	0	28°17'8.77S	31°25'44.4E	Erven
1195	ULUNDI B	1162	0	28°17'14.57S	31°25'20.43E	Erven
1196	ULUNDI C	1165	0	28°17'10.93S	31°25'44.29E	Erven
1197	ULUNDI C	1166	0	28°17'10.32S	31°25'44.04E	Erven
1198	ULUNDI C	1168	0	28°17'8.92S	31°25'43.39E	Erven
1199	ULUNDI D	1168	0	28°16'42.06S	31°26'13.6E	Erven
1200	ULUNDI C	1174	0	28°17'14.06S	31°25'40.3E	Erven
1201	ULUNDI D	1174	0	28°16'42.06S	31°26'10.32E	Erven
1202	ULUNDI D	1175	0	28°16'42.06S	31°26'9.78E	Erven
1203	ULUNDI B	1182	0	28°17'34.19S	31°24'43.06E	Erven
1204	ULUNDI C	1185	0	28°17'16.87S	31°25'26.29E	Erven
1205	ULUNDI D	1185	0	28°16'42.28S	31°26'20.73E	Erven
1206	ULUNDI C	1186	0	28°17'17.49S	31°25'26.83E	Erven
1207	ULUNDI D	1187	0	28°16'42.92S	31°26'21.52E	Erven
1208	ULUNDI B	1187	0	28°17'33.22S	31°24'40.32E	Erven
1209	ULUNDI C	1191	0	28°17'20.76S	31°25'29.85E	Erven
1210	ULUNDI D	1192	0	28°16'45.01S	31°26'22.77E	Erven

1211	ULUNDI D	1223	0	28°16'47.03S	31°26'24.32E	Erven
1212	ULUNDI D	1226	0	28°16'48.33S	31°26'25.19E	Erven
1213	ULUNDI C	1232	0	28°17'15.15S	31°25'29.85E	Erven
1214	ULUNDI C	1242	0	28°17'14.35S	31°25'28.95E	Erven
1215	ULUNDI D	1242	0	28°16'46.13S	31°26'26.56E	Erven
1216	ULUNDI C	1243	0	28°17'19.32S	31°25'30.33E	Erven
1217	ULUNDI D	525	0	28°16'25.71S	31°26'35.41E	Erven
1218	ULUNDI D	531	0	28°16'27.8S	31°26'38.15E	Erven
1219	ULUNDI D	536	0	28°16'30.47S	31°26'38.18E	Erven
1220	ULUNDI D	537	0	28°16'30.94S	31°26'38.33E	Erven
1221	ULUNDI D	540	0	28°16'32.34S	31°26'38.83E	Erven
1222	ULUNDI D	546	0	28°16'35.11S	31°26'40.96E	Erven
1223	ULUNDI D	412	0	28°16'12.36S	31°26'39.95E	Erven
1224	ULUNDI D	415	0	28°16'13.8S	31°26'40.52E	Erven
1225	ULUNDI D	424	0	28°16'12.5S	31°26'38.69E	Erven
1226	ULUNDI D	1169	0	28°16'42.06S	31°26'13.06E	Erven
1227	ULUNDI D	1172	0	28°16'42.06S	31°26'11.4E	Erven
1228	ULUNDI D	1173	0	28°16'42.06S	31°26'10.86E	Erven
1229	ULUNDI C	1175	0	28°17'14.57S	31°25'39.83E	Erven
1230	ULUNDI B	1176	0	28°17'27.06S	31°24'48.89E	Erven
1231	ULUNDI B	1177	0	28°17'30.09S	31°24'47.84E	Erven
1232	ULUNDI D	1178	0	28°16'37.45S	31°26'17.7E	Erven
1233	ULUNDI D	1186	0	28°16'42.6S	31°26'21.12E	Erven
1234	ULUNDI C	1187	0	28°17'18.06S	31°25'27.41E	Erven
1235	ULUNDI C	1188	0	28°17'18.67S	31°25'27.95E	Erven
1236	ULUNDI D	1191	0	28°16'44.51S	31°26'23.03E	Erven
1237	ULUNDI D	1195	0	28°16'43.32S	31°26'25.15E	Erven
1238	ULUNDI D	1199	0	28°16'43.82S	31°26'27.57E	Erven
1239	ULUNDI D	1201	0	28°16'44.04S	31°26'28.64E	Erven
1240	ULUNDI D	1202	0	28°16'44.18S	31°26'29.14E	Erven
1241	ULUNDI D	1214	0	28°16'44.91S	31°26'27.81E	Erven
1242	ULUNDI C	1220	0	28°17'17.84S	31°25'28.85E	Erven
1243	ULUNDI C	1226	0	28°17'14.06S	31°25'26.76E	Erven
1244	ULUNDI C	1230	0	28°17'12.59S	31°25'29.61E	Erven
1245	ULUNDI C	1234	0	28°17'16.37S	31°25'30.79E	Erven
1246	ULUNDI C	1236	0	28°17'17.41S	31°25'30.83E	Erven
1247	ULUNDI D	1238	0	28°16'49.26S	31°26'24.9E	Erven
1248	ULUNDI D	1240	0	28°16'48.97S	31°26'23.6E	Erven
1249	ULUNDI D	1241	0	28°16'46.02S	31°26'26.01E	Erven
1250	ULUNDI D	1243	0	28°16'46.24S	31°26'27.06E	Erven
1251	ULUNDI C	1247	0	28°17'18.53S	31°25'33.03E	Erven
1252	ULUNDI C	1250	0	28°17'20.3S	31°25'32.02E	Erven
1253	ULUNDI D	1344	0	28°16'49.8S	31°26'33.36E	Erven
1254	ULUNDI D	1356	0	28°16'53.37S	31°26'37.93E	Erven
1255	ULUNDI C	1366	0	28°17'3.23S	31°25'36.33E	Erven
1256	ULUNDI D	1379	0	28°16'51.96S	31°26'31.92E	Erven
1257	ULUNDI D	1380	0	28°16'51.6S	31°26'31.52E	Erven
1258	ULUNDI D	1399	0	28°16'59.52S	31°26'31.31E	Erven
1259	ULUNDI D	1410	0	28°16'58.58S	31°26'35.34E	Erven
1260	ULUNDI D	1417	0	28°17'1.68S	31°26'34.33E	Erven
1261	ULUNDI D	1425	0	28°16'57.57S	31°26'36.99E	Erven
1262	ULUNDI D	1437	0	28°17'0.99S	31°26'39.8E	Erven
1263	ULUNDI D	1451	0	28°16'58.62S	31°26'36.99E	Erven
1264	ULUNDI D	1497	0	28°16'59.3S	31°26'19.5E	Erven
1265	ULUNDI D	1506	0	28°16'55.09S	31°26'21.87E	Erven
1266	ULUNDI D	1511	0	28°16'50.7S	31°26'24.5E	Erven
1267	ULUNDI D	1513	0	28°16'50.91S	31°26'25.58E	Erven
1268	ULUNDI D	1518	0	28°16'55.52S	31°26'29.43E	Erven

1269	ULUNDI D	1526	0	28°16'59.85S	31°26'29.69E	Erven
1270	ULUNDI D	1536	0	28°17'2.37S	31°26'26.41E	Erven
1271	ULUNDI D	1546	0	28°17'2.94S	31°26'20.73E	Erven
1272	ULUNDI D	1556	0	28°17'1.46S	31°26'25.77E	Erven
1273	ULUNDI D	1564	0	28°16'58.98S	31°26'28.47E	Erven
1274	ULUNDI D	1247	0	28°16'46.7S	31°26'29.47E	Erven
1275	ULUNDI D	1252	0	28°16'47.39S	31°26'27.89E	Erven
1276	ULUNDI D	1254	0	28°16'47.17S	31°26'26.81E	Erven
1277	ULUNDI D	1257	0	28°16'44.29S	31°26'32.32E	Erven
1278	ULUNDI C	1260	0	28°17'20.08S	31°25'30.86E	Erven
1279	ULUNDI D	1261	0	28°16'46.85S	31°26'32.46E	Erven
1280	ULUNDI D	1265	0	28°16'48.29S	31°26'30.99E	Erven
1281	ULUNDI D	1272	0	28°16'50.81S	31°26'28.39E	Erven
1282	ULUNDI D	1274	0	28°16'48S	31°26'35.19E	Erven
1283	ULUNDI D	1279	0	28°16'49.33S	31°26'37.71E	Erven
1284	ULUNDI D	1280	0	28°16'49.44S	31°26'38.37E	Erven
1285	ULUNDI D	1281	0	28°16'49.55S	31°26'38.9E	Erven
1286	ULUNDI C	1283	0	28°17'16.83S	31°25'32.63E	Erven
1287	ULUNDI D	1286	0	28°16'49.8S	31°26'41.96E	Erven
1288	ULUNDI C	1289	0	28°17'12.63S	31°25'30.86E	Erven
1289	ULUNDI C	1295	0	28°17'15.65S	31°25'34.28E	Erven
1290	ULUNDI D	1306	0	28°16'55.6S	31°26'36.6E	Erven
1291	ULUNDI D	1311	0	28°16'54.55S	31°26'33.57E	Erven
1292	ULUNDI D	1317	0	28°16'52.71S	31°26'30.41E	Erven
1293	ULUNDI D	559	0	28°16'31.26S	31°26'37.28E	Erven
1294	ULUNDI D	583	0	28°16'31.33S	31°26'40.2E	Erven
1295	ULUNDI D	436	0	28°16'16.93S	31°26'40.92E	Erven
1296	ULUNDI D	438	0	28°16'17.58S	31°26'41.74E	Erven
1297	ULUNDI D	445	0	28°16'19.34S	31°26'42.32E	Erven
1298	ULUNDI D	429	0	28°16'15.82S	31°26'37.54E	Erven
1299	ULUNDI D	431	0	28°16'15.89S	31°26'38.65E	Erven
1300	ULUNDI D	433	0	28°16'15.89S	31°26'39.73E	Erven
1301	ULUNDI D	444	0	28°16'19.6S	31°26'42.97E	Erven
1302	ULUNDI D	1568	0	28°16'59.56S	31°26'20.94E	Erven
1303	ULUNDI D	1588	0	28°17'0.27S	31°26'22.85E	Erven
1304	ULUNDI D	1589	0	28°17'0.35S	31°26'22.27E	Erven
1305	ULUNDI D	1605	0	28°17'3.7S	31°26'17.16E	Erven
1306	ULUNDI D	1615	0	28°16'57.57S	31°26'16.3E	Erven
1307	ULUNDI D	1616	0	28°16'58.04S	31°26'16.12E	Erven
1308	ULUNDI D	1622	0	28°17'1.04S	31°26'15.43E	Erven
1309	ULUNDI D	1627	0	28°17'3.48S	31°26'15.43E	Erven
1310	ULUNDI D	1629	0	28°17'4.67S	31°26'14.35E	Erven
1311	ULUNDI D	1634	0	28°17'2S	31°26'14.31E	Erven
1312	ULUNDI D	1643	0	28°16'57.72S	31°26'15.07E	Erven
1313	ULUNDI D	1644	0	28°16'57.25S	31°26'15.25E	Erven
1314	ULUNDI D	1646	0	28°16'47.25S	31°26'22.16E	Erven
1315	ULUNDI D	1657	0	28°16'52.47S	31°26'20.69E	Erven
1316	ULUNDI D	1658	0	28°16'43.11S	31°26'19.28E	Erven
1317	ULUNDI D	1664	0	28°16'45.48S	31°26'20.97E	Erven
1318	ULUNDI D	1671	0	28°16'48.79S	31°26'20.04E	Erven
1319	ULUNDI D	1679	0	28°16'51.92S	31°26'18.06E	Erven
1320	ULUNDI D	1714	0	28°16'48.76S	31°26'17.41E	Erven
1321	ULUNDI D	1718	0	28°16'55.92S	31°26'18.71E	Erven
1322	ULUNDI D	1719	0	28°16'55.67S	31°26'18.24E	Erven
1323	ULUNDI D	1838	0	28°16'46.48S	31°26'41.57E	Erven
1324	ULUNDI D	1844	0	28°16'44.76S	31°26'42.11E	Erven
1325	ULUNDI D	1856	0	28°16'40.73S	31°26'42.03E	Erven
1326	ULUNDI D	1868	0	28°16'36.66S	31°26'42.03E	Erven

1327	ULUNDI D	1869	0	28°16'36.12S	31°26'42.72E	Erven
1328	ULUNDI D	1870	0	28°16'35.94S	31°26'42.18E	Erven
1329	ULUNDI D	1872	0	28°16'35.29S	31°26'42.29E	Erven
1330	ULUNDI D	1876	0	28°16'33.99S	31°26'42.54E	Erven
1331	ULUNDI D	1333	0	28°16'52.07S	31°26'38.98E	Erven
1332	ULUNDI D	1342	0	28°16'50.52S	31°26'34.33E	Erven
1333	ULUNDI D	1353	0	28°16'53.04S	31°26'36.2E	Erven
1334	ULUNDI D	1354	0	28°16'53.15S	31°26'36.85E	Erven
1335	ULUNDI D	1362	0	28°16'54.55S	31°26'41.03E	Erven
1336	ULUNDI D	1364	0	28°16'54.59S	31°26'39.73E	Erven
1337	ULUNDI D	1373	0	28°16'53.4S	31°26'34.66E	Erven
1338	ULUNDI D	1374	0	28°16'53.19S	31°26'34.15E	Erven
1339	ULUNDI D	1375	0	28°16'52.97S	31°26'33.68E	Erven
1340	ULUNDI D	1386	0	28°16'58.44S	31°26'32.28E	Erven
1341	ULUNDI D	1390	0	28°17'0.38S	31°26'32.53E	Erven
1342	ULUNDI D	1396	0	28°17'0.96S	31°26'31.49E	Erven
1343	ULUNDI D	1402	0	28°16'58.04S	31°26'31.13E	Erven
1344	ULUNDI D	1406	0	28°16'57.04S	31°26'34.04E	Erven
1345	ULUNDI D	1409	0	28°16'58.12S	31°26'35.34E	Erven
1346	ULUNDI D	1421	0	28°16'59.56S	31°26'34.18E	Erven
1347	ULUNDI D	1440	0	28°16'58.62S	31°26'39.41E	Erven
1348	ULUNDI D	1458	0	28°17'0.96S	31°26'42.58E	Erven
1349	ULUNDI D	1467	0	28°17'3.05S	31°26'36.09E	Erven
1350	ULUNDI D	1469	0	28°17'3.19S	31°26'34.66E	Erven
1351	ULUNDI D	1471	0	28°17'3.34S	31°26'33.18E	Erven
1352	ULUNDI D	1482	0	28°17'4.17S	31°26'24.97E	Erven
1353	ULUNDI D	1492	0	28°17'2.72S	31°26'19.11E	Erven
1354	ULUNDI D	1503	0	28°16'56.56S	31°26'20.94E	Erven
1355	ULUNDI D	1832	0	28°16'47.75S	31°26'39.51E	Erven
1356	ULUNDI D	1834	0	28°16'47.64S	31°26'40.28E	Erven
1357	ULUNDI D	1837	0	28°16'47.43S	31°26'41.74E	Erven
1358	ULUNDI D	1852	0	28°16'42.17S	31°26'42.07E	Erven
1359	ULUNDI D	1858	0	28°16'40.08S	31°26'42E	Erven
1360	ULUNDI D	1861	0	28°16'38.89S	31°26'42.58E	Erven
1361	ULUNDI D	1865	0	28°16'37.59S	31°26'42.54E	Erven
1362	ULUNDI D	1884	0	28°16'34.07S	31°26'36.56E	Erven
1363	ULUNDI D	1889	0	28°16'34.97S	31°26'32.71E	Erven
1364	ULUNDI D	1905	0	28°16'29.74S	31°26'19.21E	Erven
1365	ULUNDI D	1909	0	28°16'31.94S	31°26'42.9E	Erven
1366	ULUNDI D	1912	0	28°16'30.8S	31°26'43.12E	Erven
1367	ULUNDI D	1924	0	28°16'26.94S	31°26'43.8E	Erven
1368	ULUNDI D	1926	0	28°16'26.29S	31°26'43.91E	Erven
1369	ULUNDI D	1928	0	28°16'25.65S	31°26'44.02E	Erven
1370	ULUNDI D	1958	0	28°16'19.45S	31°26'45.17E	Erven
1371	ULUNDI D	1970	0	28°16'15.53S	31°26'45.27E	Erven
1372	ULUNDI D	1972	0	28°16'14.88S	31°26'45.24E	Erven
1373	ULUNDI D	1977	0	28°16'18.3S	31°26'38.65E	Erven
1374	ULUNDI D	1983	0	28°16'21.57S	31°26'41.07E	Erven
1375	ULUNDI D	1995	0	28°16'22.87S	31°26'36.2E	Erven
1376	ULUNDI D	2013	0	28°16'32.05S	31°26'34.76E	Erven
1377	ULUNDI D	2094	0	28°16'33.6S	31°25'57.33E	Erven
1378	ULUNDI D	2097	0	28°16'34.03S	31°25'57.83E	Erven
1379	ULUNDI D	2111	0	28°16'35.65S	31°26'1.43E	Erven
1380	ULUNDI D	2119	0	28°16'38.78S	31°26'0.31E	Erven
1381	ULUNDI D	2125	0	28°16'37.27S	31°26'2.58E	Erven
1382	ULUNDI D	2127	0	28°16'37.78S	31°26'3.55E	Erven
1383	ULUNDI D	638	0	28°16'40.83S	31°26'37.82E	Erven
1384	ULUNDI D	643	0	28°16'43.18S	31°26'39.01E	Erven

1385	ULUNDI D	649	0	28°16'42.42S	31°26'36.67E	Erven
1386	ULUNDI D	656	0	28°16'45.26S	31°26'39.55E	Erven
1387	ULUNDI D	660	0	28°16'45.48S	31°26'37.79E	Erven
1388	ULUNDI D	1877	0	28°16'33.56S	31°26'43.19E	Erven
1389	ULUNDI D	1888	0	28°16'34.79S	31°26'33.29E	Erven
1390	ULUNDI D	1895	0	28°16'33.99S	31°26'28.75E	Erven
1391	ULUNDI D	1896	0	28°16'33.42S	31°26'29.76E	Erven
1392	ULUNDI D	1900	0	28°16'33.85S	31°26'31.92E	Erven
1393	ULUNDI D	1911	0	28°16'31.41S	31°26'43.59E	Erven
1394	ULUNDI D	1913	0	28°16'30.75S	31°26'43.69E	Erven
1395	ULUNDI D	1921	0	28°16'28.2S	31°26'44.16E	Erven
1396	ULUNDI D	1932	0	28°16'24.46S	31°26'44.84E	Erven
1397	ULUNDI D	1936	0	28°16'29.28S	31°26'42.07E	Erven
1398	ULUNDI D	1950	0	28°16'22.01S	31°26'44.7E	Erven
1399	ULUNDI D	1973	0	28°16'14.27S	31°26'45.82E	Erven
1400	ULUNDI D	1978	0	28°16'18.26S	31°26'37.47E	Erven
1401	ULUNDI D	2001	0	28°16'25.18S	31°26'34.01E	Erven
1402	ULUNDI D	2005	0	28°16'20.82S	31°26'34.87E	Erven
1403	ULUNDI D	2007	0	28°16'25.57S	31°26'39.88E	Erven
1404	ULUNDI D	2009	0	28°16'29.82S	31°26'33.65E	Erven
1405	ULUNDI D	2093	0	28°16'33.32S	31°25'56.96E	Erven
1406	ULUNDI D	2098	0	28°16'34.28S	31°25'58.19E	Erven
1407	ULUNDI D	2105	0	28°16'35.26S	31°25'59.59E	Erven
1408	ULUNDI D	2123	0	28°16'38.17S	31°26'2E	Erven
1409	ULUNDI D	2137	0	28°16'39.36S	31°26'3.66E	Erven
1410	ULUNDI D	2164	0	28°16'38.97S	31°25'58.34E	Erven
1411	ULUNDI D	478	0	28°16'20.32S	31°26'41.13E	Erven
1412	ULUNDI D	673	0	28°16'43.93S	31°26'34.51E	Erven
1413	ULUNDI D	681	0	28°16'47.06S	31°26'37.61E	Erven
1414	ULUNDI D	690	0	28°16'37.7S	31°26'32.06E	Erven
1415	ULUNDI D	693	0	28°16'35.73S	31°26'34.26E	Erven
1416	ULUNDI D	422	0	28°16'13.58S	31°26'38.47E	Erven
1417	ULUNDI D	425	0	28°16'11.97S	31°26'38.22E	Erven
1418	ULUNDI D	434	0	28°16'16.29S	31°26'40.09E	Erven
1419	ULUNDI D	484	0	28°16'22.29S	31°26'39.48E	Erven
1420	ULUNDI D	495	0	28°16'24.17S	31°26'40.67E	Erven
1421	ULUNDI D	497	0	28°16'23.66S	31°26'39.59E	Erven
1422	ULUNDI D	504	0	28°16'24.75S	31°26'38.51E	Erven
1423	ULUNDI D	505	0	28°16'25.07S	31°26'38.9E	Erven
1424	ULUNDI D	704	0	28°16'40.66S	31°26'34.87E	Erven
1425	ULUNDI D	706	0	28°16'39.76S	31°26'34.55E	Erven
1426	ULUNDI D	709	0	28°16'38.36S	31°26'34.04E	Erven
1427	ULUNDI D	717	0	28°16'26.72S	31°26'29.94E	Erven
1428	ULUNDI D	728	0	28°16'31.94S	31°26'28.5E	Erven
1429	ULUNDI D	737	0	28°16'31.76S	31°26'33.07E	Erven
1430	ULUNDI D	1251	0	28°16'47.53S	31°26'28.43E	Erven
1431	ULUNDI D	1260	0	28°16'46.38S	31°26'33.07E	Erven
1432	ULUNDI D	1269	0	28°16'49.73S	31°26'29.51E	Erven
1433	ULUNDI D	1271	0	28°16'50.45S	31°26'28.75E	Erven
1434	ULUNDI C	1280	0	28°17'18.78S	31°25'34.43E	Erven
1435	ULUNDI C	1281	0	28°17'18.06S	31°25'33.75E	Erven
1436	ULUNDI D	1283	0	28°16'49.73S	31°26'40.06E	Erven
1437	ULUNDI C	1286	0	28°17'15S	31°25'31.08E	Erven
1438	ULUNDI D	1315	0	28°16'53.62S	31°26'31.52E	Erven
1439	ULUNDI D	1326	0	28°16'50.99S	31°26'38.65E	Erven
1440	ULUNDI D	1327	0	28°16'51.13S	31°26'39.27E	Erven
1441	ULUNDI D	1335	0	28°16'51.85S	31°26'37.89E	Erven
1442	ULUNDI D	1340	0	28°16'50.99S	31°26'35.34E	Erven

1443	ULUNDI D	1366	0	28°16'54.41S	31°26'38.26E	Erven
1444	ULUNDI D	1368	0	28°16'54.19S	31°26'37.18E	Erven
1445	ULUNDI D	1372	0	28°16'53.62S	31°26'35.13E	Erven
1446	ULUNDI D	1385	0	28°16'57.94S	31°26'32.21E	Erven
1447	ULUNDI D	1401	0	28°16'58.55S	31°26'31.2E	Erven
1448	ULUNDI D	1408	0	28°16'57.61S	31°26'35.34E	Erven
1449	ULUNDI D	1436	0	28°17'0.46S	31°26'40.78E	Erven
1450	ULUNDI D	1442	0	28°16'59.08S	31°26'37.93E	Erven
1451	ULUNDI D	519	0	28°16'26.15S	31°26'38.61E	Erven
1452	ULUNDI D	521	0	28°16'25.5S	31°26'37.79E	Erven
1453	ULUNDI D	1446	0	28°17'1.39S	31°26'37.03E	Erven
1454	ULUNDI D	1449	0	28°16'59.77S	31°26'37.03E	Erven
1455	ULUNDI D	1452	0	28°16'58.08S	31°26'36.99E	Erven
1456	ULUNDI D	1456	0	28°16'59.48S	31°26'42.65E	Erven
1457	ULUNDI D	1468	0	28°17'3.12S	31°26'35.37E	Erven
1458	ULUNDI D	1476	0	28°17'3.7S	31°26'29.54E	Erven
1459	ULUNDI D	1477	0	28°17'3.77S	31°26'28.79E	Erven
1460	ULUNDI D	1481	0	28°17'4.09S	31°26'25.69E	Erven
1461	ULUNDI D	1491	0	28°17'3.37S	31°26'19.11E	Erven
1462	ULUNDI D	1494	0	28°17'0.78S	31°26'19.11E	Erven
1463	ULUNDI D	1500	0	28°16'57.94S	31°26'20.07E	Erven
1464	ULUNDI D	1501	0	28°16'57.43S	31°26'20.29E	Erven
1465	ULUNDI D	1519	0	28°16'56.24S	31°26'29.33E	Erven
1466	ULUNDI D	1533	0	28°17'2.22S	31°26'28.07E	Erven
1467	ULUNDI D	1535	0	28°17'2.33S	31°26'26.99E	Erven
1468	ULUNDI D	1540	0	28°17'2.58S	31°26'24.25E	Erven
1469	ULUNDI D	1542	0	28°17'2.69S	31°26'23.14E	Erven
1470	ULUNDI D	1553	0	28°17'1.6S	31°26'24.1E	Erven
1471	ULUNDI D	1558	0	28°17'1.36S	31°26'26.84E	Erven
1472	ULUNDI D	1560	0	28°17'1.25S	31°26'28.25E	Erven
1473	ULUNDI D	1579	0	28°16'58.87S	31°26'27.06E	Erven
1474	ULUNDI D	1592	0	28°16'57.14S	31°26'18.21E	Erven
1475	ULUNDI D	1601	0	28°17'1.6S	31°26'17.09E	Erven
1476	ULUNDI D	1602	0	28°17'2.11S	31°26'17.09E	Erven
1477	ULUNDI D	1606	0	28°17'4.52S	31°26'17.31E	Erven
1478	ULUNDI D	1609	0	28°17'5.93S	31°26'15.65E	Erven
1479	ULUNDI D	1612	0	28°16'56.56S	31°26'15.65E	Erven
1480	ULUNDI D	1626	0	28°17'2.98S	31°26'15.43E	Erven
1481	ULUNDI D	1628	0	28°17'4.23S	31°26'15.4E	Erven
1482	ULUNDI D	744	0	28°16'28.09S	31°26'33.33E	Erven
1483	ULUNDI D	749	0	28°16'26.11S	31°26'31.6E	Erven
1484	ULUNDI D	756	0	28°16'28.17S	31°26'34.47E	Erven
1485	ULUNDI D	758	0	28°16'29.1S	31°26'34.8E	Erven
1486	ULUNDI D	760	0	28°16'30.03S	31°26'35.13E	Erven
1487	ULUNDI D	765	0	28°16'32.37S	31°26'35.95E	Erven
1488	ULUNDI D	767	0	28°16'33.32S	31°26'36.28E	Erven
1489	ULUNDI D	543	0	28°16'33.85S	31°26'39.37E	Erven
1490	ULUNDI D	548	0	28°16'36.12S	31°26'40.06E	Erven
1491	ULUNDI D	556	0	28°16'32.63S	31°26'37.79E	Erven
1492	ULUNDI D	769	0	28°16'35S	31°26'36.89E	Erven
1493	ULUNDI C	772	0	28°17'4.45S	31°25'45.77E	Erven
1494	ULUNDI C	777	0	28°17'0.53S	31°25'47.46E	Erven
1495	ULUNDI D	778	0	28°16'28.81S	31°26'32.03E	Erven
1496	ULUNDI D	779	0	28°16'29.5S	31°26'31.99E	Erven
1497	ULUNDI C	782	0	28°16'57.47S	31°25'44.36E	Erven
1498	ULUNDI D	786	0	28°16'32.2S	31°26'30.12E	Erven
1499	ULUNDI C	788	0	28°16'53.94S	31°25'40.37E	Erven
1500	ULUNDI D	789	0	28°16'30.72S	31°26'30.52E	Erven

1501	ULUNDI D	790	0	28°16'30.22S	31°26'30.66E	Erven
1502	ULUNDI D	793	0	28°16'28.81S	31°26'31.05E	Erven
1503	ULUNDI D	805	0	28°16'23.99S	31°26'30.7E	Erven
1504	ULUNDI D	581	0	28°16'33.06S	31°26'40.99E	Erven
1505	ULUNDI D	821	0	28°16'27.77S	31°26'20.76E	Erven
1506	ULUNDI C	822	0	28°16'55.6S	31°25'39.75E	Erven
1507	ULUNDI C	839	0	28°17'2.58S	31°25'45.34E	Erven
1508	ULUNDI C	844	0	28°17'0.71S	31°25'43.54E	Erven
1509	ULUNDI C	845	0	28°17'0.35S	31°25'43.17E	Erven
1510	ULUNDI D	847	0	28°16'31.94S	31°26'7.19E	Erven
1511	ULUNDI D	848	0	28°16'26.11S	31°26'12.08E	Erven
1512	ULUNDI C	849	0	28°16'58.84S	31°25'41.77E	Erven
1513	ULUNDI C	856	0	28°16'56.39S	31°25'39.03E	Erven
1514	ULUNDI D	857	0	28°16'28.34S	31°26'6.36E	Erven
1515	ULUNDI D	858	0	28°16'28.74S	31°26'6.11E	Erven
1516	ULUNDI C	859	0	28°16'55.45S	31°25'37.74E	Erven
1517	ULUNDI D	861	0	28°16'30.03S	31°26'5.32E	Erven
1518	ULUNDI D	868	0	28°16'33.96S	31°26'3.73E	Erven
1519	ULUNDI C	869	0	28°16'59.81S	31°25'40.51E	Erven
1520	ULUNDI D	871	0	28°16'35.9S	31°26'3.66E	Erven
1521	ULUNDI C	875	0	28°17'2.08S	31°25'42.64E	Erven
1522	ULUNDI D	879	0	28°16'25.97S	31°26'5.93E	Erven
1523	ULUNDI D	882	0	28°16'27.66S	31°26'4.81E	Erven
1524	ULUNDI C	901	0	28°16'58.62S	31°25'34.93E	Erven
1525	ULUNDI D	902	0	28°16'27.73S	31°26'0.6E	Erven
1526	ULUNDI D	909	0	28°16'31.44S	31°25'57.33E	Erven
1527	ULUNDI C	910	0	28°17'1.82S	31°25'38.71E	Erven
1528	ULUNDI C	914	0	28°17'3.3S	31°25'40.12E	Erven
1529	ULUNDI C	925	0	28°17'4.34S	31°25'39.61E	Erven
1530	ULUNDI D	636	0	28°16'39.9S	31°26'37.47E	Erven
1531	ULUNDI D	641	0	28°16'42.28S	31°26'38.51E	Erven
1532	ULUNDI D	645	0	28°16'43.79S	31°26'40.06E	Erven
1533	ULUNDI D	650	0	28°16'42.85S	31°26'36.99E	Erven
1534	ULUNDI D	455	0	28°16'16.79S	31°26'37.47E	Erven
1535	ULUNDI D	1515	0	28°16'51.17S	31°26'26.67E	Erven
1536	ULUNDI D	1525	0	28°16'59.34S	31°26'29.65E	Erven
1537	ULUNDI D	1530	0	28°17'2S	31°26'29.98E	Erven
1538	ULUNDI D	1534	0	28°17'2.26S	31°26'27.53E	Erven
1539	ULUNDI D	1538	0	28°17'2.47S	31°26'25.33E	Erven
1540	ULUNDI D	1543	0	28°17'2.76S	31°26'22.59E	Erven
1541	ULUNDI D	1545	0	28°17'2.87S	31°26'21.52E	Erven
1542	ULUNDI D	1547	0	28°17'2S	31°26'20.65E	Erven
1543	ULUNDI D	1551	0	28°17'1.75S	31°26'23.03E	Erven
1544	ULUNDI D	1561	0	28°17'0.71S	31°26'28.75E	Erven
1545	ULUNDI D	1566	0	28°16'58.01S	31°26'28.36E	Erven
1546	ULUNDI D	1582	0	28°16'59.95S	31°26'26.12E	Erven
1547	ULUNDI D	1583	0	28°17'0.03S	31°26'25.58E	Erven
1548	ULUNDI D	1587	0	28°17'0.24S	31°26'23.39E	Erven
1549	ULUNDI D	1607	0	28°17'5.31S	31°26'17.05E	Erven
1550	ULUNDI D	1623	0	28°17'1.54S	31°26'15.43E	Erven
1551	ULUNDI D	1647	0	28°16'47.71S	31°26'22.02E	Erven
1552	ULUNDI D	1648	0	28°16'48.18S	31°26'21.91E	Erven
1553	ULUNDI D	1651	0	28°16'49.62S	31°26'21.52E	Erven
1554	ULUNDI D	1653	0	28°16'50.56S	31°26'21.26E	Erven
1555	ULUNDI D	1663	0	28°16'44.94S	31°26'21.19E	Erven
1556	ULUNDI D	1666	0	28°16'46.42S	31°26'20.69E	Erven
1557	ULUNDI D	1669	0	28°16'47.86S	31°26'20.29E	Erven
1558	ULUNDI D	1677	0	28°16'51.63S	31°26'19.25E	Erven

1559	ULUNDI D	1680	0	28°16'51.38S	31°26'18.17E	Erven
1560	ULUNDI D	1686	0	28°16'48.58S	31°26'18.96E	Erven
1561	ULUNDI D	1691	0	28°16'46.2S	31°26'19.61E	Erven
1562	ULUNDI D	1696	0	28°16'44.11S	31°26'18.92E	Erven
1563	ULUNDI D	1702	0	28°16'48.39S	31°26'10.36E	Erven
1564	ULUNDI D	1709	0	28°16'48.39S	31°26'14.21E	Erven
1565	ULUNDI D	925	0	28°16'30.58S	31°26'0.53E	Erven
1566	ULUNDI D	928	0	28°16'30.14S	31°26'2.87E	Erven
1567	ULUNDI D	931	0	28°16'31.62S	31°26'1.14E	Erven
1568	ULUNDI D	934	0	28°16'33.35S	31°25'59.7E	Erven
1569	ULUNDI C	937	0	28°17'0.03S	31°25'35.11E	Erven
1570	ULUNDI C	939	0	28°16'59.37S	31°25'34.25E	Erven
1571	ULUNDI C	943	0	28°17'10.11S	31°25'58.66E	Erven
1572	ULUNDI D	945	0	28°16'34.39S	31°26'1.21E	Erven
1573	ULUNDI C	946	0	28°17'11.58S	31°26'0.81E	Erven
1574	ULUNDI C	961	0	28°17'11.58S	31°25'50.88E	Erven
1575	ULUNDI D	1717	0	28°16'56.14S	31°26'19.17E	Erven
1576	ULUNDI D	1843	0	28°16'44.87S	31°26'42.69E	Erven
1577	ULUNDI D	1857	0	28°16'40.19S	31°26'42.61E	Erven
1578	ULUNDI D	1859	0	28°16'39.54S	31°26'42.58E	Erven
1579	ULUNDI D	1878	0	28°16'33.35S	31°26'42.65E	Erven
1580	ULUNDI D	1882	0	28°16'42.49S	31°26'40.74E	Erven
1581	ULUNDI D	1892	0	28°16'35.9S	31°26'31.27E	Erven
1582	ULUNDI D	1893	0	28°16'33.13S	31°26'28.21E	Erven
1583	ULUNDI D	1894	0	28°16'33.32S	31°26'29.08E	Erven
1584	ULUNDI D	1938	0	28°16'29.06S	31°26'40.92E	Erven
1585	ULUNDI D	1951	0	28°16'21.57S	31°26'45.35E	Erven
1586	ULUNDI D	1953	0	28°16'20.93S	31°26'45.45E	Erven
1587	ULUNDI D	1987	0	28°16'19.95S	31°26'39.22E	Erven
1588	ULUNDI D	1988	0	28°16'20.32S	31°26'38.72E	Erven
1589	ULUNDI D	1993	0	28°16'22.15S	31°26'36.92E	Erven
1590	ULUNDI D	1999	0	28°16'24.35S	31°26'34.76E	Erven
1591	ULUNDI D	2000	0	28°16'24.7S	31°26'34.37E	Erven
1592	ULUNDI D	2096	0	28°16'33.42S	31°25'58.26E	Erven
1593	ULUNDI D	2102	0	28°16'34.89S	31°25'59.05E	Erven
1594	ULUNDI D	2110	0	28°16'36.19S	31°26'0.92E	Erven
1595	ULUNDI D	2114	0	28°16'37.02S	31°26'1.9E	Erven
1596	ULUNDI D	2118	0	28°16'38.36S	31°26'0.67E	Erven
1597	ULUNDI D	2126	0	28°16'37.45S	31°26'3.05E	Erven
1598	ULUNDI D	2133	0	28°16'39.83S	31°26'2.15E	Erven
1599	ULUNDI D	2134	0	28°16'40.3S	31°26'2.83E	Erven
1600	ULUNDI D	2142	0	28°16'39.29S	31°26'5.5E	Erven
1601	ULUNDI D	2144	0	28°16'40.33S	31°26'5.17E	Erven
1602	ULUNDI D	659	0	28°16'45.81S	31°26'38.44E	Erven
1603	ULUNDI D	666	0	28°16'42.85S	31°26'35.7E	Erven
1604	ULUNDI D	677	0	28°16'45.7S	31°26'35.63E	Erven
1605	ULUNDI D	678	0	28°16'46.09S	31°26'36.09E	Erven
1606	ULUNDI D	689	0	28°16'38.17S	31°26'32.24E	Erven
1607	ULUNDI D	696	0	28°16'37.13S	31°26'34.76E	Erven
1608	ULUNDI D	705	0	28°16'40.19S	31°26'34.69E	Erven
1609	ULUNDI D	707	0	28°16'39.29S	31°26'34.37E	Erven
1610	ULUNDI D	710	0	28°16'37.88S	31°26'33.86E	Erven
1611	ULUNDI D	711	0	28°16'37.41S	31°26'33.72E	Erven
1612	ULUNDI D	735	0	28°16'32.84S	31°26'32.96E	Erven
1613	ULUNDI D	750	0	28°16'26.22S	31°26'32.17E	Erven
1614	ULUNDI D	754	0	28°16'27.27S	31°26'34.15E	Erven
1615	ULUNDI D	757	0	28°16'28.63S	31°26'34.66E	Erven
1616	ULUNDI C	778	0	28°16'59.95S	31°25'46.74E	Erven

1617	ULUNDI D	782	0	28°16'30.94S	31°26'31.6E	Erven
1618	ULUNDI D	785	0	28°16'32.41S	31°26'31.16E	Erven
1619	ULUNDI C	786	0	28°16'54.99S	31°25'41.84E	Erven
1620	ULUNDI C	793	0	28°16'54.66S	31°25'36.55E	Erven
1621	ULUNDI D	454	0	28°16'16.82S	31°26'38.04E	Erven
1622	ULUNDI C	795	0	28°16'56.06S	31°25'35.33E	Erven
1623	ULUNDI C	796	0	28°16'56.75S	31°25'34.68E	Erven
1624	ULUNDI C	797	0	28°16'57.43S	31°25'34.07E	Erven
1625	ULUNDI C	801	0	28°17'0.35S	31°25'32.85E	Erven
1626	ULUNDI C	805	0	28°17'1.54S	31°25'34.57E	Erven
1627	ULUNDI C	808	0	28°17'2.65S	31°25'35.8E	Erven
1628	ULUNDI C	810	0	28°17'3.41S	31°25'36.55E	Erven
1629	ULUNDI C	811	0	28°17'3.84S	31°25'36.91E	Erven
1630	ULUNDI D	813	0	28°16'26.65S	31°26'26.34E	Erven
1631	ULUNDI C	821	0	28°16'55.27S	31°25'39.32E	Erven
1632	ULUNDI D	822	0	28°16'28.38S	31°26'20.47E	Erven
1633	ULUNDI D	480	0	28°16'21S	31°26'42.25E	Erven
1634	ULUNDI D	491	0	28°16'24.49S	31°26'42.9E	Erven
1635	ULUNDI D	493	0	28°16'24.35S	31°26'41.79E	Erven
1636	ULUNDI D	839	0	28°16'25.25S	31°26'25.19E	Erven
1637	ULUNDI C	843	0	28°17'1.1S	31°25'43.89E	Erven
1638	ULUNDI D	844	0	28°16'31.58S	31°26'18.85E	Erven
1639	ULUNDI D	845	0	28°16'31.44S	31°26'14.79E	Erven
1640	ULUNDI C	847	0	28°16'59.59S	31°25'42.49E	Erven
1641	ULUNDI C	848	0	28°16'59.23S	31°25'42.13E	Erven
1642	ULUNDI D	856	0	28°16'27.91S	31°26'6.65E	Erven
1643	ULUNDI D	859	0	28°16'29.17S	31°26'5.85E	Erven
1644	ULUNDI C	861	0	28°16'56.96S	31°25'37.12E	Erven
1645	ULUNDI C	862	0	28°16'57.25S	31°25'37.56E	Erven
1646	ULUNDI C	868	0	28°16'59.45S	31°25'40.15E	Erven
1647	ULUNDI D	499	0	28°16'23.02S	31°26'38.76E	Erven
1648	ULUNDI D	511	0	28°16'25.97S	31°26'42.65E	Erven
1649	ULUNDI D	517	0	28°16'26.51S	31°26'39.73E	Erven
1650	ULUNDI D	522	0	28°16'25.18S	31°26'37.36E	Erven
1651	ULUNDI D	523	0	28°16'24.85S	31°26'36.96E	Erven
1652	ULUNDI D	869	0	28°16'34.61S	31°26'3.73E	Erven
1653	ULUNDI C	871	0	28°17'0.56S	31°25'41.2E	Erven
1654	ULUNDI C	874	0	28°17'1.68S	31°25'42.27E	Erven
1655	ULUNDI C	882	0	28°17'3.84S	31°25'42.82E	Erven
1656	ULUNDI D	884	0	28°16'28.95S	31°26'3.91E	Erven
1657	ULUNDI C	896	0	28°16'58.66S	31°25'37.7E	Erven
1658	ULUNDI C	902	0	28°16'58.91S	31°25'35.37E	Erven
1659	ULUNDI C	904	0	28°16'59.52S	31°25'36.27E	Erven
1660	ULUNDI C	909	0	28°17'1.43S	31°25'38.35E	Erven
1661	ULUNDI C	911	0	28°17'2.18S	31°25'39.03E	Erven
1662	ULUNDI C	915	0	28°17'3.7S	31°25'40.48E	Erven
1663	ULUNDI C	997	0	28°17'13.13S	31°25'50.52E	Erven
1664	ULUNDI C	1017	0	28°17'12.34S	31°25'48.18E	Erven
1665	ULUNDI C	1018	0	28°17'13.09S	31°25'48.54E	Erven
1666	ULUNDI B	1040	0	28°17'16.83S	31°24'29.74E	Erven
1667	ULUNDI B	1060	0	28°17'32.24S	31°24'31.89E	Erven
1668	ULUNDI D	526	0	28°16'26.04S	31°26'35.99E	Erven
1669	ULUNDI D	528	0	28°16'26.69S	31°26'36.81E	Erven
1670	ULUNDI D	530	0	28°16'27.33S	31°26'37.65E	Erven
1671	ULUNDI D	534	0	28°16'29.57S	31°26'37.86E	Erven
1672	ULUNDI D	544	0	28°16'34.57S	31°26'39.55E	Erven
1673	ULUNDI D	547	0	28°16'36.23S	31°26'40.78E	Erven
1674	ULUNDI D	479	0	28°16'20.72S	31°26'41.6E	Erven

1675	ULUNDI D	489	0	28°16'23.45S	31°26'42.51E	Erven
1676	ULUNDI D	494	0	28°16'24.28S	31°26'41.24E	Erven
1677	ULUNDI C	918	0	28°17'4.81S	31°25'41.52E	Erven
1678	ULUNDI D	921	0	28°16'32.63S	31°25'58.69E	Erven
1679	ULUNDI C	926	0	28°17'3.95S	31°25'39.25E	Erven
1680	ULUNDI C	928	0	28°17'3.19S	31°25'38.53E	Erven
1681	ULUNDI C	931	0	28°17'2.11S	31°25'37.45E	Erven
1682	ULUNDI C	932	0	28°17'1.71S	31°25'37.12E	Erven
1683	ULUNDI C	934	0	28°17'0.96S	31°25'36.41E	Erven
1684	ULUNDI C	936	0	28°17'0.31S	31°25'35.55E	Erven
1685	ULUNDI C	945	0	28°17'11.07S	31°26'0.09E	Erven
1686	ULUNDI D	946	0	28°16'33.93S	31°26'1.9E	Erven
1687	ULUNDI D	561	0	28°16'30.32S	31°26'36.96E	Erven
1688	ULUNDI D	566	0	28°16'27.99S	31°26'36.13E	Erven
1689	ULUNDI D	568	0	28°16'26.72S	31°26'35.52E	Erven
1690	ULUNDI D	1084	0	28°16'43.54S	31°26'10.32E	Erven
1691	ULUNDI D	1090	0	28°16'43.5S	31°26'13.63E	Erven
1692	ULUNDI D	1101	0	28°16'46.88S	31°26'17.73E	Erven
1693	ULUNDI D	1111	0	28°16'44.51S	31°26'12.51E	Erven
1694	ULUNDI C	1112	0	28°17'9.38S	31°25'37.52E	Erven
1695	ULUNDI D	1116	0	28°16'44.51S	31°26'9.78E	Erven
1696	ULUNDI C	1118	0	28°17'7.62S	31°25'41.12E	Erven
1697	ULUNDI D	1126	0	28°16'45.95S	31°26'11.98E	Erven
1698	ULUNDI C	1128	0	28°17'11.51S	31°25'36.95E	Erven
1699	ULUNDI C	1133	0	28°17'14.35S	31°25'35.11E	Erven
1700	ULUNDI C	1135	0	28°17'13.88S	31°25'36.59E	Erven
1701	ULUNDI C	1136	0	28°17'13.49S	31°25'37.23E	Erven
1702	ULUNDI C	1137	0	28°17'12.95S	31°25'37.7E	Erven
1703	ULUNDI B	1141	0	28°17'10.28S	31°25'4.58E	Erven
1704	ULUNDI C	1142	0	28°17'10.17S	31°25'40.91E	Erven
1705	ULUNDI C	1144	0	28°17'11.73S	31°25'40.55E	Erven
1706	ULUNDI C	1147	0	28°17'13.13S	31°25'39.03E	Erven
1707	ULUNDI C	1150	0	28°17'14.6S	31°25'37.6E	Erven
1708	ULUNDI C	1151	0	28°17'14.82S	31°25'36.88E	Erven
1709	ULUNDI D	498	0	28°16'23.34S	31°26'39.19E	Erven
1710	ULUNDI D	501	0	28°16'23.77S	31°26'37.21E	Erven
1711	ULUNDI D	515	0	28°16'26.69S	31°26'40.81E	Erven
1712	ULUNDI D	580	0	28°16'31.87S	31°26'41.39E	Erven
1713	ULUNDI D	585	0	28°16'30.4S	31°26'39.88E	Erven
1714	ULUNDI C	1153	0	28°17'15.26S	31°25'35.51E	Erven
1715	ULUNDI C	1154	0	28°17'7.83S	31°25'43.17E	Erven
1716	ULUNDI B	1158	0	28°17'15.47S	31°25'16.64E	Erven
1717	ULUNDI C	1160	0	28°17'10.61S	31°25'45.34E	Erven
1718	ULUNDI D	1163	0	28°16'42.21S	31°26'16.69E	Erven
1719	ULUNDI C	1164	0	28°17'11.54S	31°25'44.55E	Erven
1720	ULUNDI D	1166	0	28°16'42.06S	31°26'14.71E	Erven
1721	ULUNDI B	1173	0	28°17'20.4S	31°24'42.95E	Erven
1722	ULUNDI D	1177	0	28°16'42.06S	31°26'8.66E	Erven
1723	ULUNDI C	1178	0	28°17'15.94S	31°25'38.18E	Erven
1724	ULUNDI D	1179	0	28°16'40.22S	31°26'18.21E	Erven
1725	ULUNDI D	1180	0	28°16'40.59S	31°26'18.74E	Erven
1726	ULUNDI D	1183	0	28°16'41.59S	31°26'19.93E	Erven
1727	ULUNDI B	1186	0	28°17'30.66S	31°24'41.11E	Erven
1728	ULUNDI D	1194	0	28°16'40.01S	31°26'28.57E	Erven
1729	ULUNDI D	1196	0	28°16'43.46S	31°26'25.87E	Erven
1730	ULUNDI D	1198	0	28°16'43.72S	31°26'27.02E	Erven
1731	ULUNDI D	1211	0	28°16'45.23S	31°26'29.43E	Erven
1732	ULUNDI C	1213	0	28°17'15.11S	31°25'27.3E	Erven

1733	ULUNDI C	1216	0	28°17'16.87S	31°25'28.88E	Erven
1734	ULUNDI D	1235	0	28°16'49.62S	31°26'26.52E	Erven
1735	ULUNDI C	1245	0	28°17'18.31S	31°25'31.69E	Erven
1736	ULUNDI D	1246	0	28°16'46.56S	31°26'28.68E	Erven
1737	ULUNDI C	1249	0	28°17'19.57S	31°25'31.58E	Erven
1738	ULUNDI D	630	0	28°16'37.45S	31°26'38.69E	Erven
1739	ULUNDI D	631	0	28°16'37.59S	31°26'39.37E	Erven
1740	ULUNDI D	1259	0	28°16'45.7S	31°26'33.18E	Erven
1741	ULUNDI D	1266	0	28°16'48.65S	31°26'30.62E	Erven
1742	ULUNDI D	1276	0	28°16'48.61S	31°26'36.2E	Erven
1743	ULUNDI C	1291	0	28°17'12.91S	31°25'33.14E	Erven
1744	ULUNDI D	1292	0	28°16'53S	31°26'42.58E	Erven
1745	ULUNDI C	1296	0	28°17'16.4S	31°25'34.57E	Erven
1746	ULUNDI D	1298	0	28°16'56.03S	31°26'41.13E	Erven
1747	ULUNDI D	1301	0	28°16'56.06S	31°26'39.41E	Erven
1748	ULUNDI D	1303	0	28°16'55.89S	31°26'38.22E	Erven
1749	ULUNDI D	1310	0	28°16'54.77S	31°26'34.04E	Erven
1750	ULUNDI D	1324	0	28°16'50.81S	31°26'37.5E	Erven
1751	ULUNDI D	1330	0	28°16'52.1S	31°26'40.81E	Erven
1752	ULUNDI D	1332	0	28°16'52.18S	31°26'39.51E	Erven
1753	ULUNDI D	1334	0	28°16'51.96S	31°26'38.44E	Erven
1754	ULUNDI D	1341	0	28°16'50.74S	31°26'34.87E	Erven
1755	ULUNDI D	1347	0	28°16'51.6S	31°26'33.11E	Erven
1756	ULUNDI D	1358	0	28°16'53.58S	31°26'39.05E	Erven
1757	ULUNDI C	1367	0	28°17'7.3S	31°25'49.62E	Erven
1758	ULUNDI D	1370	0	28°16'54.04S	31°26'36.09E	Erven
1759	ULUNDI D	633	0	28°16'37.78S	31°26'40.6E	Erven
1760	ULUNDI D	639	0	28°16'41.34S	31°26'37.97E	Erven
1761	ULUNDI D	644	0	28°16'43.54S	31°26'39.48E	Erven
1762	ULUNDI D	663	0	28°16'44.18S	31°26'36.56E	Erven
1763	ULUNDI D	664	0	28°16'43.75S	31°26'36.28E	Erven
1764	ULUNDI D	670	0	28°16'42.6S	31°26'33.83E	Erven
1765	ULUNDI D	2138	0	28°16'39.03S	31°26'3.95E	Erven
1766	ULUNDI D	2155	0	28°16'41.59S	31°26'2.76E	Erven
1767	ULUNDI D	2159	0	28°16'40.51S	31°26'1.32E	Erven
1768	ULUNDI D	2161	0	28°16'39.97S	31°26'0.42E	Erven
1769	ULUNDI D	2166	0	28°16'38.31S	31°25'57.83E	Erven
1770	ULUNDI D	2167	0	28°16'38.1S	31°25'57.29E	Erven
1771	ULUNDI D	2178	0	28°16'36.41S	31°25'58.55E	Erven
1772	ULUNDI D	2182	0	28°16'36.34S	31°25'57.18E	Erven
1773	ULUNDI D	2185	0	28°16'37.17S	31°25'56.03E	Erven
1774	ULUNDI D	2189	0	28°16'35.62S	31°25'56.28E	Erven
1775	ULUNDI D	2193	0	28°16'34.39S	31°25'56.14E	Erven
1776	ULUNDI D	2618	0	28°16'36.26S	31°26'3.09E	Erven
1777	ULUNDI D	2761	0	28°16'4.98S	31°26'29.87E	Erven
1778	ULUNDI D	2762	0	28°16'4.76S	31°26'30.23E	Erven
1779	ULUNDI D	2776	0	28°16'4.44S	31°26'28.43E	Erven
1780	ULUNDI D	2782	0	28°16'3.36S	31°26'28.64E	Erven
1781	ULUNDI D	2786	0	28°16'2.24S	31°26'29.87E	Erven
1782	ULUNDI D	2798	0	28°16'2.35S	31°26'26.34E	Erven
1783	ULUNDI D	2799	0	28°16'2.13S	31°26'26.7E	Erven
1784	ULUNDI D	2805	0	28°16'0.37S	31°26'27.02E	Erven
1785	ULUNDI D	2806	0	28°16'0.8S	31°26'26.52E	Erven
1786	ULUNDI D	2834	0	28°15'56.3S	31°26'22.13E	Erven
1787	ULUNDI D	2862	0	28°16'4.37S	31°26'20.4E	Erven
1788	ULUNDI D	2874	0	28°16'6.71S	31°26'18.85E	Erven
1789	ULUNDI D	2882	0	28°16'8.58S	31°26'17.45E	Erven
1790	ULUNDI D	2894	0	28°16'9.48S	31°26'19.75E	Erven

1791	ULUNDI D	2897	0	28°16'10.13S	31°26'18.64E	Erven
1792	ULUNDI D	1381	0	28°16'55.71S	31°26'31.49E	Erven
1793	ULUNDI D	1384	0	28°16'57.47S	31°26'32.17E	Erven
1794	ULUNDI D	1387	0	28°16'58.91S	31°26'32.35E	Erven
1795	ULUNDI D	1391	0	28°17'0.85S	31°26'32.61E	Erven
1796	ULUNDI D	1394	0	28°17'2S	31°26'31.63E	Erven
1797	ULUNDI D	1403	0	28°16'57.57S	31°26'31.05E	Erven
1798	ULUNDI D	1414	0	28°17'0.53S	31°26'35.37E	Erven
1799	ULUNDI D	1418	0	28°17'1.04S	31°26'34.29E	Erven
1800	ULUNDI D	1429	0	28°16'57.79S	31°26'39.44E	Erven
1801	ULUNDI D	1435	0	28°16'59.7S	31°26'40.89E	Erven
1802	ULUNDI D	1457	0	28°17'0.13S	31°26'42.65E	Erven
1803	ULUNDI D	1461	0	28°17'2.55S	31°26'40.78E	Erven
1804	ULUNDI D	1478	0	28°17'3.88S	31°26'27.89E	Erven
1805	ULUNDI D	1485	0	28°17'4.38S	31°26'22.77E	Erven
1806	ULUNDI D	1489	0	28°17'4.38S	31°26'19.79E	Erven
1807	ULUNDI D	1505	0	28°16'55.71S	31°26'21.52E	Erven
1808	ULUNDI D	1509	0	28°16'50.41S	31°26'23.17E	Erven
1809	ULUNDI D	1510	0	28°16'50.56S	31°26'23.89E	Erven
1810	ULUNDI D	1524	0	28°16'58.87S	31°26'29.58E	Erven
1811	ULUNDI D	1527	0	28°17'0.31S	31°26'29.76E	Erven
1812	ULUNDI D	1528	0	28°17'0.82S	31°26'29.83E	Erven
1813	ULUNDI D	1555	0	28°17'1.5S	31°26'25.19E	Erven
1814	ULUNDI D	1563	0	28°16'59.45S	31°26'28.53E	Erven
1815	ULUNDI D	1565	0	28°16'58.47S	31°26'28.43E	Erven
1816	ULUNDI D	1572	0	28°16'59.27S	31°26'23.25E	Erven
1817	ULUNDI D	1574	0	28°16'59.16S	31°26'24.36E	Erven
1818	ULUNDI D	1575	0	28°16'59.08S	31°26'24.9E	Erven
1819	ULUNDI D	1576	0	28°16'59.05S	31°26'25.44E	Erven
1820	ULUNDI D	1578	0	28°16'58.94S	31°26'26.52E	Erven
1821	ULUNDI D	1590	0	28°17'0.38S	31°26'21.73E	Erven
1822	ULUNDI D	682	0	28°16'47.35S	31°26'38.18E	Erven
1823	ULUNDI D	684	0	28°16'40.48S	31°26'33.07E	Erven
1824	ULUNDI D	698	0	28°16'38.07S	31°26'35.09E	Erven
1825	ULUNDI D	701	0	28°16'39.43S	31°26'35.59E	Erven
1826	ULUNDI D	2903	0	28°16'12.72S	31°26'18.24E	Erven
1827	ULUNDI D	2904	0	28°16'13.73S	31°26'18.96E	Erven
1828	ULUNDI D	2906	0	28°16'13.22S	31°26'19.79E	Erven
1829	ULUNDI D	2911	0	28°16'12.18S	31°26'21.63E	Erven
1830	ULUNDI D	2919	0	28°16'13.08S	31°26'21.77E	Erven
1831	ULUNDI D	2926	0	28°16'13.87S	31°26'22.74E	Erven
1832	ULUNDI D	2930	0	28°16'13.87S	31°26'24.36E	Erven
1833	ULUNDI D	2932	0	28°16'14.34S	31°26'23.64E	Erven
1834	ULUNDI D	2941	0	28°16'0.27S	31°26'21.73E	Erven
1835	ULUNDI D	2943	0	28°15'59.87S	31°26'22.49E	Erven
1836	ULUNDI D	2948	0	28°16'1.02S	31°26'22.31E	Erven
1837	ULUNDI D	2949	0	28°16'1.24S	31°26'21.91E	Erven
1838	ULUNDI D	2957	0	28°16'1.85S	31°26'22.92E	Erven
1839	ULUNDI D	2959	0	28°16'1.49S	31°26'23.68E	Erven
1840	ULUNDI D	2961	0	28°16'1.85S	31°26'24.43E	Erven
1841	ULUNDI D	2970	0	28°16'5.95S	31°26'20.44E	Erven
1842	ULUNDI D	2986	0	28°16'5.2S	31°26'23.14E	Erven
1843	ULUNDI D	2992	0	28°16'6.45S	31°26'20.91E	Erven
1844	ULUNDI D	3011	0	28°16'5.92S	31°26'25.87E	Erven
1845	ULUNDI D	3023	0	28°16'11.57S	31°26'18.53E	Erven
1846	ULUNDI D	3037	0	28°16'11.6S	31°26'20.18E	Erven
1847	ULUNDI D	3040	0	28°16'12.29S	31°26'19.03E	Erven
1848	ULUNDI D	3046	0	28°16'9.91S	31°26'25.55E	Erven

1849	ULUNDI D	3053	0	28°16'11.03S	31°26'25.29E	Erven
1850	ULUNDI D	3057	0	28°16'16.14S	31°26'23.06E	Erven
1851	ULUNDI D	3061	0	28°16'15.1S	31°26'24.65E	Erven
1852	ULUNDI D	3063	0	28°16'15.57S	31°26'25.51E	Erven
1853	ULUNDI D	3065	0	28°16'16S	31°26'24.76E	Erven
1854	ULUNDI D	3067	0	28°16'16.43S	31°26'24.04E	Erven
1855	ULUNDI D	1591	0	28°17'0.49S	31°26'20.87E	Erven
1856	ULUNDI D	1594	0	28°16'58.08S	31°26'17.84E	Erven
1857	ULUNDI D	1595	0	28°16'58.55S	31°26'17.66E	Erven
1858	ULUNDI D	1596	0	28°16'59.02S	31°26'17.49E	Erven
1859	ULUNDI D	1599	0	28°17'0.64S	31°26'17.09E	Erven
1860	ULUNDI D	1620	0	28°16'59.99S	31°26'15.36E	Erven
1861	ULUNDI D	1631	0	28°17'3.48S	31°26'14.35E	Erven
1862	ULUNDI D	1672	0	28°16'49.26S	31°26'19.9E	Erven
1863	ULUNDI D	1684	0	28°16'49.51S	31°26'18.71E	Erven
1864	ULUNDI D	1693	0	28°16'45.23S	31°26'20.01E	Erven
1865	ULUNDI D	1695	0	28°16'44.47S	31°26'19.32E	Erven
1866	ULUNDI D	1833	0	28°16'47.06S	31°26'39.84E	Erven
1867	ULUNDI D	1850	0	28°16'42.82S	31°26'42.07E	Erven
1868	ULUNDI D	1853	0	28°16'41.52S	31°26'42.61E	Erven
1869	ULUNDI D	1863	0	28°16'38.25S	31°26'42.58E	Erven
1870	ULUNDI D	1864	0	28°16'38.14S	31°26'41.96E	Erven
1871	ULUNDI D	1871	0	28°16'35.47S	31°26'42.86E	Erven
1872	ULUNDI D	1880	0	28°16'32.7S	31°26'42.75E	Erven
1873	ULUNDI D	1914	0	28°16'30.14S	31°26'43.22E	Erven
1874	ULUNDI D	1919	0	28°16'28.81S	31°26'44.05E	Erven
1875	ULUNDI D	1920	0	28°16'28.23S	31°26'43.59E	Erven
1876	ULUNDI D	1935	0	28°16'23.59S	31°26'44.41E	Erven
1877	ULUNDI D	1939	0	28°16'28.81S	31°26'40.06E	Erven
1878	ULUNDI D	1945	0	28°16'31.22S	31°26'41.35E	Erven
1879	ULUNDI D	1948	0	28°16'22.66S	31°26'44.59E	Erven
1880	ULUNDI D	1959	0	28°16'18.98S	31°26'45.82E	Erven
1881	ULUNDI D	1965	0	28°16'16.93S	31°26'45.96E	Erven
1882	ULUNDI D	1967	0	28°16'16.29S	31°26'45.93E	Erven
1883	ULUNDI D	703	0	28°16'40.37S	31°26'35.88E	Erven
1884	ULUNDI D	723	0	28°16'29.57S	31°26'29.14E	Erven
1885	ULUNDI D	727	0	28°16'31.44S	31°26'28.61E	Erven
1886	ULUNDI D	732	0	28°16'32.66S	31°26'34.91E	Erven
1887	ULUNDI D	738	0	28°16'31.3S	31°26'33.22E	Erven
1888	ULUNDI D	745	0	28°16'27.44S	31°26'33.11E	Erven
1889	ULUNDI D	747	0	28°16'27.16S	31°26'31.92E	Erven
1890	ULUNDI D	755	0	28°16'27.73S	31°26'34.29E	Erven
1891	ULUNDI D	772	0	28°16'36.48S	31°26'37.39E	Erven
1892	ULUNDI D	1637	0	28°17'0.56S	31°26'14.31E	Erven
1893	ULUNDI D	1642	0	28°16'58.19S	31°26'14.89E	Erven
1894	ULUNDI D	1665	0	28°16'45.95S	31°26'20.83E	Erven
1895	ULUNDI D	1667	0	28°16'46.88S	31°26'20.58E	Erven
1896	ULUNDI D	1670	0	28°16'48.33S	31°26'20.18E	Erven
1897	ULUNDI D	1673	0	28°16'49.73S	31°26'19.79E	Erven
1898	ULUNDI D	1675	0	28°16'50.7S	31°26'19.5E	Erven
1899	ULUNDI D	1681	0	28°16'50.91S	31°26'18.31E	Erven
1900	ULUNDI D	1682	0	28°16'50.45S	31°26'18.45E	Erven
1901	ULUNDI D	1687	0	28°16'48.07S	31°26'19.11E	Erven
1902	ULUNDI D	1707	0	28°16'48.39S	31°26'13.09E	Erven
1903	ULUNDI D	1712	0	28°16'48.47S	31°26'16.26E	Erven
1904	ULUNDI D	1720	0	28°16'55.42S	31°26'17.73E	Erven
1905	ULUNDI D	1824	0	28°16'51.78S	31°26'24.5E	Erven
1906	ULUNDI D	1835	0	28°16'47.6S	31°26'40.96E	Erven

1907	ULUNDI D	1836	0	28°16'46.7S	31°26'40.85E	Erven
1908	ULUNDI D	1840	0	28°16'46.34S	31°26'42.58E	Erven
1909	ULUNDI D	1841	0	28°16'45.73S	31°26'42.18E	Erven
1910	ULUNDI D	1845	0	28°16'44.22S	31°26'42.69E	Erven
1911	ULUNDI D	1851	0	28°16'42.28S	31°26'42.65E	Erven
1912	ULUNDI D	1855	0	28°16'40.88S	31°26'42.61E	Erven
1913	ULUNDI D	1866	0	28°16'37.45S	31°26'41.96E	Erven
1914	ULUNDI D	1885	0	28°16'34.28S	31°26'35.41E	Erven
1915	ULUNDI D	1907	0	28°16'54.88S	31°26'19.11E	Erven
1916	ULUNDI D	1916	0	28°16'29.5S	31°26'43.33E	Erven
1917	ULUNDI D	1917	0	28°16'29.46S	31°26'43.94E	Erven
1918	ULUNDI D	1930	0	28°16'25.1S	31°26'44.7E	Erven
1919	ULUNDI D	773	0	28°16'36.77S	31°26'36.38E	Erven
1920	ULUNDI D	777	0	28°16'34.83S	31°26'35.66E	Erven
1921	ULUNDI C	779	0	28°16'59.34S	31°25'46.13E	Erven
1922	ULUNDI D	781	0	28°16'30.47S	31°26'31.74E	Erven
1923	ULUNDI D	788	0	28°16'31.19S	31°26'30.41E	Erven
1924	ULUNDI D	791	0	28°16'29.74S	31°26'30.81E	Erven
1925	ULUNDI D	799	0	28°16'21.14S	31°26'31.49E	Erven
1926	ULUNDI D	800	0	28°16'21.61S	31°26'31.34E	Erven
1927	ULUNDI D	803	0	28°16'23.02S	31°26'30.95E	Erven
1928	ULUNDI D	804	0	28°16'23.52S	31°26'30.84E	Erven
1929	ULUNDI D	810	0	28°16'26.04S	31°26'28.07E	Erven
1930	ULUNDI D	812	0	28°16'27.12S	31°26'27.74E	Erven
1931	ULUNDI C	816	0	28°17'5.93S	31°25'38.75E	Erven
1932	ULUNDI C	820	0	28°16'54.99S	31°25'38.89E	Erven
1933	ULUNDI D	823	0	28°16'28.99S	31°26'20.22E	Erven
1934	ULUNDI C	824	0	28°16'56.21S	31°25'40.7E	Erven
1935	ULUNDI D	831	0	28°16'26.76S	31°26'19.83E	Erven
1936	ULUNDI C	832	0	28°16'59.3S	31°25'43.72E	Erven
1937	ULUNDI C	842	0	28°17'1.46S	31°25'44.26E	Erven
1938	ULUNDI C	850	0	28°16'58.47S	31°25'41.41E	Erven
1939	ULUNDI C	851	0	28°16'58.12S	31°25'41.05E	Erven
1940	ULUNDI D	1960	0	28°16'18.81S	31°26'45.27E	Erven
1941	ULUNDI D	1962	0	28°16'18.12S	31°26'45.38E	Erven
1942	ULUNDI D	1966	0	28°16'16.82S	31°26'45.38E	Erven
1943	ULUNDI D	1980	0	28°16'22.01S	31°26'42.75E	Erven
1944	ULUNDI D	1991	0	28°16'21.39S	31°26'37.65E	Erven
1945	ULUNDI D	1997	0	28°16'23.59S	31°26'35.48E	Erven
1946	ULUNDI D	2100	0	28°16'34.07S	31°25'59.12E	Erven
1947	ULUNDI D	2107	0	28°16'35S	31°26'0.49E	Erven
1948	ULUNDI D	2121	0	28°16'38.86S	31°26'1.43E	Erven
1949	ULUNDI D	2122	0	28°16'38.53S	31°26'1.71E	Erven
1950	ULUNDI D	2128	0	28°16'38.17S	31°26'3.77E	Erven
1951	ULUNDI D	2129	0	28°16'38.57S	31°26'3.27E	Erven
1952	ULUNDI D	2145	0	28°16'40.08S	31°26'4.81E	Erven
1953	ULUNDI D	2150	0	28°16'41.16S	31°26'3.95E	Erven
1954	ULUNDI D	2154	0	28°16'41.84S	31°26'3.12E	Erven
1955	ULUNDI D	2165	0	28°16'38.68S	31°25'57.36E	Erven
1956	ULUNDI D	2170	0	28°16'37.06S	31°25'58.23E	Erven
1957	ULUNDI D	2171	0	28°16'37.45S	31°25'58.58E	Erven
1958	ULUNDI D	2174	0	28°16'37.41S	31°25'59.95E	Erven
1959	ULUNDI D	2176	0	28°16'36.88S	31°25'59.27E	Erven
1960	ULUNDI D	2184	0	28°16'37.27S	31°25'56.57E	Erven
1961	ULUNDI D	2188	0	28°16'35.9S	31°25'55.96E	Erven
1962	ULUNDI D	2191	0	28°16'34.97S	31°25'56.86E	Erven
1963	ULUNDI D	854	0	28°16'27.05S	31°26'7.15E	Erven
1964	ULUNDI C	870	0	28°17'0.2S	31°25'40.84E	Erven

1965	ULUNDI C	879	0	28°17'3.73S	31°25'44.15E	Erven
1966	ULUNDI D	880	0	28°16'26.54S	31°26'5.57E	Erven
1967	ULUNDI C	886	0	28°17'2.33S	31°25'41.41E	Erven
1968	ULUNDI C	887	0	28°17'1.97S	31°25'41.05E	Erven
1969	ULUNDI C	889	0	28°17'1.21S	31°25'40.33E	Erven
1970	ULUNDI D	892	0	28°16'22.66S	31°26'5.13E	Erven
1971	ULUNDI D	894	0	28°16'23.66S	31°26'4.23E	Erven
1972	ULUNDI C	895	0	28°16'58.94S	31°25'38.21E	Erven
1973	ULUNDI D	897	0	28°16'25.21S	31°26'2.87E	Erven
1974	ULUNDI D	898	0	28°16'25.71S	31°26'2.4E	Erven
1975	ULUNDI C	900	0	28°16'57.43S	31°25'35.98E	Erven
1976	ULUNDI D	901	0	28°16'27.22S	31°26'1.03E	Erven
1977	ULUNDI C	912	0	28°17'2.55S	31°25'39.4E	Erven
1978	ULUNDI C	916	0	28°17'4.06S	31°25'40.84E	Erven
1979	ULUNDI C	919	0	28°17'5.17S	31°25'41.88E	Erven
1980	ULUNDI C	920	0	28°17'5.53S	31°25'42.38E	Erven
1981	ULUNDI D	924	0	28°16'31.12S	31°26'0.06E	Erven
1982	ULUNDI C	963	0	28°17'10.97S	31°25'52.57E	Erven
1983	ULUNDI C	964	0	28°17'10.64S	31°25'53.44E	Erven
1984	ULUNDI B	1023	0	28°17'13.92S	31°24'35.75E	Erven
1985	ULUNDI B	1025	0	28°17'21.23S	31°24'41.22E	Erven
1986	ULUNDI B	1039	0	28°17'17.2S	31°24'31.93E	Erven
1987	ULUNDI B	1050	0	28°17'26.52S	31°24'41.68E	Erven
1988	ULUNDI B	1058	0	28°17'32.57S	31°24'34.41E	Erven
1989	ULUNDI B	1062	0	28°17'31.2S	31°24'29.59E	Erven
1990	ULUNDI B	1068	0	28°17'27.49S	31°24'35.21E	Erven
1991	ULUNDI D	532	0	28°16'28.2S	31°26'37.39E	Erven
1992	ULUNDI D	550	0	28°16'35.73S	31°26'38.76E	Erven
1993	ULUNDI C	994	0	28°17'12.16S	31°25'53.15E	Erven
1994	ULUNDI C	1000	0	28°17'14.1S	31°25'53.08E	Erven
1995	ULUNDI B	1051	0	28°17'27.28S	31°24'40.75E	Erven
1996	ULUNDI D	1095	0	28°16'44.11S	31°26'16.54E	Erven
1997	ULUNDI D	1096	0	28°16'44.44S	31°26'16.94E	Erven
1998	ULUNDI D	1108	0	28°16'44.47S	31°26'14.17E	Erven
1999	ULUNDI D	554	0	28°16'33.71S	31°26'38.15E	Erven
2000	ULUNDI D	555	0	28°16'33.1S	31°26'37.93E	Erven
2001	ULUNDI D	565	0	28°16'28.45S	31°26'36.31E	Erven
2002	ULUNDI D	571	0	28°16'28.13S	31°26'40.56E	Erven
2003	ULUNDI D	574	0	28°16'28.38S	31°26'42.22E	Erven
2004	ULUNDI D	584	0	28°16'30.86S	31°26'40.06E	Erven
2005	ULUNDI B	1070	0	28°17'26.23S	31°24'38.49E	Erven
2006	ULUNDI B	1072	0	28°17'29.94S	31°24'34.38E	Erven
2007	ULUNDI B	1073	0	28°17'30.09S	31°24'32.94E	Erven
2008	ULUNDI D	1080	0	28°16'43.54S	31°26'8.13E	Erven
2009	ULUNDI D	1093	0	28°16'43.46S	31°26'15.43E	Erven
2010	ULUNDI C	1111	0	28°17'9.89S	31°25'37.06E	Erven
2011	ULUNDI D	1112	0	28°16'44.51S	31°26'11.98E	Erven
2012	ULUNDI D	1118	0	28°16'44.51S	31°26'8.66E	Erven
2013	ULUNDI D	1122	0	28°16'45.95S	31°26'9.78E	Erven
2014	ULUNDI C	1126	0	28°17'10.54S	31°25'37.89E	Erven
2015	ULUNDI D	1128	0	28°16'45.95S	31°26'13.09E	Erven
2016	ULUNDI D	1135	0	28°16'46.92S	31°26'13.09E	Erven
2017	ULUNDI D	1136	0	28°16'46.92S	31°26'12.51E	Erven
2018	ULUNDI D	1142	0	28°16'46.92S	31°26'9.24E	Erven
2019	ULUNDI B	1145	0	28°17'12.84S	31°25'7.46E	Erven
2020	ULUNDI D	1153	0	28°16'41.09S	31°26'13.6E	Erven
2021	ULUNDI D	1154	0	28°16'41.09S	31°26'14.17E	Erven
2022	ULUNDI D	1120	0	28°16'45.98S	31°26'8.7E	Erven

2023	ULUNDI D	1130	0	28°16'45.95S	31°26'14.17E	Erven
2024	ULUNDI B	1132	0	28°17'21.05S	31°24'54.68E	Erven
2025	ULUNDI D	1133	0	28°16'46.92S	31°26'14.17E	Erven
2026	ULUNDI B	1134	0	28°17'8.95S	31°24'48.13E	Erven
2027	ULUNDI B	1137	0	28°17'10.43S	31°24'55.19E	Erven
2028	ULUNDI D	1139	0	28°16'46.92S	31°26'10.89E	Erven
2029	ULUNDI C	1140	0	28°17'11.47S	31°25'39.14E	Erven
2030	ULUNDI D	1143	0	28°16'46.92S	31°26'8.7E	Erven
2031	ULUNDI D	1144	0	28°16'41.09S	31°26'8.66E	Erven
2032	ULUNDI B	1146	0	28°17'11.11S	31°25'8.65E	Erven
2033	ULUNDI B	1149	0	28°17'9.16S	31°25'9.73E	Erven
2034	ULUNDI C	1149	0	28°17'14.1S	31°25'38.1E	Erven
2035	ULUNDI D	1151	0	28°16'41.09S	31°26'12.51E	Erven
2036	ULUNDI D	1152	0	28°16'41.09S	31°26'13.06E	Erven
2037	ULUNDI C	1158	0	28°17'9.38S	31°25'44.83E	Erven
2038	ULUNDI D	1159	0	28°16'41.23S	31°26'17.23E	Erven
2039	ULUNDI B	1161	0	28°17'14.93S	31°25'19.45E	Erven
2040	ULUNDI C	1163	0	28°17'12.16S	31°25'44.79E	Erven
2041	ULUNDI B	1169	0	28°17'24.14S	31°24'32.98E	Erven
2042	ULUNDI C	1172	0	28°17'13.09S	31°25'41.52E	Erven
2043	ULUNDI B	1175	0	28°17'27.49S	31°24'46.51E	Erven
2044	ULUNDI C	1176	0	28°17'15.07S	31°25'39.36E	Erven
2045	ULUNDI D	1176	0	28°16'42.06S	31°26'9.2E	Erven
2046	ULUNDI D	1182	0	28°16'41.27S	31°26'19.54E	Erven
2047	ULUNDI D	1188	0	28°16'43.29S	31°26'21.91E	Erven
2048	ULUNDI D	1200	0	28°16'43.93S	31°26'28.1E	Erven
2049	ULUNDI D	1205	0	28°16'44.54S	31°26'30.77E	Erven
2050	ULUNDI D	1207	0	28°16'45.66S	31°26'31.6E	Erven
2051	ULUNDI D	1208	0	28°16'46.02S	31°26'31.16E	Erven
2052	ULUNDI C	1210	0	28°17'13.31S	31°25'28.74E	Erven
2053	ULUNDI C	1211	0	28°17'13.59S	31°25'27.95E	Erven
2054	ULUNDI C	1212	0	28°17'14.28S	31°25'27.44E	Erven
2055	ULUNDI D	1221	0	28°16'45.84S	31°26'24.65E	Erven
2056	ULUNDI C	1222	0	28°17'16.72S	31°25'27.81E	Erven
2057	ULUNDI C	1227	0	28°17'13.35S	31°25'27.15E	Erven
2058	ULUNDI C	1233	0	28°17'15.83S	31°25'30.29E	Erven
2059	ULUNDI D	1234	0	28°16'49.73S	31°26'27.06E	Erven
2060	ULUNDI C	1240	0	28°17'15.11S	31°25'28.88E	Erven
2061	ULUNDI C	1241	0	28°17'14.75S	31°25'28.38E	Erven
2062	ULUNDI D	1250	0	28°16'47.71S	31°26'29.11E	Erven
2063	ULUNDI D	1263	0	28°16'47.57S	31°26'31.74E	Erven
2064	ULUNDI D	1285	0	28°16'49.58S	31°26'41.35E	Erven
2065	ULUNDI D	1299	0	28°16'56.03S	31°26'40.56E	Erven
2066	ULUNDI B	1155	0	28°17'15S	31°25'13.44E	Erven
2067	ULUNDI B	1159	0	28°17'15.68S	31°25'17.69E	Erven
2068	ULUNDI D	1160	0	28°16'41.7S	31°26'17.66E	Erven
2069	ULUNDI D	1164	0	28°16'42.06S	31°26'15.83E	Erven
2070	ULUNDI D	1171	0	28°16'42.06S	31°26'11.98E	Erven
2071	ULUNDI C	1177	0	28°17'15.58S	31°25'38.89E	Erven
2072	ULUNDI C	1179	0	28°17'16.62S	31°25'38.5E	Erven
2073	ULUNDI C	1180	0	28°17'17.23S	31°25'38.79E	Erven
2074	ULUNDI C	1181	0	28°17'17.84S	31°25'39.03E	Erven
2075	ULUNDI D	1193	0	28°16'45.59S	31°26'22.63E	Erven
2076	ULUNDI D	1209	0	28°16'45.48S	31°26'30.59E	Erven
2077	ULUNDI C	1209	0	28°17'13.24S	31°25'29.67E	Erven
2078	ULUNDI D	1213	0	28°16'45.01S	31°26'28.36E	Erven
2079	ULUNDI D	1216	0	28°16'44.65S	31°26'26.77E	Erven
2080	ULUNDI C	1231	0	28°17'14.31S	31°25'29.82E	Erven

2081	ULUNDI C	1235	0	28°17'17.01S	31°25'31.37E	Erven
2082	ULUNDI D	1245	0	28°16'46.45S	31°26'28.14E	Erven
2083	ULUNDI C	1246	0	28°17'17.84S	31°25'32.37E	Erven
2084	ULUNDI D	1249	0	28°16'47.46S	31°26'29.87E	Erven
2085	ULUNDI D	1253	0	28°16'47.28S	31°26'27.35E	Erven
2086	ULUNDI D	1267	0	28°16'49S	31°26'30.26E	Erven
2087	ULUNDI D	1321	0	28°16'50.12S	31°26'35.85E	Erven
2088	ULUNDI D	1323	0	28°16'50.59S	31°26'36.85E	Erven
2089	ULUNDI D	1328	0	28°16'51.17S	31°26'39.99E	Erven
2090	ULUNDI D	1343	0	28°16'50.19S	31°26'33.79E	Erven
2091	ULUNDI D	1349	0	28°16'52.1S	31°26'34.18E	Erven
2092	ULUNDI D	1351	0	28°16'52.53S	31°26'35.16E	Erven
2093	ULUNDI D	1367	0	28°16'54.3S	31°26'37.71E	Erven
2094	ULUNDI C	1376	0	28°16'53.76S	31°25'44.22E	Erven
2095	ULUNDI D	1382	0	28°16'56.14S	31°26'32.43E	Erven
2096	ULUNDI D	1395	0	28°17'1.46S	31°26'31.56E	Erven
2097	ULUNDI D	1397	0	28°17'0.49S	31°26'31.45E	Erven
2098	ULUNDI D	1400	0	28°16'59.02S	31°26'31.27E	Erven
2099	ULUNDI D	1412	0	28°16'59.56S	31°26'35.37E	Erven
2100	ULUNDI D	1420	0	28°17'0.06S	31°26'34.23E	Erven
2101	ULUNDI D	1427	0	28°16'57.79S	31°26'38.37E	Erven
2102	ULUNDI D	1430	0	28°16'57.79S	31°26'40.02E	Erven
2103	ULUNDI D	1438	0	28°16'59.99S	31°26'39.8E	Erven
2104	ULUNDI D	1444	0	28°17'0.75S	31°26'38.15E	Erven
2105	ULUNDI D	1453	0	28°16'57.54S	31°26'42.65E	Erven
2106	ULUNDI D	1463	0	28°17'2.72S	31°26'39.19E	Erven
2107	ULUNDI D	1464	0	28°17'2.83S	31°26'38.29E	Erven
2108	ULUNDI D	1470	0	28°17'3.27S	31°26'33.9E	Erven
2109	ULUNDI D	1278	0	28°16'49.08S	31°26'37.18E	Erven
2110	ULUNDI D	1287	0	28°16'50.16S	31°26'42.4E	Erven
2111	ULUNDI D	1288	0	28°16'50.7S	31°26'42.61E	Erven
2112	ULUNDI D	1295	0	28°16'55.05S	31°26'42.72E	Erven
2113	ULUNDI D	1304	0	28°16'55.78S	31°26'37.68E	Erven
2114	ULUNDI D	1305	0	28°16'55.71S	31°26'37.14E	Erven
2115	ULUNDI D	1309	0	28°16'55.02S	31°26'34.55E	Erven
2116	ULUNDI D	1316	0	28°16'53.15S	31°26'30.95E	Erven
2117	ULUNDI D	1329	0	28°16'51.17S	31°26'40.78E	Erven
2118	ULUNDI D	1337	0	28°16'51.67S	31°26'36.81E	Erven
2119	ULUNDI D	1348	0	28°16'51.85S	31°26'33.68E	Erven
2120	ULUNDI D	1378	0	28°16'52.29S	31°26'32.28E	Erven
2121	ULUNDI C	1380	0	28°17'8.2S	31°25'55.42E	Erven
2122	ULUNDI D	1383	0	28°16'56.75S	31°26'32.1E	Erven
2123	ULUNDI D	1389	0	28°16'59.88S	31°26'32.46E	Erven
2124	ULUNDI D	1392	0	28°17'1.36S	31°26'32.67E	Erven
2125	ULUNDI D	1405	0	28°16'56.21S	31°26'31.09E	Erven
2126	ULUNDI D	1419	0	28°17'0.56S	31°26'34.26E	Erven
2127	ULUNDI D	1424	0	28°16'58.12S	31°26'34.08E	Erven
2128	ULUNDI D	1475	0	28°17'3.62S	31°26'30.26E	Erven
2129	ULUNDI D	1480	0	28°17'4.02S	31°26'26.45E	Erven
2130	ULUNDI D	1487	0	28°17'4.52S	31°26'21.34E	Erven
2131	ULUNDI D	1517	0	28°16'55.02S	31°26'29.83E	Erven
2132	ULUNDI D	1532	0	28°17'2.15S	31°26'28.61E	Erven
2133	ULUNDI D	1539	0	28°17'2.55S	31°26'24.79E	Erven
2134	ULUNDI D	1577	0	28°16'58.98S	31°26'25.98E	Erven
2135	ULUNDI D	1604	0	28°17'3.08S	31°26'17.09E	Erven
2136	ULUNDI D	1613	0	28°16'56.5S	31°26'16.73E	Erven
2137	ULUNDI D	1625	0	28°17'2.51S	31°26'15.43E	Erven
2138	ULUNDI D	1632	0	28°17'2.98S	31°26'14.31E	Erven

2139	ULUNDI D	1638	0	28°17'0.06S	31°26'14.31E	Erven
2140	ULUNDI D	1641	0	28°16'58.62S	31°26'14.71E	Erven
2141	ULUNDI D	1645	0	28°16'46.7S	31°26'22.31E	Erven
2142	ULUNDI D	1654	0	28°16'51.02S	31°26'21.12E	Erven
2143	ULUNDI D	1655	0	28°16'51.49S	31°26'20.97E	Erven
2144	ULUNDI D	1662	0	28°16'44.44S	31°26'21.02E	Erven
2145	ULUNDI D	1688	0	28°16'47.6S	31°26'19.25E	Erven
2146	ULUNDI D	1700	0	28°16'48.39S	31°26'9.24E	Erven
2147	ULUNDI D	1704	0	28°16'48.39S	31°26'11.44E	Erven
2148	ULUNDI D	1710	0	28°16'48.39S	31°26'14.75E	Erven
2149	ULUNDI D	1713	0	28°16'48.61S	31°26'16.8E	Erven
2150	ULUNDI D	1721	0	28°16'55.2S	31°26'17.2E	Erven
2151	ULUNDI D	1822	0	28°16'31.58S	31°26'21.52E	Erven
2152	ULUNDI D	1848	0	28°16'43.46S	31°26'42.07E	Erven
2153	ULUNDI D	1854	0	28°16'41.38S	31°26'42.03E	Erven
2154	ULUNDI D	1862	0	28°16'38.78S	31°26'42E	Erven
2155	ULUNDI D	1874	0	28°16'34.65S	31°26'42.43E	Erven
2156	ULUNDI D	1881	0	28°16'43.07S	31°26'40.74E	Erven
2157	ULUNDI D	1883	0	28°16'42.56S	31°26'39.99E	Erven
2158	ULUNDI D	1887	0	28°16'34.61S	31°26'33.9E	Erven
2159	ULUNDI D	1906	0	28°16'53.19S	31°26'17.92E	Erven
2160	ULUNDI D	1908	0	28°16'32.16S	31°26'43.44E	Erven
2161	ULUNDI D	1923	0	28°16'27.55S	31°26'44.26E	Erven
2162	ULUNDI D	1929	0	28°16'25.61S	31°26'44.63E	Erven
2163	ULUNDI D	1931	0	28°16'24.89S	31°26'44.16E	Erven
2164	ULUNDI D	1933	0	28°16'24.24S	31°26'44.26E	Erven
2165	ULUNDI D	1937	0	28°16'29.21S	31°26'41.5E	Erven
2166	ULUNDI D	1940	0	28°16'28.92S	31°26'39.33E	Erven
2167	ULUNDI D	1943	0	28°16'30.47S	31°26'41.28E	Erven
2168	ULUNDI D	1956	0	28°16'20.06S	31°26'45.03E	Erven
2169	ULUNDI D	1963	0	28°16'17.58S	31°26'46E	Erven
2170	ULUNDI D	1964	0	28°16'17.47S	31°26'45.42E	Erven
2171	ULUNDI D	1971	0	28°16'14.99S	31°26'45.85E	Erven
2172	ULUNDI D	1974	0	28°16'14.23S	31°26'45.24E	Erven
2173	ULUNDI D	1981	0	28°16'21.94S	31°26'42.22E	Erven
2174	ULUNDI D	1982	0	28°16'21.9S	31°26'41.57E	Erven
2175	ULUNDI D	1985	0	28°16'20.89S	31°26'40.2E	Erven
2176	ULUNDI D	1994	0	28°16'22.51S	31°26'36.56E	Erven
2177	ULUNDI D	1998	0	28°16'23.99S	31°26'35.13E	Erven
2178	ULUNDI D	2008	0	28°16'30.32S	31°26'33.47E	Erven
2179	ULUNDI D	2011	0	28°16'31.3S	31°26'34.4E	Erven
2180	ULUNDI D	2091	0	28°16'32.13S	31°25'56.71E	Erven
2181	ULUNDI D	2099	0	28°16'33.82S	31°25'58.76E	Erven
2182	ULUNDI D	2101	0	28°16'34.65S	31°25'58.69E	Erven
2183	ULUNDI D	2106	0	28°16'35.51S	31°25'59.91E	Erven
2184	ULUNDI D	2112	0	28°16'35.36S	31°26'1.68E	Erven
2185	ULUNDI D	2130	0	28°16'38.86S	31°26'2.94E	Erven
2186	ULUNDI D	2131	0	28°16'39.18S	31°26'2.69E	Erven
2187	ULUNDI D	2146	0	28°16'39.87S	31°26'4.49E	Erven
2188	ULUNDI D	2149	0	28°16'41.38S	31°26'4.27E	Erven
2189	ULUNDI D	2153	0	28°16'42.13S	31°26'3.44E	Erven
2190	ULUNDI D	2156	0	28°16'41.34S	31°26'2.43E	Erven
2191	ULUNDI D	2163	0	28°16'39.54S	31°25'59.38E	Erven
2192	ULUNDI D	2179	0	28°16'36.16S	31°25'58.23E	Erven
2193	ULUNDI D	2183	0	28°16'36.66S	31°25'56.96E	Erven
2194	ULUNDI D	2186	0	28°16'36.84S	31°25'55.63E	Erven
2195	ULUNDI D	2187	0	28°16'36.37S	31°25'55.42E	Erven
2196	ULUNDI D	2614	0	28°16'54.62S	31°26'5.68E	Erven

2197	ULUNDI D	2756	0	28°16'5.92S	31°26'31.2E	Erven
2198	ULUNDI D	2764	0	28°16'5.16S	31°26'31.09E	Erven
2199	ULUNDI D	2765	0	28°16'4.83S	31°26'31.66E	Erven
2200	ULUNDI D	2770	0	28°16'2.97S	31°26'30.7E	Erven
2201	ULUNDI D	2779	0	28°16'3.97S	31°26'27.57E	Erven
2202	ULUNDI D	2783	0	28°16'3.14S	31°26'29.04E	Erven
2203	ULUNDI D	2785	0	28°16'2.57S	31°26'30.23E	Erven
2204	ULUNDI D	2787	0	28°16'1.96S	31°26'29.29E	Erven
2205	ULUNDI D	2794	0	28°16'3.25S	31°26'26.48E	Erven
2206	ULUNDI D	2795	0	28°16'3.47S	31°26'26.01E	Erven
2207	ULUNDI D	2797	0	28°16'2.57S	31°26'25.98E	Erven
2208	ULUNDI D	2766	0	28°16'4.26S	31°26'31.38E	Erven
2209	ULUNDI D	2788	0	28°16'1.74S	31°26'28.82E	Erven
2210	ULUNDI D	2790	0	28°16'2.39S	31°26'27.96E	Erven
2211	ULUNDI D	2802	0	28°16'1.34S	31°26'28.36E	Erven
2212	ULUNDI D	2809	0	28°16'1.45S	31°26'25.37E	Erven
2213	ULUNDI D	2812	0	28°16'0.34S	31°26'25.66E	Erven
2214	ULUNDI D	2813	0	28°16'0.08S	31°26'26.45E	Erven
2215	ULUNDI D	2830	0	28°15'57.09S	31°26'23.49E	Erven
2216	ULUNDI D	2839	0	28°15'58.89S	31°26'21.77E	Erven
2217	ULUNDI D	2847	0	28°16'2.24S	31°26'19.97E	Erven
2218	ULUNDI D	2851	0	28°16'3.4S	31°26'18.42E	Erven
2219	ULUNDI D	2853	0	28°16'4.54S	31°26'18.45E	Erven
2220	ULUNDI D	2854	0	28°16'4.33S	31°26'18.82E	Erven
2221	ULUNDI D	2859	0	28°16'3.25S	31°26'20.69E	Erven
2222	ULUNDI D	2860	0	28°16'3.9S	31°26'21.16E	Erven
2223	ULUNDI D	2867	0	28°16'5.41S	31°26'18.56E	Erven
2224	ULUNDI D	2873	0	28°16'6.93S	31°26'18.45E	Erven
2225	ULUNDI D	2879	0	28°16'7.86S	31°26'18.56E	Erven
2226	ULUNDI D	2885	0	28°16'9.41S	31°26'18.5E	Erven
2227	ULUNDI D	2886	0	28°16'9.01S	31°26'18.89E	Erven
2228	ULUNDI D	2895	0	28°16'9.69S	31°26'19.35E	Erven
2229	ULUNDI D	2905	0	28°16'13.48S	31°26'19.35E	Erven
2230	ULUNDI D	2909	0	28°16'12.58S	31°26'20.91E	Erven
2231	ULUNDI D	2923	0	28°16'14.62S	31°26'21.34E	Erven
2232	ULUNDI D	2937	0	28°16'1.17S	31°26'20.25E	Erven
2233	ULUNDI D	2947	0	28°16'0.73S	31°26'22.63E	Erven
2234	ULUNDI D	2951	0	28°16'1.6S	31°26'21.16E	Erven
2235	ULUNDI D	2960	0	28°16'1.27S	31°26'24.1E	Erven
2236	ULUNDI D	2965	0	28°16'2.64S	31°26'23.49E	Erven
2237	ULUNDI D	2980	0	28°16'3.65S	31°26'24.36E	Erven
2238	ULUNDI D	3003	0	28°16'5.7S	31°26'24.61E	Erven
2239	ULUNDI D	3013	0	28°16'6.38S	31°26'25.11E	Erven
2240	ULUNDI D	3014	0	28°16'6.6S	31°26'24.72E	Erven
2241	ULUNDI D	3018	0	28°16'7.46S	31°26'23.21E	Erven
2242	ULUNDI D	3034	0	28°16'10.99S	31°26'21.26E	Erven
2243	ULUNDI D	3035	0	28°16'11.17S	31°26'20.91E	Erven
2244	ULUNDI D	3039	0	28°16'12.04S	31°26'19.43E	Erven
2245	ULUNDI D	3047	0	28°16'9.69S	31°26'25.91E	Erven
2246	ULUNDI D	3049	0	28°16'10.13S	31°26'26.84E	Erven
2247	ULUNDI D	3079	0	28°16'17.08S	31°26'28.57E	Erven
2248	ULUNDI D	3090	0	28°16'15.82S	31°26'28.82E	Erven
2249	ULUNDI D	3093	0	28°16'15.6S	31°26'27.46E	Erven
2250	ULUNDI D	3094	0	28°16'15.24S	31°26'27.02E	Erven
2251	ULUNDI D	3097	0	28°16'14.34S	31°26'25.98E	Erven
2252	ULUNDI D	3102	0	28°16'13.19S	31°26'27.96E	Erven
2253	ULUNDI D	3105	0	28°16'14.3S	31°26'27.71E	Erven
2254	ULUNDI D	3112	0	28°16'14.59S	31°26'31.05E	Erven

2255	ULUNDI D	3113	0	28°16'14.05S	31°26'31.02E	Erven
2256	ULUNDI D	3135	0	28°16'12.54S	31°26'26.73E	Erven
2257	ULUNDI D	3148	0	28°16'10.92S	31°26'27.85E	Erven
2258	ULUNDI D	3151	0	28°16'10.24S	31°26'29E	Erven
2259	ULUNDI D	3164	0	28°16'8.69S	31°26'27.49E	Erven
2260	ULUNDI D	3171	0	28°16'9.58S	31°26'23.68E	Erven
2261	ULUNDI D	3191	0	28°16'7.61S	31°26'27.2E	Erven
2262	ULUNDI D	1426	0	28°16'57.79S	31°26'37.79E	Erven
2263	ULUNDI D	1431	0	28°16'57.54S	31°26'40.81E	Erven
2264	ULUNDI D	1432	0	28°16'58.01S	31°26'40.85E	Erven
2265	ULUNDI D	1441	0	28°16'58.62S	31°26'38.44E	Erven
2266	ULUNDI D	1445	0	28°17'1.32S	31°26'38.11E	Erven
2267	ULUNDI D	1447	0	28°17'0.75S	31°26'37.03E	Erven
2268	ULUNDI D	1450	0	28°16'59.23S	31°26'36.99E	Erven
2269	ULUNDI D	1455	0	28°16'58.84S	31°26'42.69E	Erven
2270	ULUNDI D	1493	0	28°17'1.97S	31°26'19.11E	Erven
2271	ULUNDI D	1512	0	28°16'50.81S	31°26'25.05E	Erven
2272	ULUNDI D	1516	0	28°16'54.48S	31°26'30.15E	Erven
2273	ULUNDI D	1529	0	28°17'1.28S	31°26'29.87E	Erven
2274	ULUNDI D	1537	0	28°17'2.44S	31°26'25.87E	Erven
2275	ULUNDI D	1549	0	28°17'1.82S	31°26'21.91E	Erven
2276	ULUNDI D	1552	0	28°17'1.68S	31°26'23.57E	Erven
2277	ULUNDI D	1559	0	28°17'1.28S	31°26'27.39E	Erven
2278	ULUNDI D	1573	0	28°16'59.19S	31°26'23.78E	Erven
2279	ULUNDI D	1580	0	28°16'59.85S	31°26'27.2E	Erven
2280	ULUNDI D	1598	0	28°17'0.03S	31°26'17.05E	Erven
2281	ULUNDI D	1600	0	28°17'1.14S	31°26'17.09E	Erven
2282	ULUNDI D	1611	0	28°17'2.55S	31°26'11.58E	Erven
2283	ULUNDI D	1617	0	28°16'58.52S	31°26'15.93E	Erven
2284	ULUNDI D	1618	0	28°16'58.98S	31°26'15.72E	Erven
2285	ULUNDI D	1624	0	28°17'2S	31°26'15.43E	Erven
2286	ULUNDI D	1630	0	28°17'3.95S	31°26'14.35E	Erven
2287	ULUNDI D	1635	0	28°17'1.54S	31°26'14.31E	Erven
2288	ULUNDI D	1636	0	28°17'1.04S	31°26'14.31E	Erven
2289	ULUNDI D	1649	0	28°16'48.65S	31°26'21.77E	Erven
2290	ULUNDI D	1656	0	28°16'52S	31°26'20.87E	Erven
2291	ULUNDI D	1659	0	28°16'43.43S	31°26'19.72E	Erven
2292	ULUNDI D	1668	0	28°16'47.35S	31°26'20.44E	Erven
2293	ULUNDI D	1674	0	28°16'50.19S	31°26'19.64E	Erven
2294	ULUNDI D	1678	0	28°16'52.14S	31°26'19.11E	Erven
2295	ULUNDI D	1683	0	28°16'49.98S	31°26'18.56E	Erven
2296	ULUNDI D	1692	0	28°16'45.73S	31°26'19.75E	Erven
2297	ULUNDI D	1698	0	28°16'48.39S	31°26'8.13E	Erven
2298	ULUNDI D	1699	0	28°16'48.39S	31°26'8.7E	Erven
2299	ULUNDI D	1705	0	28°16'48.39S	31°26'11.98E	Erven
2300	ULUNDI D	1706	0	28°16'48.39S	31°26'12.55E	Erven
2301	ULUNDI D	1711	0	28°16'48.36S	31°26'15.5E	Erven
2302	ULUNDI D	1847	0	28°16'43.57S	31°26'42.65E	Erven
2303	ULUNDI D	1860	0	28°16'39.43S	31°26'42E	Erven
2304	ULUNDI D	1867	0	28°16'36.84S	31°26'42.61E	Erven
2305	ULUNDI D	1875	0	28°16'34.21S	31°26'43.08E	Erven
2306	ULUNDI D	1879	0	28°16'32.92S	31°26'43.3E	Erven
2307	ULUNDI D	1886	0	28°16'34.43S	31°26'34.51E	Erven
2308	ULUNDI D	1891	0	28°16'35.4S	31°26'30.88E	Erven
2309	ULUNDI D	1897	0	28°16'33.53S	31°26'30.3E	Erven
2310	ULUNDI D	1898	0	28°16'33.67S	31°26'30.84E	Erven
2311	ULUNDI D	1899	0	28°16'33.78S	31°26'31.38E	Erven
2312	ULUNDI D	1901	0	28°16'33.93S	31°26'32.57E	Erven

2313	ULUNDI D	1918	0	28°16'28.89S	31°26'43.44E	Erven
2314	ULUNDI D	1934	0	28°16'23.81S	31°26'44.95E	Erven
2315	ULUNDI D	1942	0	28°16'30.32S	31°26'40.7E	Erven
2316	ULUNDI D	1946	0	28°16'30.18S	31°26'24.5E	Erven
2317	ULUNDI D	1954	0	28°16'20.72S	31°26'44.92E	Erven
2318	ULUNDI D	1957	0	28°16'19.63S	31°26'45.71E	Erven
2319	ULUNDI D	1969	0	28°16'15.63S	31°26'45.89E	Erven
2320	ULUNDI D	1979	0	28°16'22.08S	31°26'43.33E	Erven
2321	ULUNDI D	1992	0	28°16'21.76S	31°26'37.28E	Erven
2322	ULUNDI D	1996	0	28°16'23.24S	31°26'35.85E	Erven
2323	ULUNDI D	2002	0	28°16'24.96S	31°26'33.33E	Erven
2324	ULUNDI D	2003	0	28°16'24.81S	31°26'32.67E	Erven
2325	ULUNDI D	2004	0	28°16'24.67S	31°26'31.99E	Erven
2326	ULUNDI D	2010	0	28°16'30.14S	31°26'34.26E	Erven
2327	ULUNDI D	2090	0	28°16'32.74S	31°25'56.24E	Erven
2328	ULUNDI D	2104	0	28°16'34.65S	31°25'59.99E	Erven
2329	ULUNDI D	2115	0	28°16'37.35S	31°26'1.57E	Erven
2330	ULUNDI D	2116	0	28°16'37.7S	31°26'1.28E	Erven
2331	ULUNDI D	2139	0	28°16'38.53S	31°26'4.23E	Erven
2332	ULUNDI D	2140	0	28°16'38.6S	31°26'4.71E	Erven
2333	ULUNDI D	2143	0	28°16'39.54S	31°26'5.85E	Erven
2334	ULUNDI D	2151	0	28°16'40.88S	31°26'3.59E	Erven
2335	ULUNDI D	2169	0	28°16'36.91S	31°25'57.65E	Erven
2336	ULUNDI D	2181	0	28°16'36.01S	31°25'57.47E	Erven
2337	ULUNDI D	2771	0	28°16'3.4S	31°26'30.26E	Erven
2338	ULUNDI D	2772	0	28°16'3.61S	31°26'29.91E	Erven
2339	ULUNDI D	2777	0	28°16'4.69S	31°26'27.92E	Erven
2340	ULUNDI D	2781	0	28°16'3.58S	31°26'28.29E	Erven
2341	ULUNDI D	2784	0	28°16'2.97S	31°26'29.62E	Erven
2342	ULUNDI D	2792	0	28°16'2.82S	31°26'27.2E	Erven
2343	ULUNDI D	2803	0	28°16'0.98S	31°26'28E	Erven
2344	ULUNDI D	2808	0	28°16'1.24S	31°26'25.8E	Erven
2345	ULUNDI D	3071	0	28°16'16.72S	31°26'25.87E	Erven
2346	ULUNDI D	3072	0	28°16'16.5S	31°26'26.27E	Erven
2347	ULUNDI D	3073	0	28°16'16.32S	31°26'26.67E	Erven
2348	ULUNDI D	3078	0	28°16'17.04S	31°26'28.21E	Erven
2349	ULUNDI D	3086	0	28°16'16.18S	31°26'30.52E	Erven
2350	ULUNDI D	3107	0	28°16'14.91S	31°26'28.61E	Erven
2351	ULUNDI D	3127	0	28°16'10.64S	31°26'30.09E	Erven
2352	ULUNDI D	3133	0	28°16'12.1S	31°26'27.46E	Erven
2353	ULUNDI D	3136	0	28°16'12.76S	31°26'26.38E	Erven
2354	ULUNDI D	3152	0	28°16'10.06S	31°26'29.4E	Erven
2355	ULUNDI D	3153	0	28°16'9.8S	31°26'29.8E	Erven
2356	ULUNDI D	3155	0	28°16'8.9S	31°26'30.37E	Erven
2357	ULUNDI D	3165	0	28°16'7.83S	31°26'26.84E	Erven
2358	ULUNDI D	3169	0	28°16'9.12S	31°26'24.47E	Erven
2359	ULUNDI D	3178	0	28°16'8.44S	31°26'23.93E	Erven
2360	ULUNDI D	3192	0	28°16'8.47S	31°26'27.89E	Erven
2361	ULUNDI D	3193	0	28°16'8.29S	31°26'28.29E	Erven
2362	ULUNDI D	3194	0	28°16'8.01S	31°26'28.61E	Erven
2363	ULUNDI D	3195	0	28°16'7.75S	31°26'28.93E	Erven
2364	ULUNDI D	3197	0	28°16'7.17S	31°26'30.44E	Erven
2365	ULUNDI D	653	0	28°16'44.18S	31°26'37.79E	Erven
2366	ULUNDI D	686	0	28°16'39.54S	31°26'32.75E	Erven
2367	ULUNDI D	691	0	28°16'37.24S	31°26'31.92E	Erven
2368	ULUNDI D	712	0	28°16'36.95S	31°26'33.54E	Erven
2369	ULUNDI D	719	0	28°16'27.66S	31°26'29.69E	Erven
2370	ULUNDI D	739	0	28°16'30.8S	31°26'33.33E	Erven

2371	ULUNDI D	748	0	28°16'27.05S	31°26'31.34E	Erven
2372	ULUNDI D	751	0	28°16'26.33S	31°26'32.71E	Erven
2373	ULUNDI C	769	0	28°17'6.54S	31°25'44.47E	Erven
2374	ULUNDI C	770	0	28°17'5.71S	31°25'44.58E	Erven
2375	ULUNDI C	774	0	28°17'3.16S	31°25'46.85E	Erven
2376	ULUNDI C	776	0	28°17'1.68S	31°25'48E	Erven
2377	ULUNDI C	783	0	28°16'56.85S	31°25'43.79E	Erven
2378	ULUNDI C	789	0	28°16'53.43S	31°25'39.69E	Erven
2379	ULUNDI C	790	0	28°16'52.93S	31°25'38.96E	Erven
2380	ULUNDI C	792	0	28°16'53.76S	31°25'37.34E	Erven
2381	ULUNDI D	801	0	28°16'22.08S	31°26'31.24E	Erven
2382	ULUNDI D	807	0	28°16'21.68S	31°26'25.44E	Erven
2383	ULUNDI D	808	0	28°16'25.1S	31°26'28.32E	Erven
2384	ULUNDI C	813	0	28°17'4.63S	31°25'37.67E	Erven
2385	ULUNDI C	815	0	28°17'5.39S	31°25'38.5E	Erven
2386	ULUNDI D	816	0	28°16'26.11S	31°26'24.07E	Erven
2387	ULUNDI D	830	0	28°16'27.37S	31°26'19.57E	Erven
2388	ULUNDI D	832	0	28°16'26S	31°26'20.11E	Erven
2389	ULUNDI D	834	0	28°16'25.39S	31°26'21.58E	Erven
2390	ULUNDI D	835	0	28°16'25.25S	31°26'22.31E	Erven
2391	ULUNDI C	836	0	28°17'0.82S	31°25'45.12E	Erven
2392	ULUNDI D	837	0	28°16'24.92S	31°26'23.75E	Erven
2393	ULUNDI D	849	0	28°16'24.89S	31°26'8.48E	Erven
2394	ULUNDI D	850	0	28°16'25.32S	31°26'8.23E	Erven
2395	ULUNDI D	851	0	28°16'25.76S	31°26'7.94E	Erven
2396	ULUNDI D	853	0	28°16'26.61S	31°26'7.44E	Erven
2397	ULUNDI D	855	0	28°16'27.48S	31°26'6.9E	Erven
2398	ULUNDI D	863	0	28°16'30.9S	31°26'4.78E	Erven
2399	ULUNDI D	867	0	28°16'33.24S	31°26'3.73E	Erven
2400	ULUNDI C	883	0	28°17'3.45S	31°25'42.45E	Erven
2401	ULUNDI D	886	0	28°16'27.09S	31°26'3.66E	Erven
2402	ULUNDI D	887	0	28°16'26.58S	31°26'4.09E	Erven
2403	ULUNDI D	2768	0	28°16'3.58S	31°26'31.63E	Erven
2404	ULUNDI D	2774	0	28°16'4.01S	31°26'29.14E	Erven
2405	ULUNDI D	2775	0	28°16'4.22S	31°26'28.79E	Erven
2406	ULUNDI D	2796	0	28°16'2.93S	31°26'25.55E	Erven
2407	ULUNDI D	2800	0	28°16'1.96S	31°26'27.1E	Erven
2408	ULUNDI D	2815	0	28°15'59.26S	31°26'25.91E	Erven
2409	ULUNDI D	2816	0	28°15'58.93S	31°26'25.48E	Erven
2410	ULUNDI D	2818	0	28°15'59.61S	31°26'24.58E	Erven
2411	ULUNDI D	2823	0	28°15'58.5S	31°26'25.08E	Erven
2412	ULUNDI D	2824	0	28°15'58.04S	31°26'24.83E	Erven
2413	ULUNDI D	2825	0	28°15'57.49S	31°26'24.25E	Erven
2414	ULUNDI D	2829	0	28°15'57.6S	31°26'22.77E	Erven
2415	ULUNDI D	2842	0	28°15'59.44S	31°26'20.62E	Erven
2416	ULUNDI D	2850	0	28°16'2.86S	31°26'18.67E	Erven
2417	ULUNDI D	2864	0	28°16'4.87S	31°26'19.72E	Erven
2418	ULUNDI D	2872	0	28°16'7.17S	31°26'18.06E	Erven
2419	ULUNDI D	2876	0	28°16'7.14S	31°26'19.75E	Erven
2420	ULUNDI D	2888	0	28°16'8.58S	31°26'19.61E	Erven
2421	ULUNDI D	2910	0	28°16'12.39S	31°26'21.26E	Erven
2422	ULUNDI D	2913	0	28°16'11.75S	31°26'22.38E	Erven
2423	ULUNDI D	2921	0	28°16'13.51S	31°26'21.05E	Erven
2424	ULUNDI D	2922	0	28°16'13.8S	31°26'20.62E	Erven
2425	ULUNDI D	2934	0	28°16'14.77S	31°26'22.88E	Erven
2426	ULUNDI D	2938	0	28°16'0.91S	31°26'20.62E	Erven
2427	ULUNDI D	2939	0	28°16'0.69S	31°26'21.02E	Erven
2428	ULUNDI D	2810	0	28°16'0.8S	31°26'24.9E	Erven

2429	ULUNDI D	2817	0	28°15'59.4S	31°26'24.94E	Erven
2430	ULUNDI D	2822	0	28°15'58.72S	31°26'24.43E	Erven
2431	ULUNDI D	2831	0	28°15'56.7S	31°26'23.03E	Erven
2432	ULUNDI D	2840	0	28°15'59.11S	31°26'21.41E	Erven
2433	ULUNDI D	2861	0	28°16'4.15S	31°26'20.8E	Erven
2434	ULUNDI D	2869	0	28°16'5.84S	31°26'17.84E	Erven
2435	ULUNDI D	2871	0	28°16'7.68S	31°26'17.52E	Erven
2436	ULUNDI D	2877	0	28°16'7.39S	31°26'19.35E	Erven
2437	ULUNDI D	2880	0	28°16'8.07S	31°26'18.17E	Erven
2438	ULUNDI D	2883	0	28°16'9.84S	31°26'17.41E	Erven
2439	ULUNDI D	2902	0	28°16'12.04S	31°26'17.73E	Erven
2440	ULUNDI D	2914	0	28°16'11.53S	31°26'22.74E	Erven
2441	ULUNDI D	2925	0	28°16'14.09S	31°26'22.38E	Erven
2442	ULUNDI D	2928	0	28°16'13.44S	31°26'23.49E	Erven
2443	ULUNDI D	2929	0	28°16'13.22S	31°26'23.89E	Erven
2444	ULUNDI D	2933	0	28°16'14.56S	31°26'23.25E	Erven
2445	ULUNDI D	2936	0	28°16'15.31S	31°26'21.95E	Erven
2446	ULUNDI D	2952	0	28°16'1.85S	31°26'20.73E	Erven
2447	ULUNDI D	2978	0	28°16'4.04S	31°26'23.39E	Erven
2448	ULUNDI D	2979	0	28°16'3.83S	31°26'23.78E	Erven
2449	ULUNDI D	2989	0	28°16'5.84S	31°26'21.98E	Erven
2450	ULUNDI D	2991	0	28°16'6.28S	31°26'21.26E	Erven
2451	ULUNDI D	2996	0	28°16'7.25S	31°26'21.95E	Erven
2452	ULUNDI D	2997	0	28°16'7.03S	31°26'22.31E	Erven
2453	ULUNDI D	3015	0	28°16'6.82S	31°26'24.36E	Erven
2454	ULUNDI D	3024	0	28°16'11.35S	31°26'18.92E	Erven
2455	ULUNDI D	3030	0	28°16'10.06S	31°26'21.12E	Erven
2456	ULUNDI D	3044	0	28°16'10.35S	31°26'24.76E	Erven
2457	ULUNDI D	890	0	28°16'24.89S	31°26'5.46E	Erven
2458	ULUNDI D	891	0	28°16'24.09S	31°26'6.11E	Erven
2459	ULUNDI D	895	0	28°16'24.17S	31°26'3.77E	Erven
2460	ULUNDI C	897	0	28°16'58.33S	31°25'37.31E	Erven
2461	ULUNDI D	904	0	28°16'28.78S	31°25'59.7E	Erven
2462	ULUNDI D	905	0	28°16'29.28S	31°25'59.23E	Erven
2463	ULUNDI C	917	0	28°17'4.41S	31°25'41.2E	Erven
2464	ULUNDI C	927	0	28°17'3.59S	31°25'38.89E	Erven
2465	ULUNDI C	930	0	28°17'2.47S	31°25'37.81E	Erven
2466	ULUNDI C	933	0	28°17'1.36S	31°25'36.77E	Erven
2467	ULUNDI C	941	0	28°17'9.1S	31°25'57.22E	Erven
2468	ULUNDI D	3051	0	28°16'10.59S	31°26'26.05E	Erven
2469	ULUNDI D	3055	0	28°16'11.49S	31°26'24.5E	Erven
2470	ULUNDI D	3070	0	28°16'16.93S	31°26'25.51E	Erven
2471	ULUNDI D	3083	0	28°16'17.29S	31°26'30.19E	Erven
2472	ULUNDI D	3088	0	28°16'16S	31°26'29.65E	Erven
2473	ULUNDI D	3089	0	28°16'15.89S	31°26'29.25E	Erven
2474	ULUNDI D	3096	0	28°16'14.73S	31°26'26.52E	Erven
2475	ULUNDI D	3099	0	28°16'13.83S	31°26'26.84E	Erven
2476	ULUNDI D	3111	0	28°16'15.2S	31°26'30.91E	Erven
2477	ULUNDI D	3115	0	28°16'12.65S	31°26'30.77E	Erven
2478	ULUNDI D	3122	0	28°16'12.32S	31°26'29.43E	Erven
2479	ULUNDI D	3137	0	28°16'12.97S	31°26'25.98E	Erven
2480	ULUNDI D	3139	0	28°16'13.4S	31°26'25.19E	Erven
2481	ULUNDI D	3141	0	28°16'12.5S	31°26'25.11E	Erven
2482	ULUNDI D	3142	0	28°16'12.29S	31°26'25.48E	Erven
2483	ULUNDI D	3154	0	28°16'9.52S	31°26'30.3E	Erven
2484	ULUNDI D	3157	0	28°16'8.36S	31°26'29.54E	Erven
2485	ULUNDI D	3168	0	28°16'8.9S	31°26'24.87E	Erven
2486	ULUNDI D	3176	0	28°16'8.87S	31°26'23.17E	Erven

2487	ULUNDI C	965	0	28°17'10.25S	31°25'54.3E	Erven
2488	ULUNDI C	989	0	28°17'13.2S	31°25'57.47E	Erven
2489	ULUNDI C	995	0	28°17'12.48S	31°25'52.32E	Erven
2490	ULUNDI C	1001	0	28°17'13.78S	31°25'53.91E	Erven
2491	ULUNDI B	1052	0	28°17'27.96S	31°24'39.71E	Erven
2492	ULUNDI B	1053	0	28°17'28.9S	31°24'38.99E	Erven
2493	ULUNDI B	1054	0	28°17'29.83S	31°24'38.27E	Erven
2494	ULUNDI B	1055	0	28°17'30.8S	31°24'37.59E	Erven
2495	ULUNDI B	1059	0	28°17'32.46S	31°24'33.16E	Erven
2496	ULUNDI B	1064	0	28°17'29.37S	31°24'30.17E	Erven
2497	ULUNDI D	1081	0	28°16'43.54S	31°26'8.66E	Erven
2498	ULUNDI D	1085	0	28°16'43.54S	31°26'10.86E	Erven
2499	ULUNDI D	1086	0	28°16'43.54S	31°26'11.44E	Erven
2500	ULUNDI D	1098	0	28°16'45.19S	31°26'17.88E	Erven
2501	ULUNDI D	1106	0	28°16'44.69S	31°26'15.72E	Erven
2502	ULUNDI D	1114	0	28°16'44.51S	31°26'10.86E	Erven
2503	ULUNDI C	1116	0	28°17'7.48S	31°25'39.61E	Erven
2504	ULUNDI D	1119	0	28°16'44.51S	31°26'8.13E	Erven
2505	ULUNDI B	1120	0	28°17'12.95S	31°24'40.14E	Erven
2506	ULUNDI B	1129	0	28°17'20.4S	31°24'51.01E	Erven
2507	ULUNDI B	1130	0	28°17'20.72S	31°24'52.16E	Erven
2508	ULUNDI C	1130	0	28°17'12.52S	31°25'35.98E	Erven
2509	ULUNDI B	1135	0	28°17'9.16S	31°24'49.32E	Erven
2510	ULUNDI D	1137	0	28°16'46.92S	31°26'11.98E	Erven
2511	ULUNDI C	1139	0	28°17'11.97S	31°25'38.68E	Erven
2512	ULUNDI B	1140	0	28°17'8.81S	31°25'5.52E	Erven
2513	ULUNDI D	1140	0	28°16'46.92S	31°26'10.32E	Erven
2514	ULUNDI B	1142	0	28°17'12.59S	31°25'3.58E	Erven
2515	ULUNDI B	1147	0	28°17'10.39S	31°25'9.27E	Erven
2516	ULUNDI D	1150	0	28°16'41.09S	31°26'11.98E	Erven
2517	ULUNDI C	1155	0	28°17'7.91S	31°25'43.89E	Erven
2518	ULUNDI B	1156	0	28°17'15.26S	31°25'14.63E	Erven
2519	ULUNDI D	1158	0	28°16'41.02S	31°26'16.51E	Erven
2520	ULUNDI C	1159	0	28°17'10S	31°25'45.08E	Erven
2521	ULUNDI D	1167	0	28°16'42.06S	31°26'14.17E	Erven
2522	ULUNDI B	1178	0	28°17'32.03S	31°24'47.3E	Erven
2523	ULUNDI C	1183	0	28°17'16.37S	31°25'43.97E	Erven
2524	ULUNDI D	1184	0	28°16'41.92S	31°26'20.33E	Erven
2525	ULUNDI B	1184	0	28°17'30.7S	31°24'43.88E	Erven
2526	ULUNDI C	1189	0	28°17'19.29S	31°25'28.52E	Erven
2527	ULUNDI D	1197	0	28°16'43.61S	31°26'26.48E	Erven
2528	ULUNDI D	1210	0	28°16'45.34S	31°26'29.98E	Erven
2529	ULUNDI D	1212	0	28°16'45.12S	31°26'28.9E	Erven
2530	ULUNDI C	1214	0	28°17'15.72S	31°25'27.84E	Erven
2531	ULUNDI D	1217	0	28°16'44.54S	31°26'26.23E	Erven
2532	ULUNDI C	1218	0	28°17'18.06S	31°25'29.96E	Erven
2533	ULUNDI D	1219	0	28°16'44.62S	31°26'24.9E	Erven
2534	ULUNDI D	1222	0	28°16'46.53S	31°26'24.43E	Erven
2535	ULUNDI C	1225	0	28°17'14.82S	31°25'26.51E	Erven
2536	ULUNDI D	1229	0	28°16'48.68S	31°26'26.77E	Erven
2537	ULUNDI D	1232	0	28°16'48.94S	31°26'28.43E	Erven
2538	ULUNDI D	1233	0	28°16'49.77S	31°26'27.63E	Erven
2539	ULUNDI D	1239	0	28°16'49.15S	31°26'24.29E	Erven
2540	ULUNDI D	1244	0	28°16'46.34S	31°26'27.6E	Erven
2541	ULUNDI C	1248	0	28°17'19.03S	31°25'32.34E	Erven
2542	ULUNDI D	1255	0	28°16'47.06S	31°26'26.27E	Erven
2543	ULUNDI D	1256	0	28°16'46.92S	31°26'25.77E	Erven
2544	ULUNDI C	1261	0	28°17'19.86S	31°25'33.06E	Erven

2545	ULUNDI D	1264	0	28°16'47.93S	31°26'31.34E	Erven
2546	ULUNDI C	1279	0	28°17'19.43S	31°25'35E	Erven
2547	ULUNDI D	1284	0	28°16'49.69S	31°26'40.63E	Erven
2548	ULUNDI D	1289	0	28°16'51.38S	31°26'42.54E	Erven
2549	ULUNDI D	1302	0	28°16'56.03S	31°26'38.76E	Erven
2550	ULUNDI D	1307	0	28°16'55.49S	31°26'36.06E	Erven
2551	ULUNDI D	1312	0	28°16'54.33S	31°26'33.07E	Erven
2552	ULUNDI D	1314	0	28°16'53.87S	31°26'32.1E	Erven
2553	ULUNDI D	1320	0	28°16'49.91S	31°26'35.37E	Erven
2554	ULUNDI D	1336	0	28°16'51.74S	31°26'37.36E	Erven
2555	ULUNDI D	1338	0	28°16'51.42S	31°26'36.31E	Erven
2556	ULUNDI D	1345	0	28°16'50.91S	31°26'32.24E	Erven
2557	ULUNDI D	1355	0	28°16'53.26S	31°26'37.39E	Erven
2558	ULUNDI D	1357	0	28°16'53.43S	31°26'38.47E	Erven
2559	ULUNDI D	1361	0	28°16'53.62S	31°26'41.03E	Erven
2560	ULUNDI D	1363	0	28°16'54.59S	31°26'40.49E	Erven
2561	ULUNDI D	1371	0	28°16'53.87S	31°26'35.59E	Erven
2562	ULUNDI D	1407	0	28°16'56.96S	31°26'35.23E	Erven
2563	ULUNDI D	1411	0	28°16'59.08S	31°26'35.34E	Erven
2564	ULUNDI D	1413	0	28°17'0.06S	31°26'35.37E	Erven
2565	ULUNDI D	1415	0	28°17'1.04S	31°26'35.37E	Erven
2566	ULUNDI D	1416	0	28°17'1.6S	31°26'35.37E	Erven
2567	ULUNDI D	1422	0	28°16'59.08S	31°26'34.15E	Erven
2568	ULUNDI D	1423	0	28°16'58.62S	31°26'34.12E	Erven
2569	ULUNDI D	1433	0	28°16'58.55S	31°26'40.85E	Erven
2570	ULUNDI D	1434	0	28°16'59.16S	31°26'40.85E	Erven
2571	ULUNDI D	1439	0	28°16'59.05S	31°26'39.91E	Erven
2572	ULUNDI D	1448	0	28°17'0.24S	31°26'37.03E	Erven
2573	ULUNDI D	1459	0	28°17'1.5S	31°26'41.96E	Erven
2574	ULUNDI D	1462	0	28°17'2.61S	31°26'39.91E	Erven
2575	ULUNDI D	1465	0	28°17'2.9S	31°26'37.54E	Erven
2576	ULUNDI D	1474	0	28°17'3.55S	31°26'30.99E	Erven
2577	ULUNDI D	1488	0	28°17'4.7S	31°26'20.54E	Erven
2578	ULUNDI D	1499	0	28°16'58.41S	31°26'19.86E	Erven
2579	ULUNDI D	1504	0	28°16'56.14S	31°26'21.19E	Erven
2580	ULUNDI D	1541	0	28°17'2.65S	31°26'23.68E	Erven
2581	ULUNDI D	1550	0	28°17'1.79S	31°26'22.49E	Erven
2582	ULUNDI D	1554	0	28°17'1.57S	31°26'24.65E	Erven
2583	ULUNDI D	1567	0	28°16'55.89S	31°26'25.77E	Erven
2584	ULUNDI D	1571	0	28°16'59.3S	31°26'22.7E	Erven
2585	ULUNDI D	1584	0	28°17'0.06S	31°26'25.01E	Erven
2586	ULUNDI D	1593	0	28°16'57.65S	31°26'18.06E	Erven
2587	ULUNDI D	1597	0	28°16'59.48S	31°26'17.27E	Erven
2588	ULUNDI D	1614	0	28°16'57.14S	31°26'16.48E	Erven
2589	ULUNDI D	1619	0	28°16'59.41S	31°26'15.54E	Erven
2590	ULUNDI D	1633	0	28°17'2.51S	31°26'14.31E	Erven
2591	ULUNDI D	1652	0	28°16'50.09S	31°26'21.37E	Erven
2592	ULUNDI D	1660	0	28°16'43.75S	31°26'20.11E	Erven
2593	ULUNDI D	1676	0	28°16'51.17S	31°26'19.39E	Erven
2594	ULUNDI D	1685	0	28°16'49.05S	31°26'18.85E	Erven
2595	ULUNDI D	1689	0	28°16'47.14S	31°26'19.35E	Erven
2596	ULUNDI D	1694	0	28°16'44.76S	31°26'19.83E	Erven
2597	ULUNDI D	1697	0	28°16'43.79S	31°26'18.56E	Erven
2598	ULUNDI D	1703	0	28°16'48.39S	31°26'10.89E	Erven
2599	ULUNDI D	1715	0	28°16'51.81S	31°26'12.55E	Erven
2600	ULUNDI D	1839	0	28°16'47.14S	31°26'42.51E	Erven
2601	ULUNDI D	1842	0	28°16'45.48S	31°26'42.72E	Erven
2602	ULUNDI D	1846	0	28°16'44.11S	31°26'42.11E	Erven

2603	ULUNDI D	1849	0	28°16'42.92S	31°26'42.65E	Erven
2604	ULUNDI D	1873	0	28°16'34.83S	31°26'42.97E	Erven
2605	ULUNDI D	1890	0	28°16'35.15S	31°26'31.95E	Erven
2606	ULUNDI D	1910	0	28°16'31.44S	31°26'43.01E	Erven
2607	ULUNDI D	1915	0	28°16'30.11S	31°26'43.8E	Erven
2608	ULUNDI D	1922	0	28°16'27.59S	31°26'43.69E	Erven
2609	ULUNDI D	1925	0	28°16'26.9S	31°26'44.37E	Erven
2610	ULUNDI D	1927	0	28°16'26.26S	31°26'44.52E	Erven
2611	ULUNDI D	1941	0	28°16'29.64S	31°26'40.6E	Erven
2612	ULUNDI D	1944	0	28°16'30.58S	31°26'41.85E	Erven
2613	ULUNDI D	1947	0	28°16'22.84S	31°26'45.13E	Erven
2614	ULUNDI D	1949	0	28°16'22.18S	31°26'45.24E	Erven
2615	ULUNDI D	1952	0	28°16'21.36S	31°26'44.81E	Erven
2616	ULUNDI D	1955	0	28°16'20.28S	31°26'45.6E	Erven
2617	ULUNDI D	1961	0	28°16'18.3S	31°26'45.96E	Erven
2618	ULUNDI D	1984	0	28°16'21.22S	31°26'40.63E	Erven
2619	ULUNDI D	1986	0	28°16'20.57S	31°26'39.77E	Erven
2620	ULUNDI D	1989	0	28°16'20.67S	31°26'38.37E	Erven
2621	ULUNDI D	1990	0	28°16'21.04S	31°26'38E	Erven
2622	ULUNDI D	2006	0	28°16'25.5S	31°26'39.3E	Erven
2623	ULUNDI D	2012	0	28°16'31.8S	31°26'33.94E	Erven
2624	ULUNDI D	2095	0	28°16'33.13S	31°25'57.86E	Erven
2625	ULUNDI D	2103	0	28°16'34.43S	31°25'59.63E	Erven
2626	ULUNDI D	2157	0	28°16'41.09S	31°26'2.11E	Erven
2627	ULUNDI D	2172	0	28°16'37.7S	31°25'58.95E	Erven
2628	ULUNDI D	2173	0	28°16'37.99S	31°25'59.38E	Erven
2629	ULUNDI D	2180	0	28°16'35.69S	31°25'57.79E	Erven
2630	ULUNDI D	2758	0	28°16'5.7S	31°26'29.98E	Erven
2631	ULUNDI D	2759	0	28°16'5.41S	31°26'29.04E	Erven
2632	ULUNDI D	2767	0	28°16'4.08S	31°26'31.95E	Erven
2633	ULUNDI D	2769	0	28°16'3.21S	31°26'31.16E	Erven
2634	ULUNDI D	2773	0	28°16'3.79S	31°26'29.51E	Erven
2635	ULUNDI D	2778	0	28°16'4.19S	31°26'27.1E	Erven
2636	ULUNDI D	2780	0	28°16'3.76S	31°26'27.92E	Erven
2637	ULUNDI D	2789	0	28°16'2.17S	31°26'28.32E	Erven
2638	ULUNDI D	2804	0	28°16'0.66S	31°26'27.49E	Erven
2639	ULUNDI D	2811	0	28°16'0.56S	31°26'25.29E	Erven
2640	ULUNDI D	2821	0	28°15'58.93S	31°26'24.07E	Erven
2641	ULUNDI D	2826	0	28°15'57.78S	31°26'23.75E	Erven
2642	ULUNDI D	2827	0	28°15'57.99S	31°26'23.39E	Erven
2643	ULUNDI D	2833	0	28°15'56.77S	31°26'22.2E	Erven
2644	ULUNDI D	2843	0	28°15'59.76S	31°26'20.29E	Erven
2645	ULUNDI D	2881	0	28°16'8.29S	31°26'17.81E	Erven
2646	ULUNDI D	2884	0	28°16'9.55S	31°26'17.95E	Erven
2647	ULUNDI D	2890	0	28°16'8.15S	31°26'20.4E	Erven
2648	ULUNDI D	1968	0	28°16'16.18S	31°26'45.32E	Erven
2649	ULUNDI D	1975	0	28°16'17.25S	31°26'44.12E	Erven
2650	ULUNDI D	1976	0	28°16'17.22S	31°26'43.51E	Erven
2651	ULUNDI D	2092	0	28°16'32.7S	31°25'57.36E	Erven
2652	ULUNDI D	2108	0	28°16'35.26S	31°26'0.86E	Erven
2653	ULUNDI D	2120	0	28°16'39.21S	31°26'1.07E	Erven
2654	ULUNDI D	2124	0	28°16'37.85S	31°26'2.26E	Erven
2655	ULUNDI D	2135	0	28°16'39.97S	31°26'3.12E	Erven
2656	ULUNDI D	2136	0	28°16'39.69S	31°26'3.41E	Erven
2657	ULUNDI D	2141	0	28°16'38.97S	31°26'5.13E	Erven
2658	ULUNDI D	2152	0	28°16'42.45S	31°26'3.73E	Erven
2659	ULUNDI D	2162	0	28°16'39.76S	31°25'59.91E	Erven
2660	ULUNDI D	2616	0	28°16'47.32S	31°25'55.63E	Erven

2661	ULUNDI D	2760	0	28°16'5.2S	31°26'29.51E	Erven
2662	ULUNDI D	2791	0	28°16'2.6S	31°26'27.6E	Erven
2663	ULUNDI D	2807	0	28°16'1.02S	31°26'26.16E	Erven
2664	ULUNDI D	2814	0	28°15'59.65S	31°26'26.27E	Erven
2665	ULUNDI D	2820	0	28°15'59.18S	31°26'23.68E	Erven
2666	ULUNDI D	2838	0	28°15'58.65S	31°26'22.16E	Erven
2667	ULUNDI D	2841	0	28°15'59.33S	31°26'21.05E	Erven
2668	ULUNDI D	2848	0	28°16'2.5S	31°26'19.57E	Erven
2669	ULUNDI D	2855	0	28°16'4.12S	31°26'19.17E	Erven
2670	ULUNDI D	2856	0	28°16'3.9S	31°26'19.54E	Erven
2671	ULUNDI D	2858	0	28°16'3.47S	31°26'20.29E	Erven
2672	ULUNDI D	2863	0	28°16'4.59S	31°26'20.04E	Erven
2673	ULUNDI D	2865	0	28°16'5.09S	31°26'19.35E	Erven
2674	ULUNDI D	2866	0	28°16'5.23S	31°26'18.96E	Erven
2675	ULUNDI D	2868	0	28°16'5.63S	31°26'18.21E	Erven
2676	ULUNDI D	2875	0	28°16'6.42S	31°26'19.32E	Erven
2677	ULUNDI D	2878	0	28°16'7.61S	31°26'18.92E	Erven
2678	ULUNDI D	2889	0	28°16'8.36S	31°26'19.97E	Erven
2679	ULUNDI D	2891	0	28°16'8.8S	31°26'20.87E	Erven
2680	ULUNDI D	2892	0	28°16'9.05S	31°26'20.47E	Erven
2681	ULUNDI D	2912	0	28°16'11.97S	31°26'21.98E	Erven
2682	ULUNDI D	2917	0	28°16'12.65S	31°26'22.53E	Erven
2683	ULUNDI D	2920	0	28°16'13.3S	31°26'21.41E	Erven
2684	ULUNDI D	2931	0	28°16'14.12S	31°26'24E	Erven
2685	ULUNDI D	2942	0	28°16'0.05S	31°26'22.13E	Erven
2686	ULUNDI D	2956	0	28°16'2.07S	31°26'22.53E	Erven
2687	ULUNDI D	2977	0	28°16'4.3S	31°26'23.03E	Erven
2688	ULUNDI D	2998	0	28°16'6.78S	31°26'22.7E	Erven
2689	ULUNDI D	3001	0	28°16'6.13S	31°26'23.86E	Erven
2690	ULUNDI D	3006	0	28°16'5.02S	31°26'25.77E	Erven
2691	ULUNDI D	3008	0	28°16'5.27S	31°26'27.06E	Erven
2692	ULUNDI D	3010	0	28°16'5.7S	31°26'26.27E	Erven
2693	ULUNDI D	3012	0	28°16'6.13S	31°26'25.51E	Erven
2694	ULUNDI D	3017	0	28°16'7.25S	31°26'23.57E	Erven
2695	ULUNDI D	3020	0	28°16'7.93S	31°26'22.45E	Erven
2696	ULUNDI D	3026	0	28°16'10.92S	31°26'19.64E	Erven
2697	ULUNDI D	3045	0	28°16'10.13S	31°26'25.15E	Erven
2698	ULUNDI D	3069	0	28°16'17.11S	31°26'24.94E	Erven
2699	ULUNDI D	3075	0	28°16'17.11S	31°26'27.24E	Erven
2700	ULUNDI D	2819	0	28°15'59.83S	31°26'24.18E	Erven
2701	ULUNDI D	2835	0	28°15'58.54S	31°26'20.97E	Erven
2702	ULUNDI D	2836	0	28°15'57.78S	31°26'21.26E	Erven
2703	ULUNDI D	2845	0	28°16'2.02S	31°26'18.85E	Erven
2704	ULUNDI D	2846	0	28°16'1.67S	31°26'19.46E	Erven
2705	ULUNDI D	2852	0	28°16'4.94S	31°26'17.95E	Erven
2706	ULUNDI D	2893	0	28°16'9.26S	31°26'20.11E	Erven
2707	ULUNDI D	2918	0	28°16'12.87S	31°26'22.13E	Erven
2708	ULUNDI D	2935	0	28°16'15.02S	31°26'22.42E	Erven
2709	ULUNDI D	2953	0	28°16'2.79S	31°26'21.44E	Erven
2710	ULUNDI D	2955	0	28°16'2.35S	31°26'22.2E	Erven
2711	ULUNDI D	2958	0	28°16'1.7S	31°26'23.32E	Erven
2712	ULUNDI D	2966	0	28°16'2.82S	31°26'23.1E	Erven
2713	ULUNDI D	2969	0	28°16'3.47S	31°26'21.95E	Erven
2714	ULUNDI D	2983	0	28°16'4.51S	31°26'24.29E	Erven
2715	ULUNDI D	2984	0	28°16'4.73S	31°26'23.93E	Erven
2716	ULUNDI D	2987	0	28°16'5.41S	31°26'22.74E	Erven
2717	ULUNDI D	2994	0	28°16'7.68S	31°26'21.23E	Erven
2718	ULUNDI D	2995	0	28°16'7.46S	31°26'21.55E	Erven

2719	ULUNDI D	3007	0	28°16'4.8S	31°26'26.27E	Erven
2720	ULUNDI D	3016	0	28°16'7.03S	31°26'23.96E	Erven
2721	ULUNDI D	3022	0	28°16'8.36S	31°26'21.69E	Erven
2722	ULUNDI D	3028	0	28°16'10.49S	31°26'20.4E	Erven
2723	ULUNDI D	3029	0	28°16'10.27S	31°26'20.76E	Erven
2724	ULUNDI D	3031	0	28°16'9.8S	31°26'21.55E	Erven
2725	ULUNDI D	3033	0	28°16'10.78S	31°26'21.66E	Erven
2726	ULUNDI D	3036	0	28°16'11.42S	31°26'20.54E	Erven
2727	ULUNDI D	3038	0	28°16'11.82S	31°26'19.83E	Erven
2728	ULUNDI D	3041	0	28°16'11.06S	31°26'23.57E	Erven
2729	ULUNDI D	3077	0	28°16'16.97S	31°26'27.85E	Erven
2730	ULUNDI D	3081	0	28°16'17.19S	31°26'29.33E	Erven
2731	ULUNDI D	3082	0	28°16'17.25S	31°26'29.76E	Erven
2732	ULUNDI D	3092	0	28°16'15.63S	31°26'28.03E	Erven
2733	ULUNDI D	3103	0	28°16'13.83S	31°26'28.47E	Erven
2734	ULUNDI D	3108	0	28°16'15.13S	31°26'29.11E	Erven
2735	ULUNDI D	3118	0	28°16'13.22S	31°26'29.58E	Erven
2736	ULUNDI D	3123	0	28°16'12.1S	31°26'29.8E	Erven
2737	ULUNDI D	3124	0	28°16'11.89S	31°26'30.15E	Erven
2738	ULUNDI D	3132	0	28°16'11.82S	31°26'27.96E	Erven
2739	ULUNDI D	3146	0	28°16'11.42S	31°26'26.95E	Erven
2740	ULUNDI D	3147	0	28°16'11.17S	31°26'27.42E	Erven
2741	ULUNDI D	3166	0	28°16'7.86S	31°26'25.77E	Erven
2742	ULUNDI D	3177	0	28°16'8.65S	31°26'23.57E	Erven
2743	ULUNDI D	3179	0	28°16'8.18S	31°26'24.32E	Erven
2744	ULUNDI D	3185	0	28°16'6.17S	31°26'27.78E	Erven
2745	ULUNDI D	3188	0	28°16'6.71S	31°26'28.43E	Erven
2746	ULUNDI D	3043	0	28°16'10.56S	31°26'24.39E	Erven
2747	ULUNDI D	3048	0	28°16'9.45S	31°26'26.34E	Erven
2748	ULUNDI D	3064	0	28°16'15.78S	31°26'25.11E	Erven
2749	ULUNDI D	3068	0	28°16'16.61S	31°26'23.6E	Erven
2750	ULUNDI D	3091	0	28°16'15.74S	31°26'28.43E	Erven
2751	ULUNDI D	3101	0	28°16'13.4S	31°26'27.6E	Erven
2752	ULUNDI D	3104	0	28°16'14.09S	31°26'28.07E	Erven
2753	ULUNDI D	3110	0	28°16'15.39S	31°26'30.33E	Erven
2754	ULUNDI D	3130	0	28°16'11.39S	31°26'28.75E	Erven
2755	ULUNDI D	3163	0	28°16'9.01S	31°26'27.13E	Erven
2756	ULUNDI D	3167	0	28°16'8.69S	31°26'25.22E	Erven
2757	ULUNDI D	3181	0	28°16'7.06S	31°26'26.27E	Erven
2758	ULUNDI D	3186	0	28°16'5.95S	31°26'28.18E	Erven
2759	ULUNDI D	3201	0	28°16'55.95S	31°26'42.22E	Erven
2760	ULUNDI D	2945	0	28°16'0.3S	31°26'23.39E	Erven
2761	ULUNDI D	2946	0	28°16'0.56S	31°26'22.99E	Erven
2762	ULUNDI D	2954	0	28°16'2.57S	31°26'21.84E	Erven
2763	ULUNDI D	2963	0	28°16'2.68S	31°26'24.29E	Erven
2764	ULUNDI D	2973	0	28°16'5.16S	31°26'21.48E	Erven
2765	ULUNDI D	2981	0	28°16'4.04S	31°26'25.15E	Erven
2766	ULUNDI D	2985	0	28°16'4.94S	31°26'23.54E	Erven
2767	ULUNDI D	3009	0	28°16'5.49S	31°26'26.67E	Erven
2768	ULUNDI D	3032	0	28°16'10.53S	31°26'22.02E	Erven
2769	ULUNDI D	3058	0	28°16'15.74S	31°26'23.54E	Erven
2770	ULUNDI D	3059	0	28°16'15.53S	31°26'23.89E	Erven
2771	ULUNDI D	3060	0	28°16'15.31S	31°26'24.25E	Erven
2772	ULUNDI D	3062	0	28°16'14.88S	31°26'25.05E	Erven
2773	ULUNDI D	3066	0	28°16'16.21S	31°26'24.39E	Erven
2774	ULUNDI D	3074	0	28°16'17.08S	31°26'26.56E	Erven
2775	ULUNDI D	3084	0	28°16'17.4S	31°26'30.66E	Erven
2776	ULUNDI D	3109	0	28°16'15.28S	31°26'29.69E	Erven

2777	ULUNDI D	3119	0	28°16'13.44S	31°26'29.19E	Erven
2778	ULUNDI D	3121	0	28°16'12.54S	31°26'29.08E	Erven
2779	ULUNDI D	3125	0	28°16'11.6S	31°26'30.52E	Erven
2780	ULUNDI D	2849	0	28°16'2.71S	31°26'19.21E	Erven
2781	ULUNDI D	3145	0	28°16'11.64S	31°26'26.59E	Erven
2782	ULUNDI D	3150	0	28°16'10.45S	31°26'28.64E	Erven
2783	ULUNDI D	3158	0	28°16'8.62S	31°26'29.19E	Erven
2784	ULUNDI D	3160	0	28°16'9.19S	31°26'28.43E	Erven
2785	ULUNDI D	3170	0	28°16'9.37S	31°26'24.07E	Erven
2786	ULUNDI D	3183	0	28°16'6.64S	31°26'27.02E	Erven
2787	ULUNDI D	3196	0	28°16'7.68S	31°26'29.72E	Erven
2788	ULUNDI D	2896	0	28°16'9.91S	31°26'19E	Erven
2789	ULUNDI D	2898	0	28°16'10.35S	31°26'18.28E	Erven
2790	ULUNDI D	2899	0	28°16'10.56S	31°26'17.88E	Erven
2791	ULUNDI D	2901	0	28°16'11.03S	31°26'17.16E	Erven
2792	ULUNDI D	2907	0	28°16'13.01S	31°26'20.15E	Erven
2793	ULUNDI D	2908	0	28°16'12.79S	31°26'20.51E	Erven
2794	ULUNDI D	2915	0	28°16'12.18S	31°26'23.25E	Erven
2795	ULUNDI D	2924	0	28°16'14.49S	31°26'21.98E	Erven
2796	ULUNDI D	2940	0	28°16'0.48S	31°26'21.37E	Erven
2797	ULUNDI D	2950	0	28°16'1.38S	31°26'21.52E	Erven
2798	ULUNDI D	2967	0	28°16'3.03S	31°26'22.7E	Erven
2799	ULUNDI D	2968	0	28°16'3.25S	31°26'22.35E	Erven
2800	ULUNDI D	2976	0	28°16'4.51S	31°26'22.63E	Erven
2801	ULUNDI D	2988	0	28°16'5.63S	31°26'22.38E	Erven
2802	ULUNDI D	2990	0	28°16'6.06S	31°26'21.63E	Erven
2803	ULUNDI D	2993	0	28°16'6.67S	31°26'20.54E	Erven
2804	ULUNDI D	2999	0	28°16'6.56S	31°26'23.06E	Erven
2805	ULUNDI D	3000	0	28°16'6.35S	31°26'23.46E	Erven
2806	ULUNDI D	3002	0	28°16'5.92S	31°26'24.21E	Erven
2807	ULUNDI D	3005	0	28°16'5.23S	31°26'25.37E	Erven
2808	ULUNDI D	3021	0	28°16'8.15S	31°26'22.06E	Erven
2809	ULUNDI D	3025	0	28°16'11.14S	31°26'19.28E	Erven
2810	ULUNDI D	3027	0	28°16'10.7S	31°26'20.01E	Erven
2811	ULUNDI D	3042	0	28°16'10.78S	31°26'24E	Erven
2812	ULUNDI D	3085	0	28°16'16.21S	31°26'30.95E	Erven
2813	ULUNDI D	3087	0	28°16'16.07S	31°26'30.09E	Erven
2814	ULUNDI D	3106	0	28°16'14.56S	31°26'27.39E	Erven
2815	ULUNDI D	3116	0	28°16'12.79S	31°26'30.3E	Erven
2816	ULUNDI D	3117	0	28°16'13.01S	31°26'29.94E	Erven
2817	ULUNDI D	2109	0	28°16'35.87S	31°26'0.42E	Erven
2818	ULUNDI D	2113	0	28°16'36.69S	31°26'2.19E	Erven
2819	ULUNDI D	2117	0	28°16'38.03S	31°26'1E	Erven
2820	ULUNDI D	2132	0	28°16'39.47S	31°26'2.4E	Erven
2821	ULUNDI D	2147	0	28°16'40.44S	31°26'4.13E	Erven
2822	ULUNDI D	2148	0	28°16'40.94S	31°26'4.63E	Erven
2823	ULUNDI D	2158	0	28°16'40.8S	31°26'1.75E	Erven
2824	ULUNDI D	2160	0	28°16'40.22S	31°26'0.89E	Erven
2825	ULUNDI D	2168	0	28°16'37.63S	31°25'57.04E	Erven
2826	ULUNDI D	2175	0	28°16'37.13S	31°25'59.59E	Erven
2827	ULUNDI D	2177	0	28°16'36.62S	31°25'58.91E	Erven
2828	ULUNDI D	2190	0	28°16'35.33S	31°25'56.57E	Erven
2829	ULUNDI D	2192	0	28°16'34.86S	31°25'55.88E	Erven
2830	ULUNDI D	2194	0	28°16'33.85S	31°25'55.27E	Erven
2831	ULUNDI D	2757	0	28°16'5.77S	31°26'30.59E	Erven
2832	ULUNDI D	2763	0	28°16'4.59S	31°26'30.62E	Erven
2833	ULUNDI D	2793	0	28°16'3.03S	31°26'26.84E	Erven
2834	ULUNDI D	2801	0	28°16'1.74S	31°26'27.63E	Erven

2835	ULUNDI D	2828	0	28°15'58.21S	31°26'22.96E	Erven
2836	ULUNDI D	2832	0	28°15'57.06S	31°26'22.42E	Erven
2837	ULUNDI D	2837	0	28°15'58.25S	31°26'21.66E	Erven
2838	ULUNDI D	3120	0	28°16'12.79S	31°26'28.68E	Erven
2839	ULUNDI D	3128	0	28°16'10.74S	31°26'29.54E	Erven
2840	ULUNDI D	3129	0	28°16'11.14S	31°26'29.11E	Erven
2841	ULUNDI D	3131	0	28°16'11.6S	31°26'28.36E	Erven
2842	ULUNDI D	3134	0	28°16'12.32S	31°26'27.1E	Erven
2843	ULUNDI D	3138	0	28°16'13.19S	31°26'25.62E	Erven
2844	ULUNDI D	3143	0	28°16'12.07S	31°26'25.87E	Erven
2845	ULUNDI D	3144	0	28°16'11.86S	31°26'26.23E	Erven
2846	ULUNDI D	3149	0	28°16'10.7S	31°26'28.25E	Erven
2847	ULUNDI D	3159	0	28°16'8.9S	31°26'28.82E	Erven
2848	ULUNDI D	3161	0	28°16'9.45S	31°26'28.03E	Erven
2849	ULUNDI D	3172	0	28°16'9.8S	31°26'23.32E	Erven
2850	ULUNDI D	3173	0	28°16'10.06S	31°26'22.88E	Erven
2851	ULUNDI D	3174	0	28°16'9.34S	31°26'22.38E	Erven
2852	ULUNDI D	3175	0	28°16'9.08S	31°26'22.77E	Erven
2853	ULUNDI D	3180	0	28°16'7.97S	31°26'24.72E	Erven
2854	ULUNDI D	3184	0	28°16'6.42S	31°26'27.39E	Erven
2855	ULUNDI D	3187	0	28°16'6.38S	31°26'28.82E	Erven
2856	ULUNDI D	2844	0	28°16'0.27S	31°26'19.79E	Erven
2857	ULUNDI D	2857	0	28°16'3.69S	31°26'19.93E	Erven
2858	ULUNDI D	2870	0	28°16'6.24S	31°26'17.45E	Erven
2859	ULUNDI D	2887	0	28°16'8.8S	31°26'19.25E	Erven
2860	ULUNDI D	2900	0	28°16'10.78S	31°26'17.52E	Erven
2861	ULUNDI D	2916	0	28°16'12.43S	31°26'22.88E	Erven
2862	ULUNDI D	2927	0	28°16'13.66S	31°26'23.14E	Erven
2863	ULUNDI D	2944	0	28°15'59.61S	31°26'22.88E	Erven
2864	ULUNDI D	2962	0	28°16'2.31S	31°26'24.76E	Erven
2865	ULUNDI D	2964	0	28°16'2.28S	31°26'23.86E	Erven
2866	ULUNDI D	2971	0	28°16'5.63S	31°26'20.76E	Erven
2867	ULUNDI D	2972	0	28°16'5.38S	31°26'21.12E	Erven
2868	ULUNDI D	2974	0	28°16'4.94S	31°26'21.87E	Erven
2869	ULUNDI D	2975	0	28°16'4.73S	31°26'22.27E	Erven
2870	ULUNDI D	2982	0	28°16'4.3S	31°26'24.68E	Erven
2871	ULUNDI D	3004	0	28°16'5.45S	31°26'25.01E	Erven
2872	ULUNDI D	3019	0	28°16'7.72S	31°26'22.81E	Erven
2873	ULUNDI D	3050	0	28°16'10.38S	31°26'26.41E	Erven
2874	ULUNDI D	3052	0	28°16'10.81S	31°26'25.66E	Erven
2875	ULUNDI D	3054	0	28°16'11.25S	31°26'24.9E	Erven
2876	ULUNDI D	3056	0	28°16'11.75S	31°26'24.07E	Erven
2877	ULUNDI D	3076	0	28°16'16.64S	31°26'27.46E	Erven
2878	ULUNDI D	3080	0	28°16'17.11S	31°26'28.93E	Erven
2879	ULUNDI D	3095	0	28°16'15.02S	31°26'26.73E	Erven
2880	ULUNDI D	3098	0	28°16'14.05S	31°26'26.48E	Erven
2881	ULUNDI D	3100	0	28°16'13.62S	31°26'27.2E	Erven
2882	ULUNDI D	3114	0	28°16'13.62S	31°26'30.84E	Erven
2883	ULUNDI D	3126	0	28°16'10.49S	31°26'30.48E	Erven
2884	ULUNDI D	3140	0	28°16'12.76S	31°26'24.72E	Erven
2885	ULUNDI D	3156	0	28°16'8.4S	31°26'30.52E	Erven
2886	ULUNDI D	3162	0	28°16'9.66S	31°26'27.63E	Erven
2887	ULUNDI D	3182	0	28°16'6.85S	31°26'26.67E	Erven
2888	ULUNDI D	3189	0	28°16'7S	31°26'28E	Erven
2889	ULUNDI D	3190	0	28°16'7.32S	31°26'27.57E	Erven
2890	UITKIJK	353	0	28°11'37.78S	31°13'22.43E	Farm
2891	DUIKERFONTEIN	528	0	28°13'30.04S	31°13'21.07E	Farm

2892	LANGGEWACHT	235	0	28°13'21.42S	31°11'33.84E	Farm
2893	LOT 285 EMPANGENI	13400	0	28°33'55.49S	31°48'23.79E	Farm
2894	LOT 292 EMPANGENI	13399	0	28°38'43.2S	31°50'29.16E	Farm
2895	RESERVE NO 11	15831	0	28°31'59.08S	31°37'36.63E	Farm
2896	RESERVE NO 20	15840	0	28°4'31.6S	31°25'40.17E	Farm
2897	OBIZO	16920	0	28°37'19.04S	31°52'57.26E	Farm
2898	WELGEVONDEN	527	0	28°15'47.88S	31°9'29.72E	Farm
2899	EENSGEVONDEN	551	0	28°12'15.26S	31°15'13.68E	Farm
2900	PLATBERG	583	0	28°13'19.44S	31°9'3.86E	Farm
2901	LOT 308 EMPANGENI	13742	0	28°31'59.37S	31°47'44.87E	Farm
2902	LOT 307 EMPANGENI	13746	0	28°31'25.51S	31°48'29.23E	Farm
2903	XIMBA	16506	0	28°20'57.78S	31°34'47.86E	Farm
2904	LOT 309 EMPANGENI	13050	0	28°32'35.35S	31°47'4.8E	Farm
2905	WALLENTON	11582	0	28°42'6.94S	31°43'59.47E	Farm
2906	EZULWINI	11065	0	28°40'1.69S	31°48'57.52E	Farm
2907	LOTTERY	531	0	28°13'3.29S	31°17'21.88E	Farm
2908	LOT 321 EMPANGENI	13040	0	28°30'19.99S	31°44'6.18E	Farm
2909	LOT 290 EMPANGENI	13388	0	28°36'30.69S	31°49'20.7E	Farm
2910	LOT 289 EMPANGENI	13389	0	28°35'28.95S	31°49'56.68E	Farm
2911	BAREND	781	0	28°11'9.2S	31°12'34.01E	Farm
2912	DUBE RIDGE	15223	0	28°35'12.72S	31°48'10.88E	Farm
2913	LOT 317 EMPANGENI	14404	0	28°30'36.01S	31°46'22.48E	Farm
2914	SKYE BLUE	16653	0	28°40'24.39S	31°49'45.4E	Farm
2915	MATATANE CROCODILE	17384	0	28°14'25.6S	31°10'11.84E	Farm
2916	LOT 316 EMPANGENI	13051	0	28°31'15.4S	31°45'42.11E	Farm
2917	LOT 239 EMPANGENI	12280	0	28°42'4.14S	31°47'22.07E	Farm
2918	HILL TOP	11745	0	28°39'18.41S	31°48'5.48E	Farm
2919	NEWLANDS	11588	0	28°41'35.32S	31°45'15.69E	Farm
2920	PROSPECT ESTATE	10974	0	28°41'26.55S	31°47'45.32E	Farm
2921	LOT 244 EMPANGENI	10574	0	28°39'38.53S	31°49'32.36E	Farm
2922	HLANGASA	10963	0	28°39'29.04S	31°50'18.95E	Farm
2923	LOT 291 EMPANGENI	13387	0	28°37'1S	31°48'51.63E	Farm
2924	THORNCREEK	11542	0	28°39'3.91S	31°46'58.19E	Farm
2925	ARCADIA	11079	0	28°37'27.84S	31°48'24.41E	Farm
2926	NOBAMBA	16505	0	28°18'30.99S	31°15'39.61E	Farm
2927	VALLEY	16786	0	28°42'39.44S	31°45'29.24E	Farm
2928	HANDLEY CROSS	12187	0	28°38'50.33S	31°48'34.64E	Farm

2929	NEEDMORE	11386	0	28°40'32.46S	31°48'41.78E	Farm
2930	LOT 241 EMPANGENI	11058	0	28°41'2.22S	31°48'14.77E	Farm
2931	WINDY RIDGE	15304	0	28°34'55.16S	31°46'48.46E	Farm
2932	SYLVIA	16305	0	28°38'38.6S	31°49'28.21E	Farm
2933	BELLA VISTA	18409	0	28°40'13.9S	31°46'52.19E	Farm
2934	NTOMBOTI	18410	0	28°41'2.24S	31°46'3.9E	Farm
2935	ZUNGU	16507	0	28°12'50.07S	31°35'40.37E	Farm
2936	HANDLEY	18087	0	28°38'0.12S	31°47'47.94E	Farm
2937	GOODLUCK	270	0	28°10'41.18S	31°16'45.83E	Farm
2938	GROOT GELUK	201	0	28°11'20.34S	31°10'45.82E	Farm
2939	FULENI RESERVE	14375	0	28°27'29.26S	31°47'34.3E	Farm
2940	LOT 318 EMPANGENI	14496	0	28°29'57.91S	31°47'20.48E	Farm
2941	MAMBUKA	16919	0	28°32'43.55S	31°50'45.48E	Farm
2942	SHORROCKS HILL	11561	0	28°42'41.24S	31°44'44.15E	Farm
2943	LYNWOOD	11425	0	28°38'12.76S	31°50'58.59E	Farm
2944	PICCADILLY	10985	0	28°40'11.79S	31°47'24.77E	Farm
2945	UITKIJK	353	2	28°11'24.51S	31°13'25.22E	Farm Portion
2946	UITKIJK	353	1	28°11'54.19S	31°12'24.28E	Farm Portion
2947	GOODLUCK	270	1	28°11'29.96S	31°17'20.15E	Farm Portion
2948	UITKIJK	353	9	28°11'31.31S	31°12'15.11E	Farm Portion
2949	UITKIJK	353	4	28°11'28.18S	31°14'23.22E	Farm Portion
2950	GROOT GELUK	201	4	28°11'4.99S	31°11'10.21E	Farm Portion
2951	GROOT GELUK	201	5	28°11'14S	31°10'53.54E	Farm Portion
2952	LANGGEWACHT	235	4	28°12'56.61S	31°11'15.2E	Farm Portion
2953	UITKIJK	353	10	28°12'11.94S	31°12'15.82E	Farm Portion
2954	UITKIJK	353	11	28°11'40.95S	31°12'7.11E	Farm Portion
2955	LOTTERY	531	5	28°11'47.7S	31°17'38.86E	Farm Portion
2956	LOTTERY	531	2	28°12'39.05S	31°17'43.76E	Farm Portion
2957	EENSGEVONDEN	551	2	28°12'36.38S	31°14'57.34E	Farm Portion
2958	EENSGEVONDEN	551	7	28°12'6.79S	31°15'48.32E	Farm Portion
2959	PICCADILLY	10985	3	28°40'12.25S	31°47'24.86E	Farm Portion
2960	PICCADILLY	10985	0	28°40'9.78S	31°46'58.23E	Farm Portion
2961	ARCADIA	11079	0	28°37'35.22S	31°48'23.23E	Farm Portion
2962	BLACKWOOD	11394	0	28°40'37.78S	31°46'26.65E	Farm Portion
2963	LYNWOOD	11425	0	28°38'13.04S	31°50'58.48E	Farm Portion
2964	THORNCREEK	11542	4	28°39'52.66S	31°47'21.37E	Farm Portion
2965	HILL TOP	11745	3	28°39'27.4S	31°48'4.39E	Farm Portion
2966	WELGEVONDEN	527	1	28°15'40.37S	31°9'8.61E	Farm Portion
2967	LOTTERY	531	0	28°13'31.05S	31°16'59.5E	Farm Portion
2968	LOT 309 EMPANGENI	13050	0	28°32'36.99S	31°47'5.2E	Farm Portion
2969	BLACKWOOD	11394	3	28°40'29.98S	31°46'48.61E	Farm Portion
2970	NEWLANDS	11588	0	28°41'41.09S	31°45'23.95E	Farm Portion
2971	HILL TOP	11745	4	28°39'18.4S	31°47'55.33E	Farm Portion
2972	12167	0		28°31'36.94S	31°50'6.07E	Farm Portion
2973	HANDLEY CROSS	12187	2	28°38'58.95S	31°48'25.98E	Farm Portion

2974	LOT 252 EMPANGENI	13313	1	28°41'9.63S	31°45'54.57E	Farm Portion
2975	LOT 307 EMPANGENI	13746	0	28°31'26.01S	31°48'28.16E	Farm Portion
2976	HANDLEY CROSS	12187	1	28°38'46.49S	31°48'37.79E	Farm Portion
2977	LOT 309 EMPANGENI	13050	1	28°33'27.6S	31°47'17.89E	Farm Portion
2978	LOT 316 EMPANGENI	13051	1	28°31'25.85S	31°46'3.65E	Farm Portion
2979	LOT 241 EMPANGENI	11058	0	28°41'1.49S	31°48'14.68E	Farm Portion
2980	LOT 308 EMPANGENI	13742	0	28°31'59.81S	31°47'44.75E	Farm Portion
2981	LOT 318 EMPANGENI	14496	0	28°29'58.7S	31°47'20.67E	Farm Portion
2982	RESERVE NO 20	15840	11	28°16'50.26S	31°26'50.23E	Farm Portion
2983	RESERVE NO 20	15840	8	28°15'19.11S	31°19'29.13E	Farm Portion
2984	XIMBA	16506	1	28°18'42.23S	31°33'59.76E	Farm Portion
2985	16561	0		28°40'37.58S	31°46'26.62E	Farm Portion
2986	LOT 285 EMPANGENI	13400	0	28°33'56.89S	31°48'23.54E	Farm Portion
2987	GROOT GELUK	201	0	28°10'45.43S	31°11'54.95E	Farm Portion
2988	GROOT GELUK	201	8	28°12'0.67S	31°10'3.11E	Farm Portion
2989	UITKIJK	353	7	28°11'40.8S	31°11'41.94E	Farm Portion
2990	UITKIJK	353	14	28°12'6.42S	31°13'25.4E	Farm Portion
2991	LOTTERY	531	2	28°12'39.05S	31°17'43.76E	Farm Portion
2992	EENSGEVONDEN	551	5	28°11'22.85S	31°15'25.01E	Farm Portion
2993	EENSGEVONDEN	551	9	28°12'56.11S	31°15'49.27E	Farm Portion
2994	10507	0		28°36'59.06S	31°52'9.73E	Farm Portion
2995	HLANGASA	10963	0	28°39'29.33S	31°50'18.85E	Farm Portion
2996	LOT 241 EMPANGENI	11058	1	28°41'4.43S	31°47'46.51E	Farm Portion
2997	WALLENTON	11582	1	28°42'9.01S	31°44'47.65E	Farm Portion
2998	HILL TOP	11745	1	28°39'4.32S	31°48'9.43E	Farm Portion
2999	EENSGEVONDEN	551	14	28°12'35.56S	31°15'18.12E	Farm Portion
3000	11896	0		28°34'42.61S	31°50'45.97E	Farm Portion
3001	LOT 291 EMPANGENI	13387	0	28°37'1.44S	31°48'50.93E	Farm Portion
3002	13427	0		28°33'43.94S	31°49'59.62E	Farm Portion
3003	RESERVE NO 11	15831	3	28°28'14.58S	31°32'15.19E	Farm Portion
3004	EENSGEVONDEN	551	1	28°12'22.81S	31°14'45.94E	Farm Portion
3005	EENSGEVONDEN	551	0	28°13'25.24S	31°15'55.32E	Farm Portion
3006	RESERVE NO 20	15840	8	28°14'11.1S	31°20'48.65E	Farm Portion
3007	RESERVE NO 20	15840	68	28°17'13.01S	31°22'30.68E	Farm Portion

3008	RESERVE NO 20	15840	54	28°14'30.25S	31°19'13.14E	Farm Portion
3009	RESERVE NO 20	15840	47	28°14'31.14S	31°23'12.56E	Farm Portion
3010	RESERVE NO 20	15840	9	28°13'34.88S	31°24'58.82E	Farm Portion
3011	VALLEY	16786	3	28°42'1.29S	31°45'58.72E	Farm Portion
3012	10510	0		28°36'5.08S	31°51'5.8E	Farm Portion
3013	LOT 244 EMPANGENI	10574	0	28°39'38.81S	31°49'32.26E	Farm Portion
3014	NEEDMORE	11386	0	28°40'32.53S	31°48'41.81E	Farm Portion
3015	SHORROCKS HILL	11561	0	28°42'41.76S	31°44'44.06E	Farm Portion
3016	13426	0		28°33'30.33S	31°49'1.87E	Farm Portion
3017	GROOT GELUK	201	7	28°12'10.98S	31°10'28.5E	Farm Portion
3018	LANGGEWACHT	235	0	28°13'6.58S	31°11'33.33E	Farm Portion
3019	LANGGEWACHT	235	3	28°13'1.9S	31°10'36.41E	Farm Portion
3020	UITKIJK	353	6	28°12'44.44S	31°13'40.05E	Farm Portion
3021	UITKIJK	353	8	28°12'25.18S	31°13'14.31E	Farm Portion
3022	UITKIJK	353	13	28°12'36.66S	31°12'57.96E	Farm Portion
3023	DUIKERFONTEIN	528	1	28°13'30.04S	31°13'21.07E	Farm Portion
3024	LOTTERY	531	3	28°14'34.75S	31°18'1.78E	Farm Portion
3025	EENSGEVONDEN	551	2	28°12'33.06S	31°14'35.47E	Farm Portion
3026	EENSGEVONDEN	551	4	28°12'33.92S	31°14'20.15E	Farm Portion
3027	EENSGEVONDEN	551	8	28°13'29.61S	31°15'6.03E	Farm Portion
3028	BAREND	781	0	28°11'9.2S	31°12'34.01E	Farm Portion
3029	GROOT GELUK	201	6	28°11'18.25S	31°10'39.61E	Farm Portion
3030	GROOT GELUK	201	10	28°12'25.32S	31°10'47.53E	Farm Portion
3031	LANGGEWACHT	235	1	28°14'15.6S	31°11'36.84E	Farm Portion
3032	UITKIJK	353	5	28°10'51.46S	31°13'37.83E	Farm Portion
3033	LOTTERY	531	4	28°13'1.16S	31°18'10.75E	Farm Portion
3034	EENSGEVONDEN	551	5	28°11'15.85S	31°15'20.6E	Farm Portion
3035	EENSGEVONDEN	551	3	28°12'2.16S	31°16'27.82E	Farm Portion
3036	PLATBERG	583	0	28°13'20.88S	31°9'3.87E	Farm Portion
3037	PROSPECT ESTATE	10974	4	28°41'13.21S	31°47'33.01E	Farm Portion
3038	EZULWINI	11065	1	28°40'2.48S	31°48'57.02E	Farm Portion
3039	THORNCREEK	11542	0	28°39'4.52S	31°46'59.02E	Farm Portion
3040	LOT 239 EMPANGENI	12280	0	28°41'43.54S	31°46'43.29E	Farm Portion
3041	LOT 316 EMPANGENI	13051	0	28°30'55.25S	31°45'8.5E	Farm Portion
3042	14376	1		28°20'43.23S	31°38'1.61E	Farm Portion
3043	RESERVE NO 20	15840	17	28°18'38.96S	31°25'36.01E	Farm Portion

3044	RESERVE NO 20	15840	71	28°15'1.15S	31°19'13.28E	Farm Portion
3045	RESERVE NO 20	15840	70	28°18'1.55S	31°26'32.15E	Farm Portion
3046	RESERVE NO 20	15840	53	28°15'52.44S	31°20'11.31E	Farm Portion
3047	RESERVE NO 20	15840	52	28°15'45.69S	31°20'11.23E	Farm Portion
3048	RESERVE NO 20	15840	49	28°14'48.49S	31°22'29.05E	Farm Portion
3049	RESERVE NO 20	15840	18	28°21'42.61S	31°30'38.88E	Farm Portion
3050	SYLVIA	16305	0	28°38'39.82S	31°49'28.24E	Farm Portion
3051	XIMBA	16506	5	28°18'6.69S	31°32'2.9E	Farm Portion
3052	XIMBA	16506	7	28°22'14.18S	31°39'10.87E	Farm Portion
3053	16561	0		28°40'50.7S	31°46'21.76E	Farm Portion
3054	16561	1		28°40'23.49S	31°46'23.74E	Farm Portion
3055	PROSPECT ESTATE	10974	3	28°41'9.56S	31°46'58.08E	Farm Portion
3056	PROSPECT ESTATE	10974	1	28°41'7.82S	31°47'47.56E	Farm Portion
3057	HILL TOP	11745	2	28°39'13.95S	31°48'17.45E	Farm Portion
3058	LOT 321 EMPANGENI	13040	0	28°30'20.55S	31°44'5.67E	Farm Portion
3059	FULENI RESERVE	14375	1	28°27'38.17S	31°47'43.08E	Farm Portion
3060	LOT 317 EMPANGENI	14404	0	28°30'36.47S	31°46'22.36E	Farm Portion
3061	WINDY RIDGE	15304	0	28°34'56.57S	31°46'48.21E	Farm Portion
3062	10509	0		28°37'40.16S	31°51'33.58E	Farm Portion
3063	RESERVE NO 20	15840	48	28°14'36.56S	31°23'15.93E	Farm Portion
3064	RESERVE NO 20	15840	46	28°14'27.32S	31°22'48.54E	Farm Portion
3065	XIMBA	16506	0	28°20'58.37S	31°34'47.74E	Farm Portion
3066	XIMBA	16506	4	28°18'18.41S	31°30'30.06E	Farm Portion
3067	XIMBA	16506	2	28°20'28.45S	31°35'52.96E	Farm Portion
3068	SKYE BLUE	16653	0	28°40'24.98S	31°49'44.94E	Farm Portion
3069	VALLEY	16786	10	28°42'20.37S	31°45'45.74E	Farm Portion
3070	BELLA VISTA	18409	0	28°40'14.2S	31°46'52.21E	Farm Portion
3071	LOT 290 EMPANGENI	13388	0	28°36'30.97S	31°49'20.53E	Farm Portion
3072	LOT 289 EMPANGENI	13389	0	28°35'30.08S	31°49'56.69E	Farm Portion
3073	13427	1		28°34'21.67S	31°50'1.77E	Farm Portion
3074	RESERVE NO 11	15831	4	28°31'59.47S	31°37'36.63E	Farm Portion
3075	RESERVE NO 20	15840	103	28°17'1.45S	31°25'17.49E	Farm Portion
3076	RESERVE NO 20	15840	112	28°18'27.03S	31°27'13.57E	Farm Portion
3077	RESERVE NO 11	15831	7	28°25'40.77S	31°42'38.65E	Farm Portion
3078	RESERVE NO 20	15840	0	28°12'22.85S	31°34'20.3E	Farm Portion
3079	RESERVE NO 20	15840	55	28°13'19.5S	31°18'18.83E	Farm Portion
3080	NOBAMBA	16505	24	28°14'5.12S	31°16'18.2E	Farm Portion

3081	VALLEY	16786	8	28°42'34.7S	31°45'45.74E	Farm Portion
3082	VALLEY	16786	6	28°42'26.53S	31°46'4.12E	Farm Portion
3083	MAMBUKA	16919	0	28°32'43.55S	31°50'45.48E	Farm Portion
3084	RESERVE NO 20	15840	50	28°15'49.77S	31°22'17.86E	Farm Portion
3085	RESERVE NO 20	15840	72	28°15'32.94S	31°19'22.49E	Farm Portion
3086	LOT 292 EMPANGENI	13399	0	28°38'43.75S	31°50'28.52E	Farm Portion
3087	FULENI RESERVE	14375	5	28°27'41.43S	31°44'23.38E	Farm Portion
3088	DUBE RIDGE	15223	1	28°35'13.85S	31°48'10.89E	Farm Portion
3089	RESERVE NO 20	15840	62	28°15'47.01S	31°20'36.03E	Farm Portion
3090	RESERVE NO 20	15840	45	28°13'44.26S	31°22'45.13E	Farm Portion
3091	RESERVE NO 20	15840	4	28°4'31.6S	31°25'40.17E	Farm Portion
3092	XIMBA	16506	3	28°21'33.85S	31°36'25.04E	Farm Portion
3093	ZUNGU	16507	0	28°12'50.49S	31°35'40.32E	Farm Portion
3094	VALLEY	16786	11	28°42'9.75S	31°45'51.79E	Farm Portion
3095	VALLEY	16786	4	28°42'7.34S	31°46'23.26E	Farm Portion
3096	RESERVE NO 11	15831	6	28°23'43.26S	31°41'33.13E	Farm Portion
3097	RESERVE NO 20	15840	10	28°18'54.96S	31°27'21.09E	Farm Portion
3098	16560	0		28°40'10.71S	31°46'58.38E	Farm Portion
3099	NOBAMBA	16505	0	28°18'30.99S	31°15'39.61E	Farm Portion
3100	NOBAMBA	16505	23	28°16'45.37S	31°19'39.9E	Farm Portion
3101	VALLEY	16786	9	28°42'21.32S	31°45'28.78E	Farm Portion
3102	OBIZO	16920	0	28°37'19.45S	31°52'57.25E	Farm Portion
3103	NTOMBOTI	18410	0	28°41'2.66S	31°46'3.97E	Farm Portion
3104	VALLEY	16786	5	28°42'18.01S	31°46'12.84E	Farm Portion
3105	VALLEY	16786	2	28°41'54.68S	31°46'8.79E	Farm Portion
3106	MATATANE CROCODILE	17384	0	28°14'25.6S	31°10'11.84E	Farm Portion
3107	HANDLEY	18087	0	28°38'0.59S	31°47'47.99E	Farm Portion
3108	ULUNDI D	1308	0	28°16'56.25S	31°26'35.46E	Public Place
3109	ULUNDI D	1903	0	28°16'36.36S	31°26'31.6E	Public Place
3110	ULUNDI D	3199	0	28°16'14.31S	31°26'29.86E	Public Place
3111	ULUNDI B	1075	0	28°17'25.51S	31°24'44.4E	Public Place
3112	ULUNDI D	1716	0	28°16'54.66S	31°26'16.74E	Public Place
3113	ULUNDI D	3200	0	28°16'17.55S	31°26'27.62E	Public Place
3114	ULUNDI D	1904	0	28°16'39.93S	31°26'39.44E	Public Place
3115	ULUNDI D	2197	0	28°16'34.15S	31°25'55.76E	Public Place
3116	ULUNDI D	2613	0	28°16'43.97S	31°26'5.51E	Public Place
3117	ULUNDI D	307	0	28°16'18.5S	31°26'32.21E	Public Place
3118	ULUNDI D	846	0	28°16'29.93S	31°26'12.79E	Public Place
3119	ULUNDI D	1273	0	28°16'49.29S	31°26'31.68E	Public Place
3120	ULUNDI D	3198	0	28°16'8.06S	31°26'16.62E	Public Place
3121	ULUNDI D	1507	0	28°16'52.99S	31°26'26.15E	Public Place
3122	ULUNDI D	2014	0	28°16'23.24S	31°26'44.78E	Public Place
3123	ULUNDI D	1490	0	28°17'3.97S	31°26'19.33E	Public Place
3124	ULUNDI D	2195	0	28°16'37.09S	31°25'57.1E	Public Place
3125	ULUNDI D	2196	0	28°16'36.09S	31°25'55.75E	Public Place
3126	ULUNDI C	119	0	28°17'17.6S	31°25'34.65E	Public Place
3127	ULUNDI D	160	0	28°16'19.16S	31°26'20.88E	Public Place
3128	ULUNDI D	1291	0	28°16'52.51S	31°26'42.56E	Public Place

3129	ULUNDI D	1902	0	28°16'34.48S	31°26'31.95E	Public Place

Appendix E : Site Photographs

Photo 01: Showing proposed powerline route.

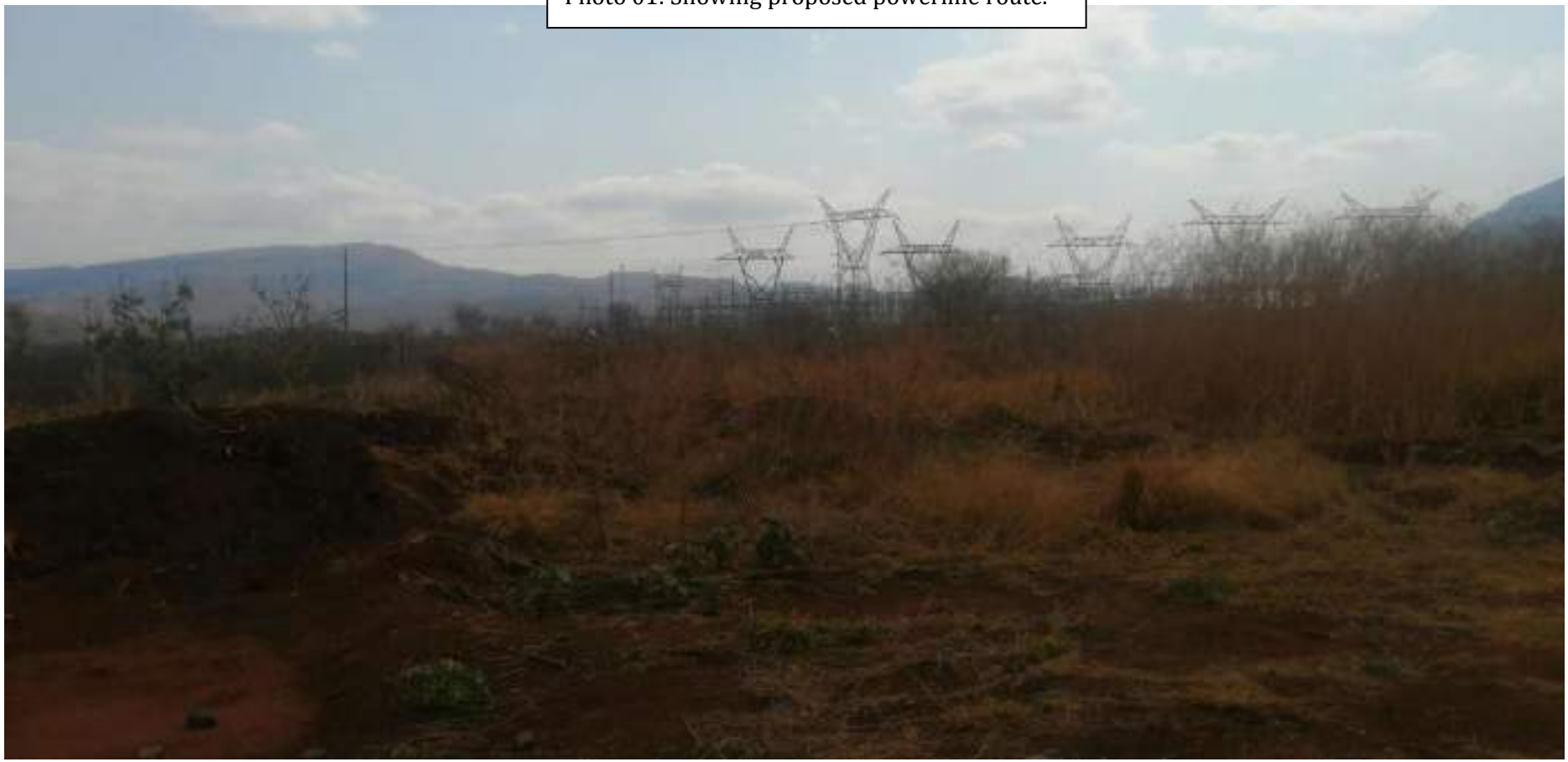


Photo 02: Showing proposed powerline route.

Photo 03: Showing proposed powerline route.

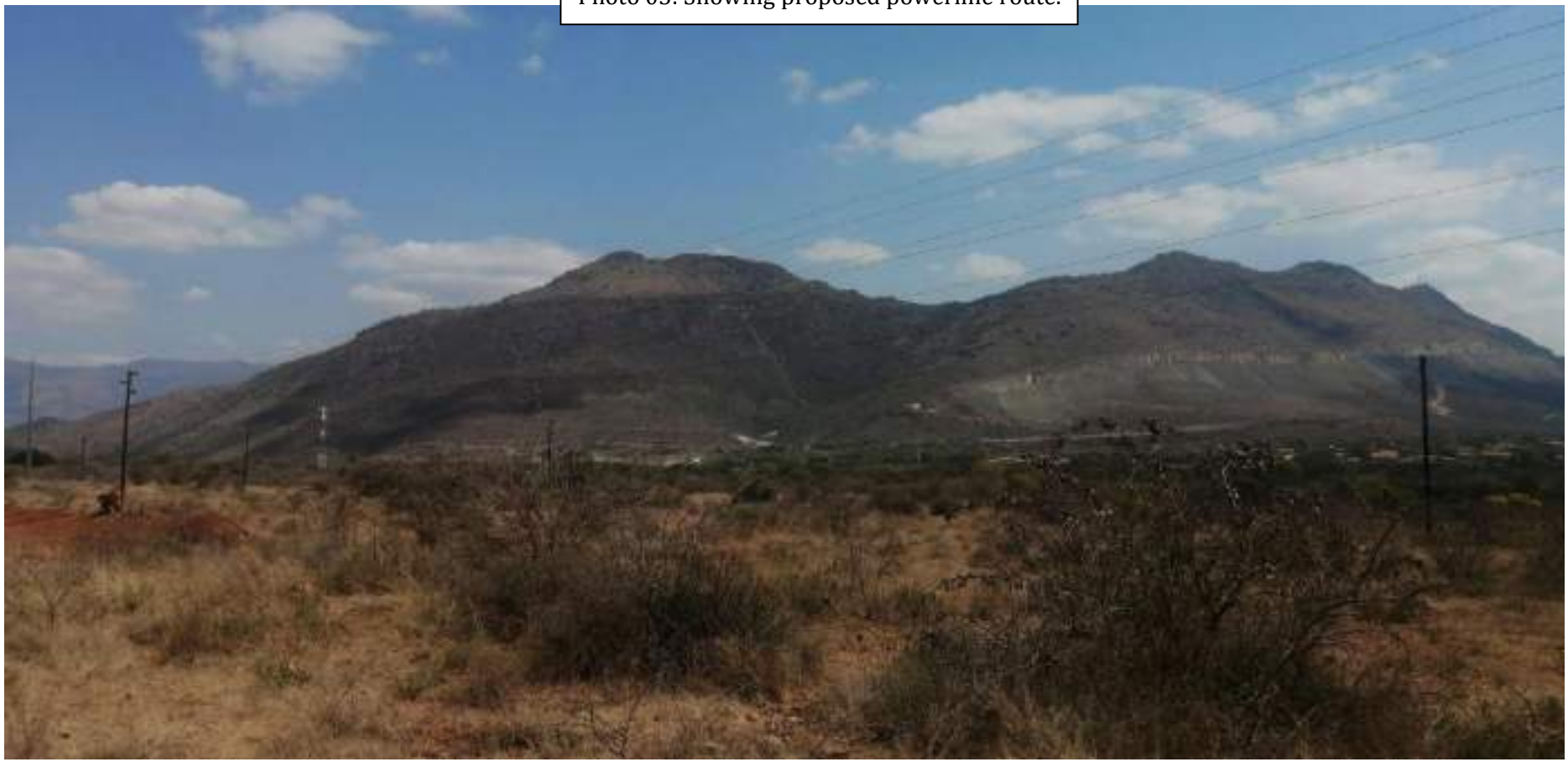


Photo 04: Showing proposed powerline route.

Appendix F : Facility Illustration

UMFOLOZI – MBEWU 765KV LINE

CONSTRUCTION PROFILES

Structure Family: 701, 702, 705, 518

Conductor: 6 x Tern, 4 x Tern

1  RIVER CROSSING

2  WATER COURSE/BONGA

3  WETLAND/VLEI

4  NO ACCESS

5  ALTERNATIVE CONSTRUCTION

6  RECOMMENDED OR NEGOTIATED ACCESS

7  CONCRETE DRIFTS/ROADS

8  SPECIFIC MAINTENANCE

9  LANDOWNER SPECIAL CONDITIONS

10  GOVT SPECIAL CONDITIONS

11  UNDERGROUND WATER PIPE LINE

12  UNDERGROUND FUEL PIPE LINE

13  IRRIGATION LINES

14  IRRIGATION CANNAL

15  PIVOT IRRIGATION

16  STORMWATER PIPES

17  ELECTRIC FENCE

18  GAME FENCE

19  BUSH CLEARING

20  NO CUTTING OF TREES OR BUSH

21  NO CUTTING OF ENDANGERED SPECIES

22  BIRDS GUARDS

23  BIRDS NESTING ON EXISTING LINES

24  AVIATION

25  BIRDS DIVERTERS

26  GAME FARM

27  ARCHAEOLOGICAL SITE

28  GRAVE

29  EROSION PROTECTION

30  SUGAR CANE

31  GRAPES/VINEYARD

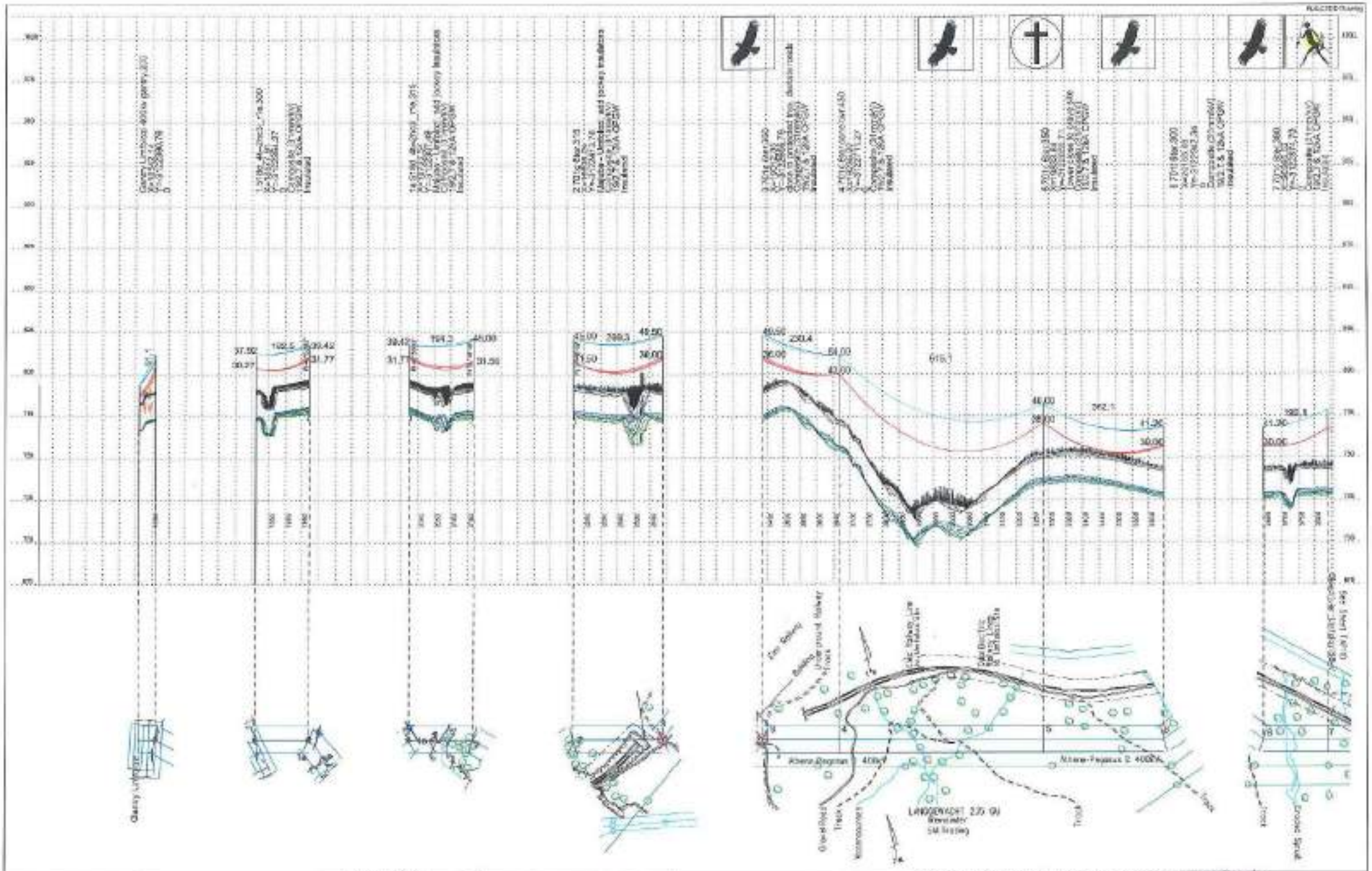
32  SPECIAL FLORA

33  DRY LAND/CROPS

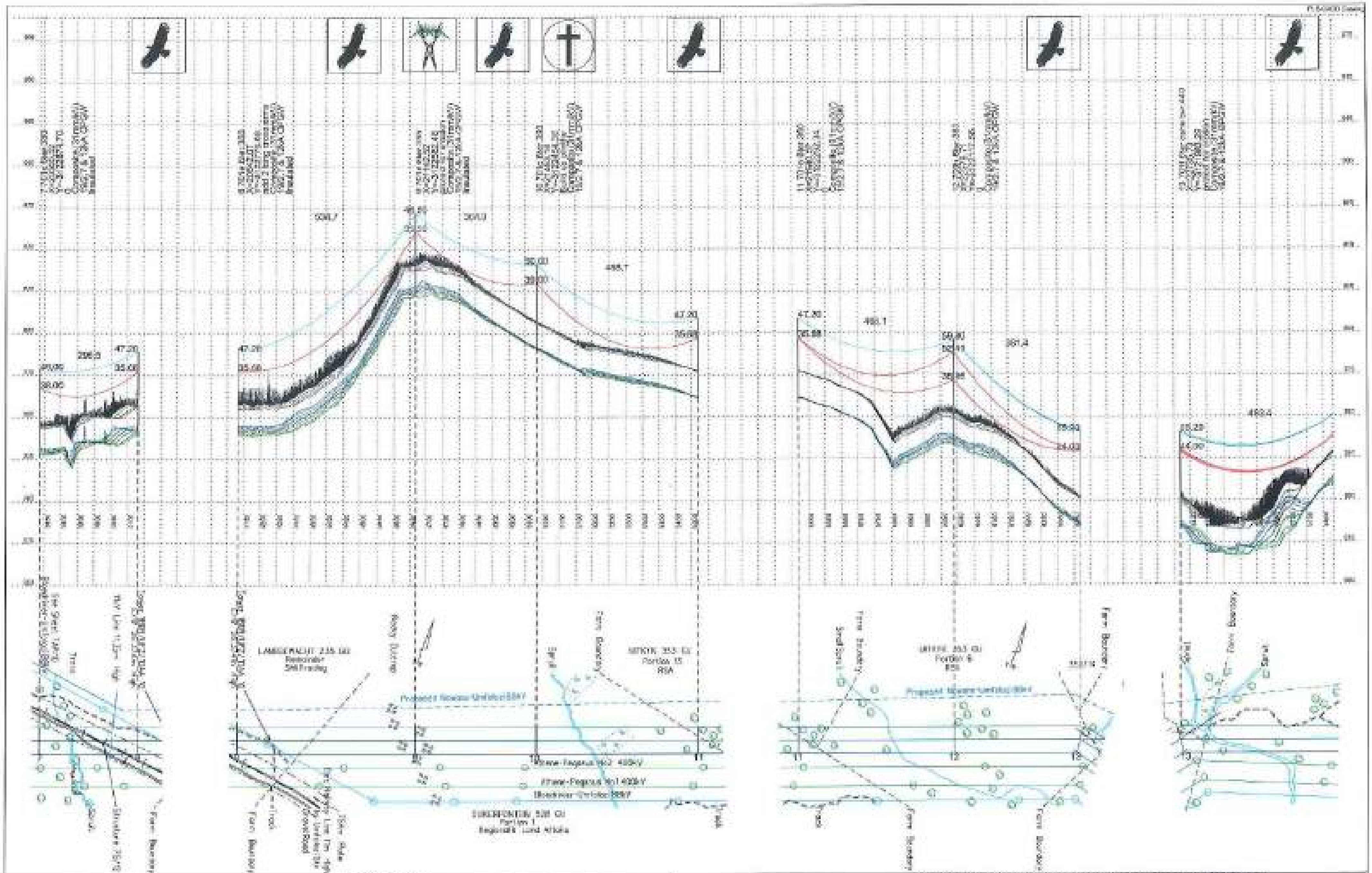
34  NO FIRES

35  PLANTATIONS

36  ENDANGERED ANIMALS

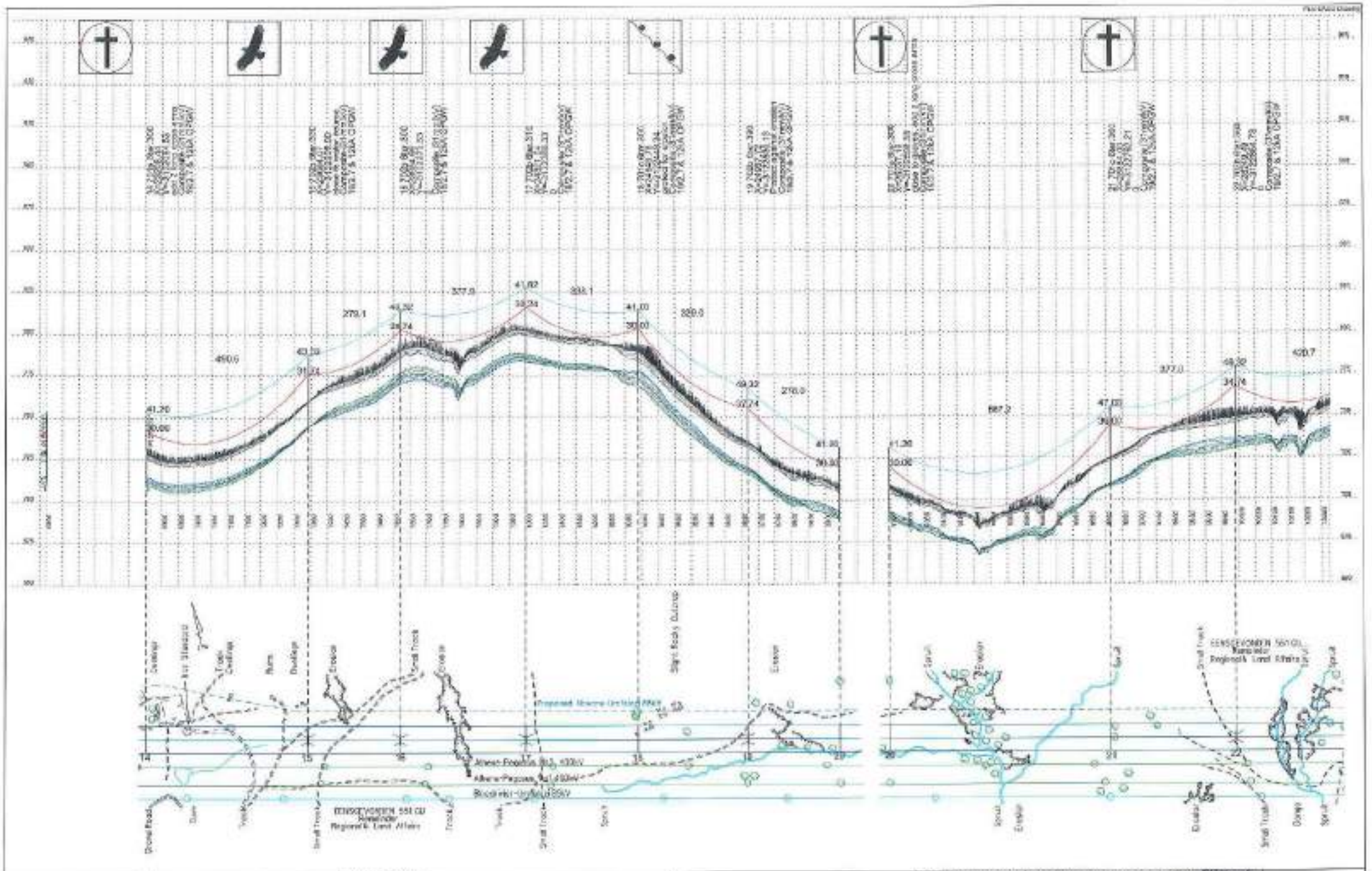


100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umiloluzi - Mbewu 765kV Part 1 Structure Family: 701, 702, 705, 718 Conductor: 6 Tern, 4 Tern Templating Temperature: 70 Degrees	DATE: September 2017 Shoot 1/14	Project No. Te. 364



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 1 Structure Family: 701, 702, 705, 516 Conductor: 6 Tern, 6 Tern Templating Temperature: 70 Degrees	DATE: September 2017 Sheet 2/14

Project No. TX 203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Unifolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 618

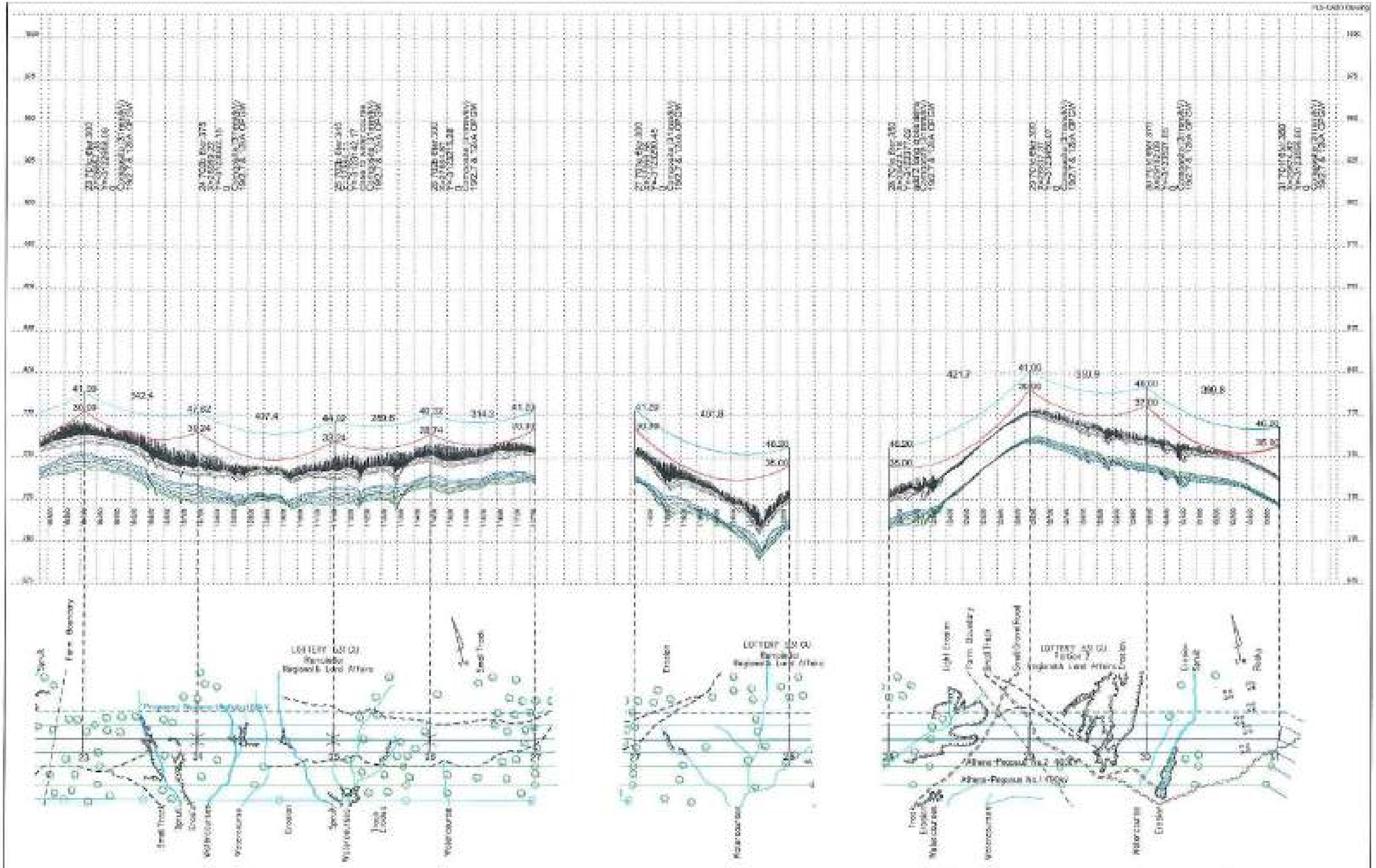
Conductor: 6 Tern, 4 Tern

Templating Temperature: 70 Degrees

DATE: September 2017

Shoot 3/14

Project No. Tx_203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfoloz - Mbewu 765kV Part 1

Structure Family: 761, 732, 795, 518

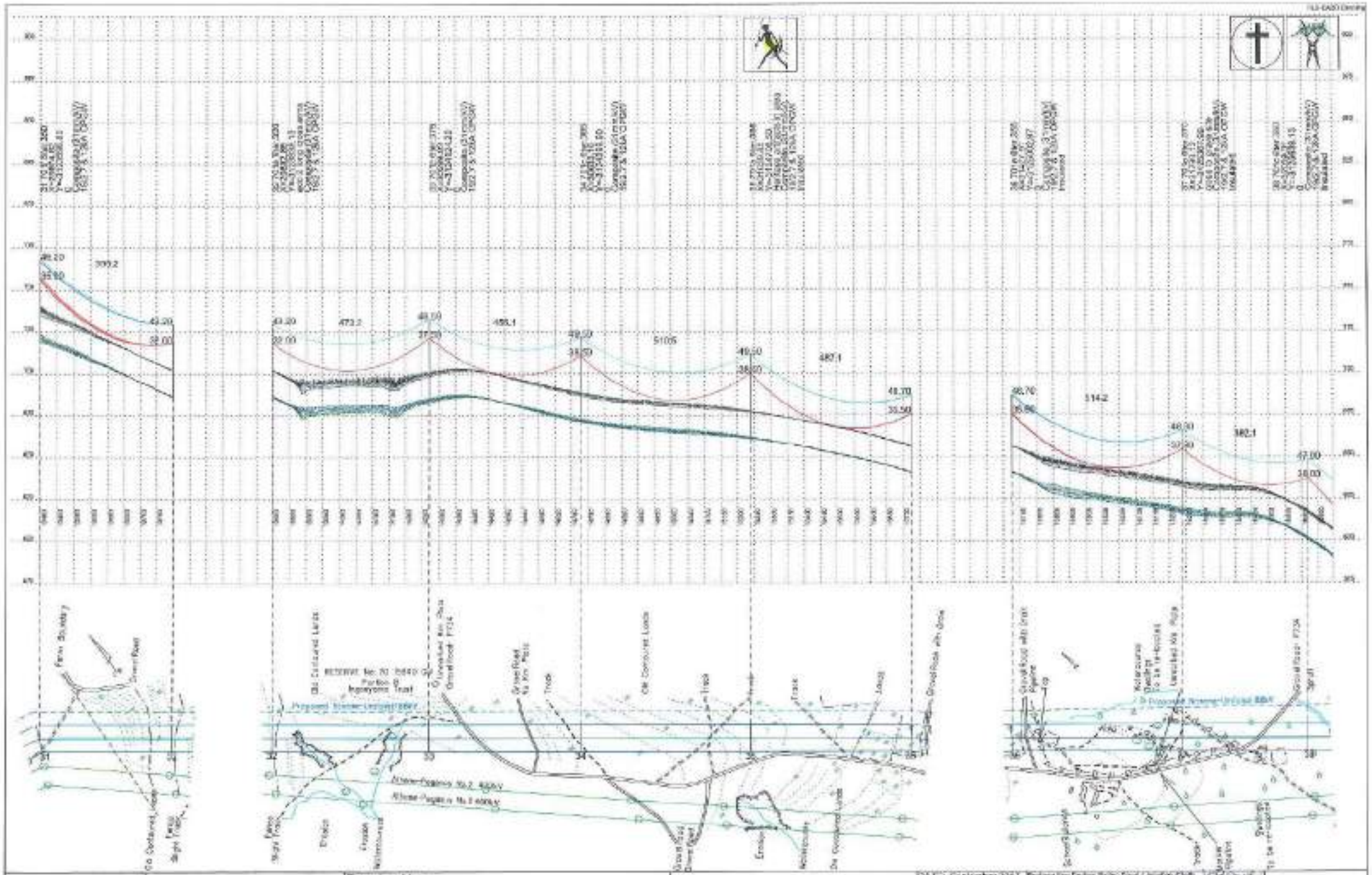
Conductor: 6 Tern, 4 Tern

Templating Temperature: 70 Degrees

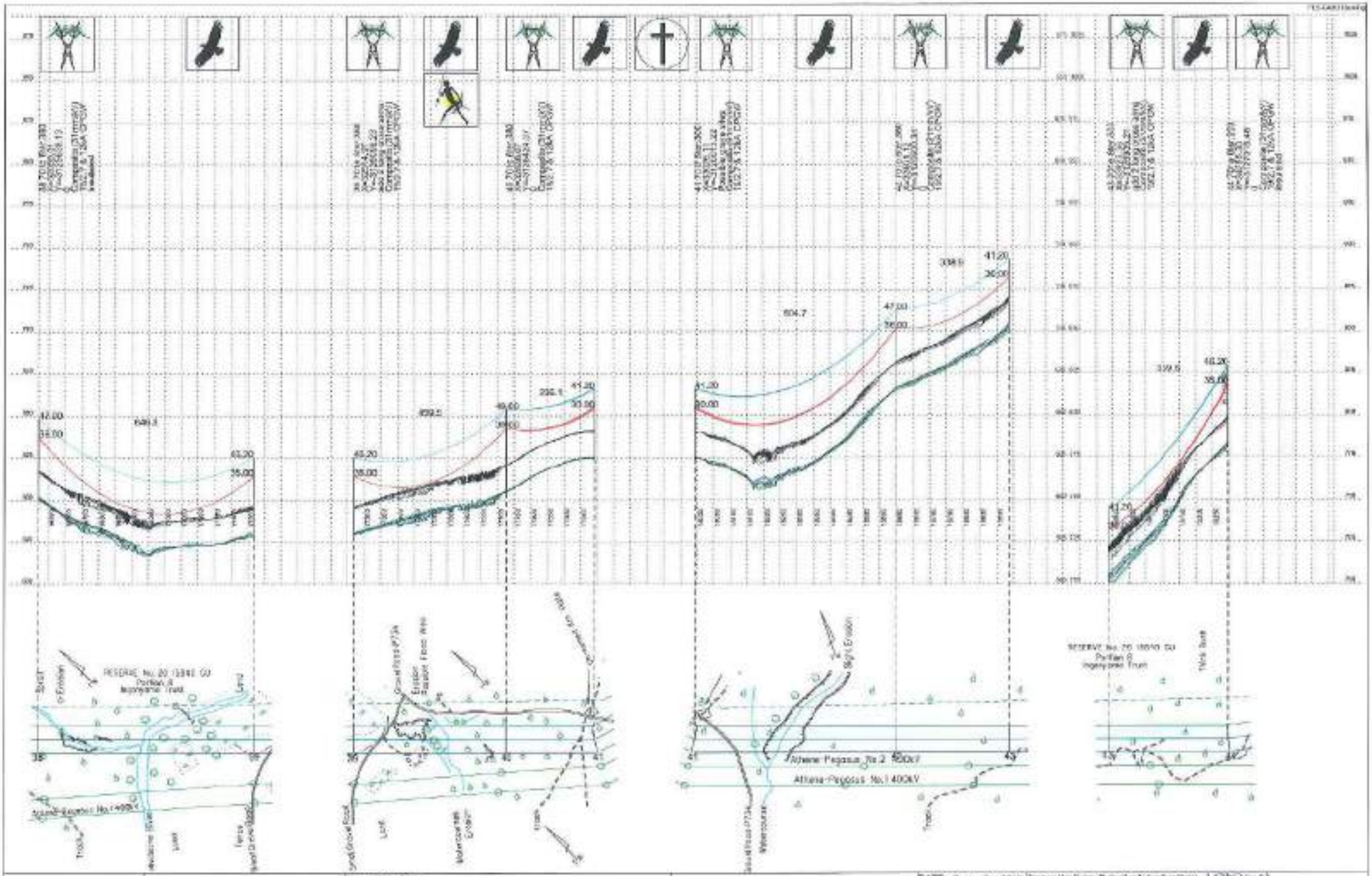
DATE: September 2017

Sheet 4/14

Project No. [illegible]



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 1 Structure Family: 701, 702, 735, 518 Conductor: 0 Term, 4 Term Templating Temperature: 70 Degrees	DATE: September 2017 Sheet 5/14	Project No: 12_369



100.0 m
Horiz. Scale

20.0 m
Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 731, 732, 735, 618

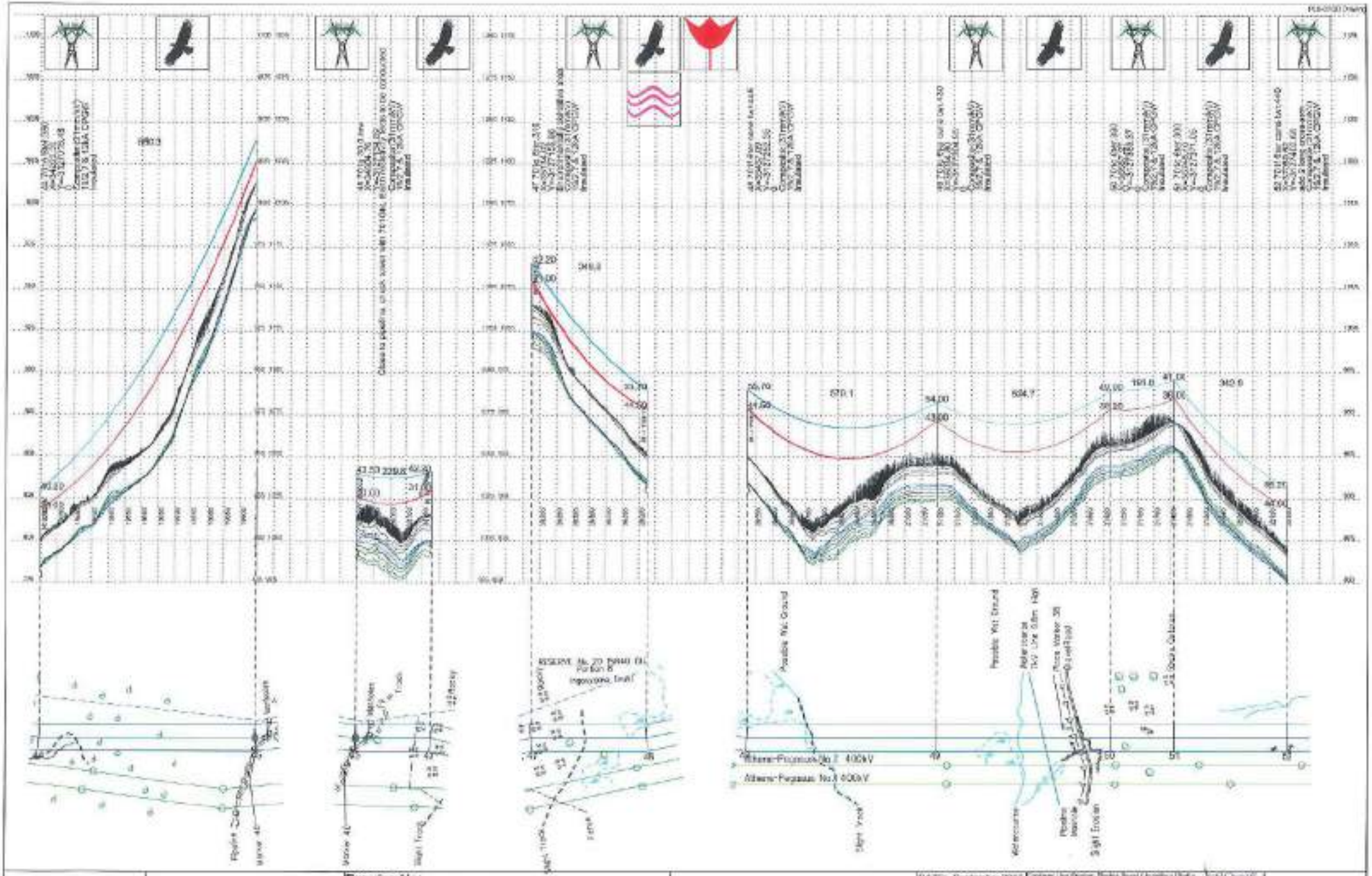
Conductor: 6 Twin, 4 Twin

Templating Temperature: 75 Degrees

DATE: September 2017

Sheet 6/14

Project No.
Te. 269



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Maewu 765kV Part 1

Structure Family: 701, 702, 705, 918

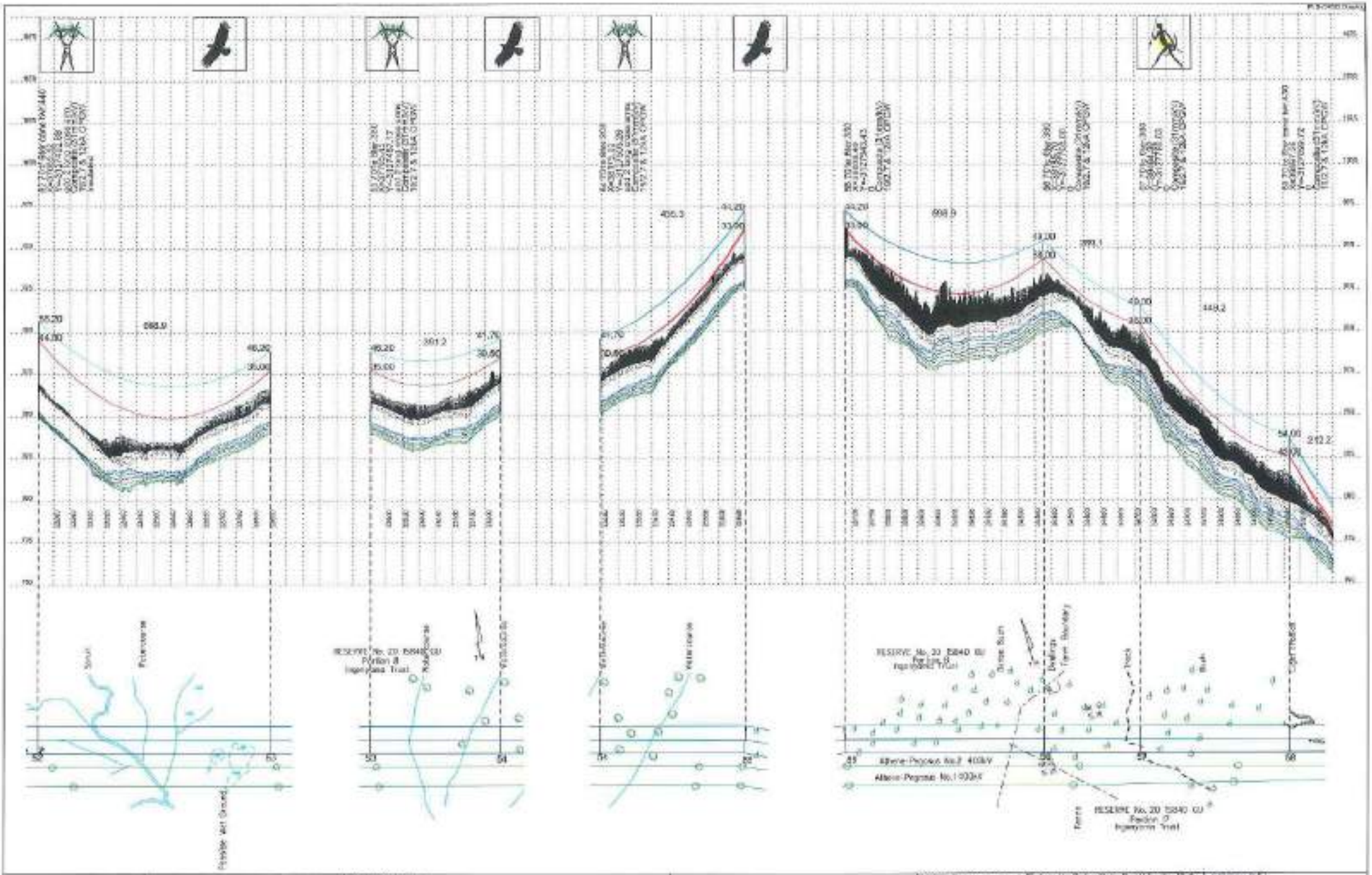
Conductor: 6 Tern, 4 Tern

Sagging Temperature: 70 Degrees

DATE: September 2017

Sheet 7/14

Project No.
TX 201



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 518

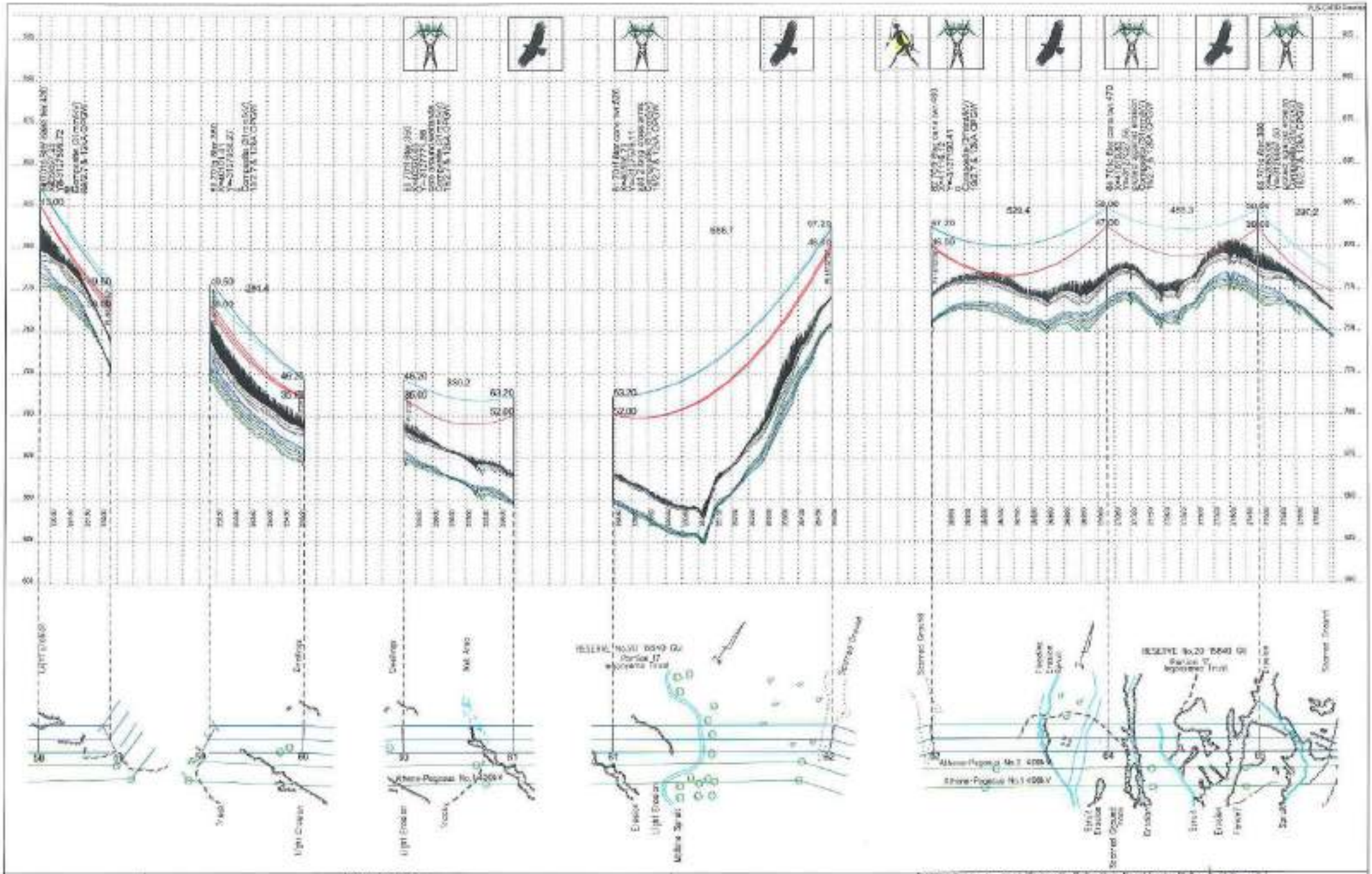
Conductor: 6 Tern, 4 Tern

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 8/14

Project No.
TX 063



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 518

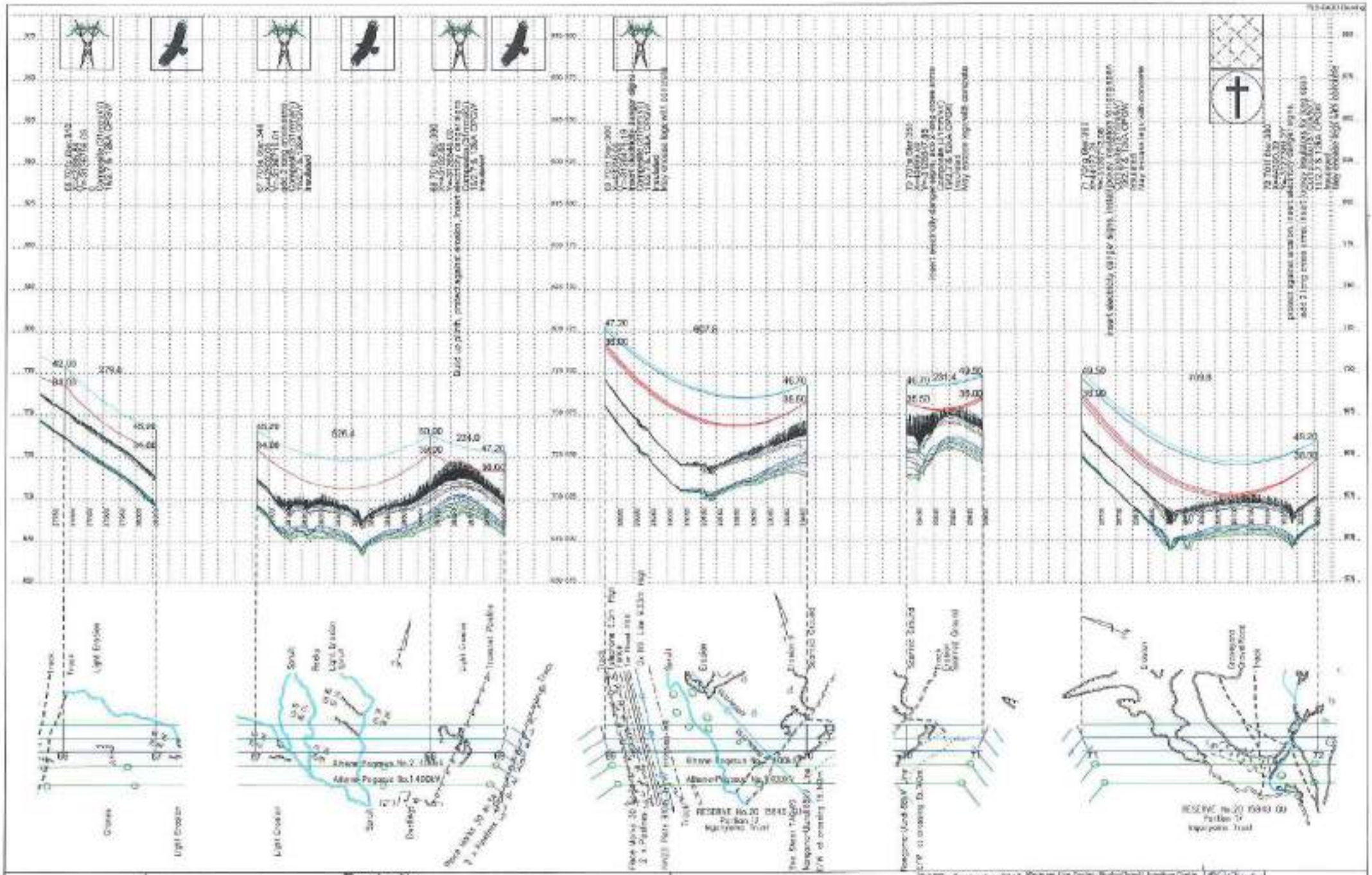
Conductor: 5 Tern, 4 Tern

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 9/14

Project No. Tx 303



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 703, 919

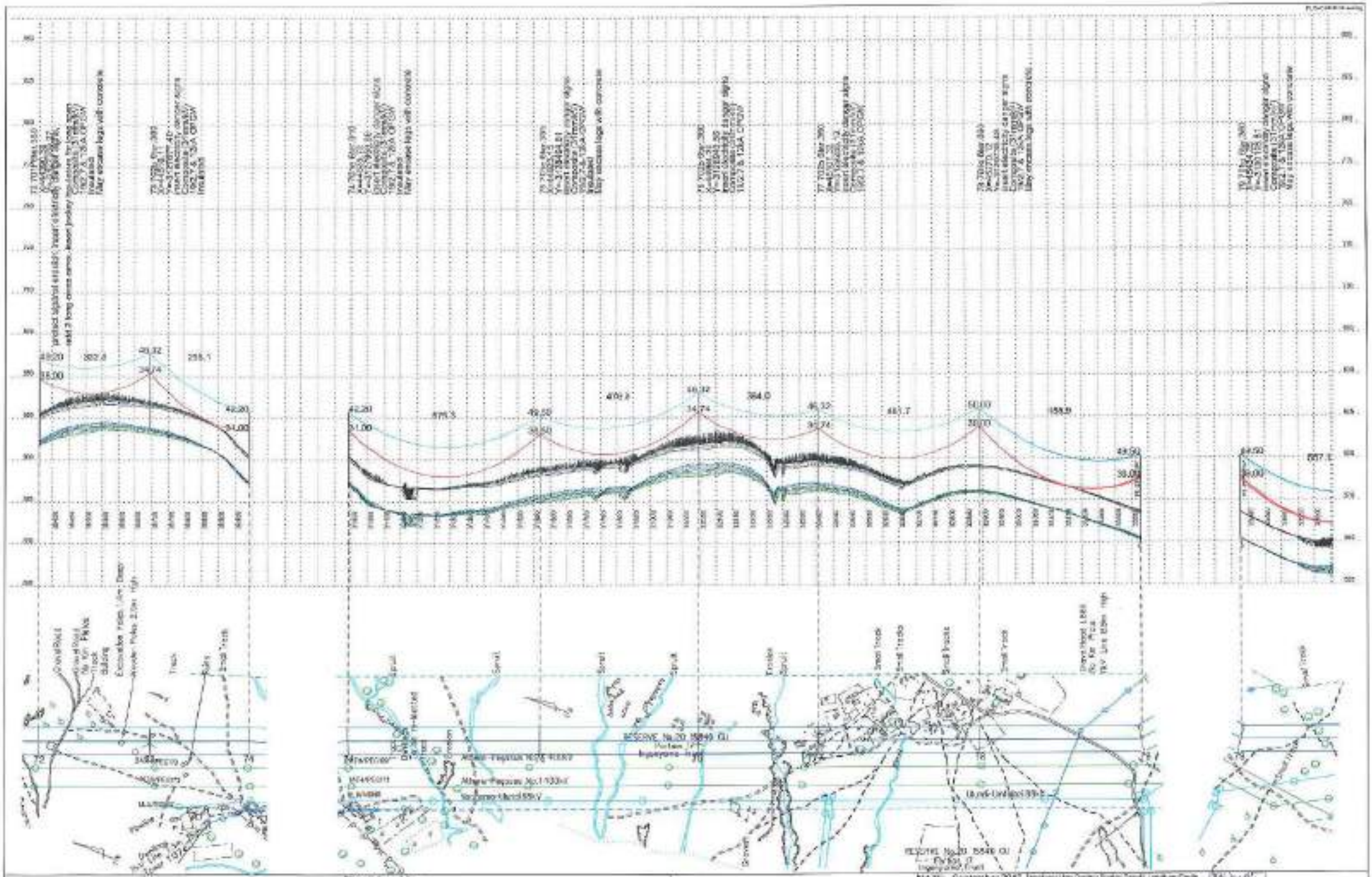
Conductor: 6 Tern, 4 Toxis

Tensioning Temperature: 20 Degrees

DATE: September 2017

Shoot 10/14

Project No. TX. 265



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

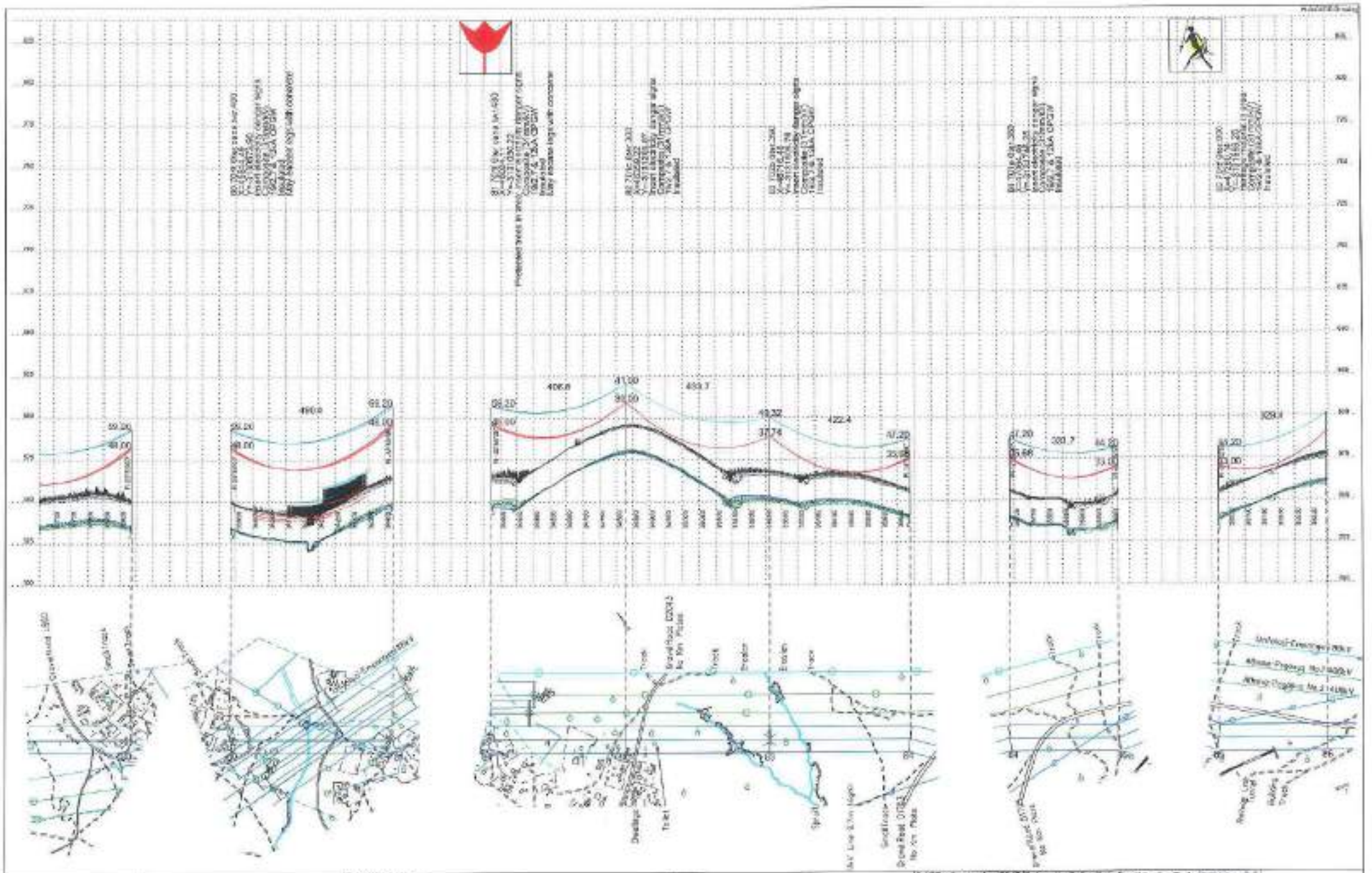
CONSTRUCTION PROFILES

Umfolozi - Mbewu 765kV Part 1

Sheet 11/14

DATE: September 2017

Printed No. 12 203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 1

Structure Family: 701, 702, 705, 018

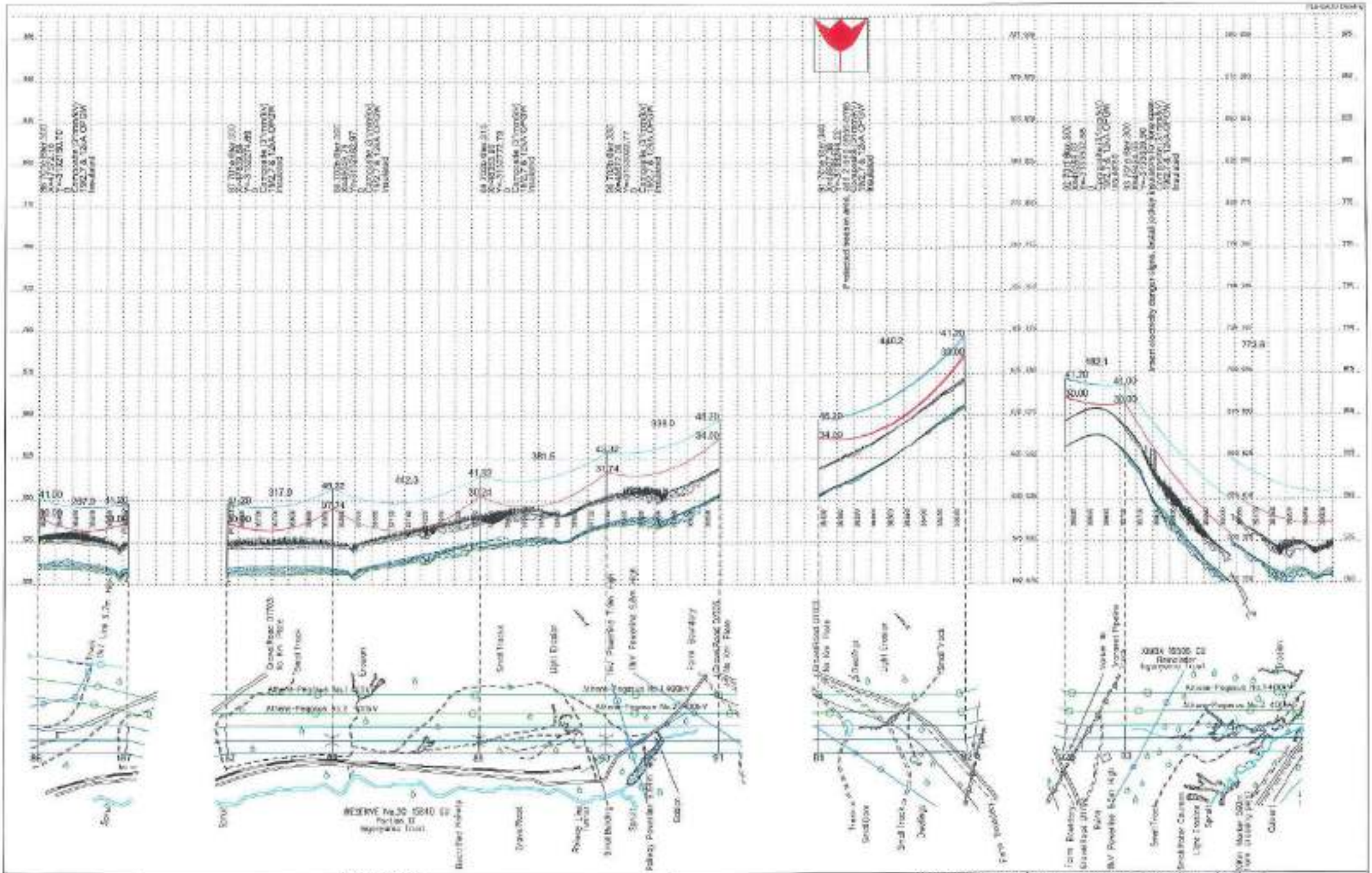
Conductor: 6 Tern, 4 Tern

Templating Temperature: 70 Degrees

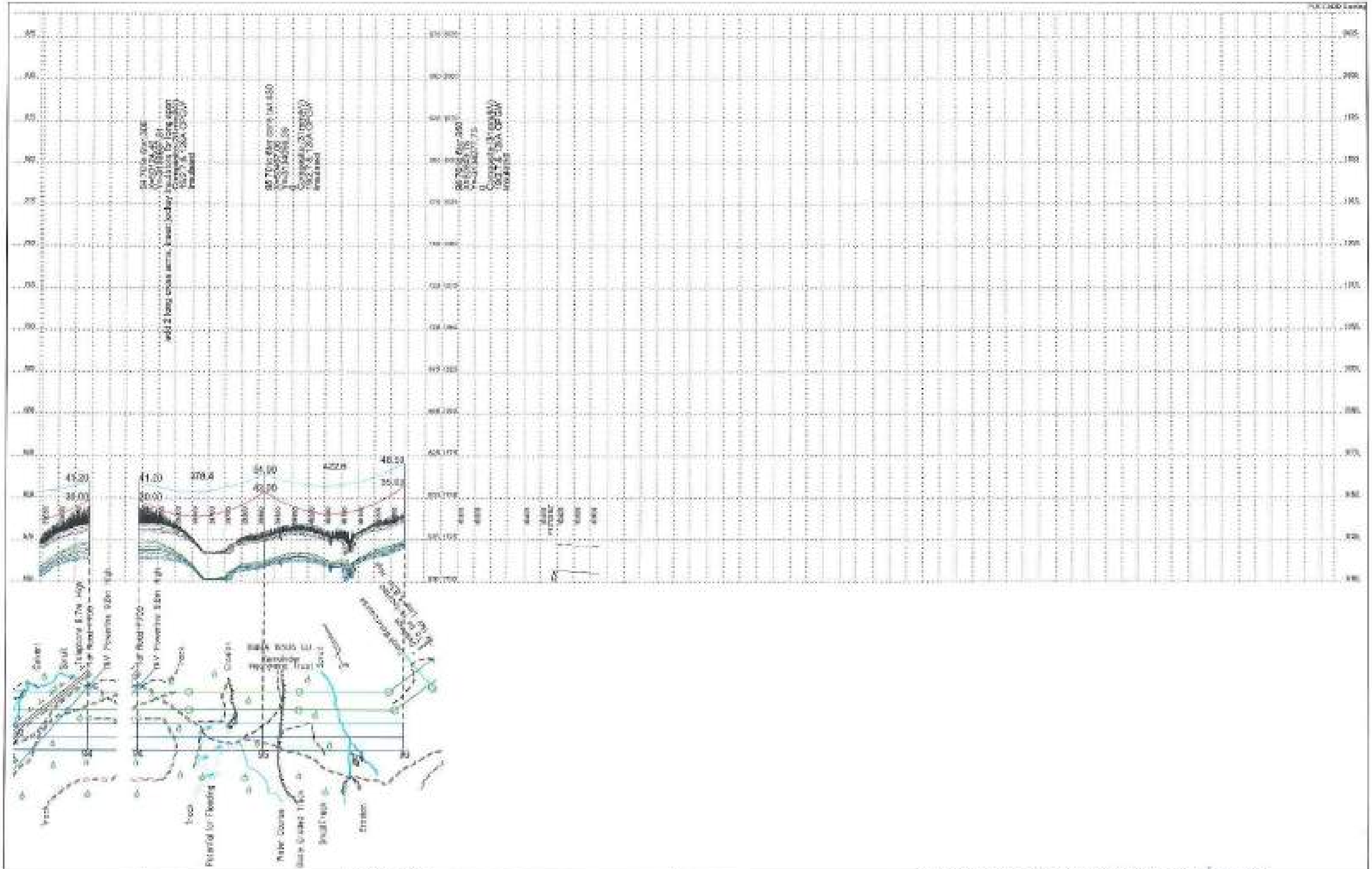
DATE: September 2017

Sheet 12/14

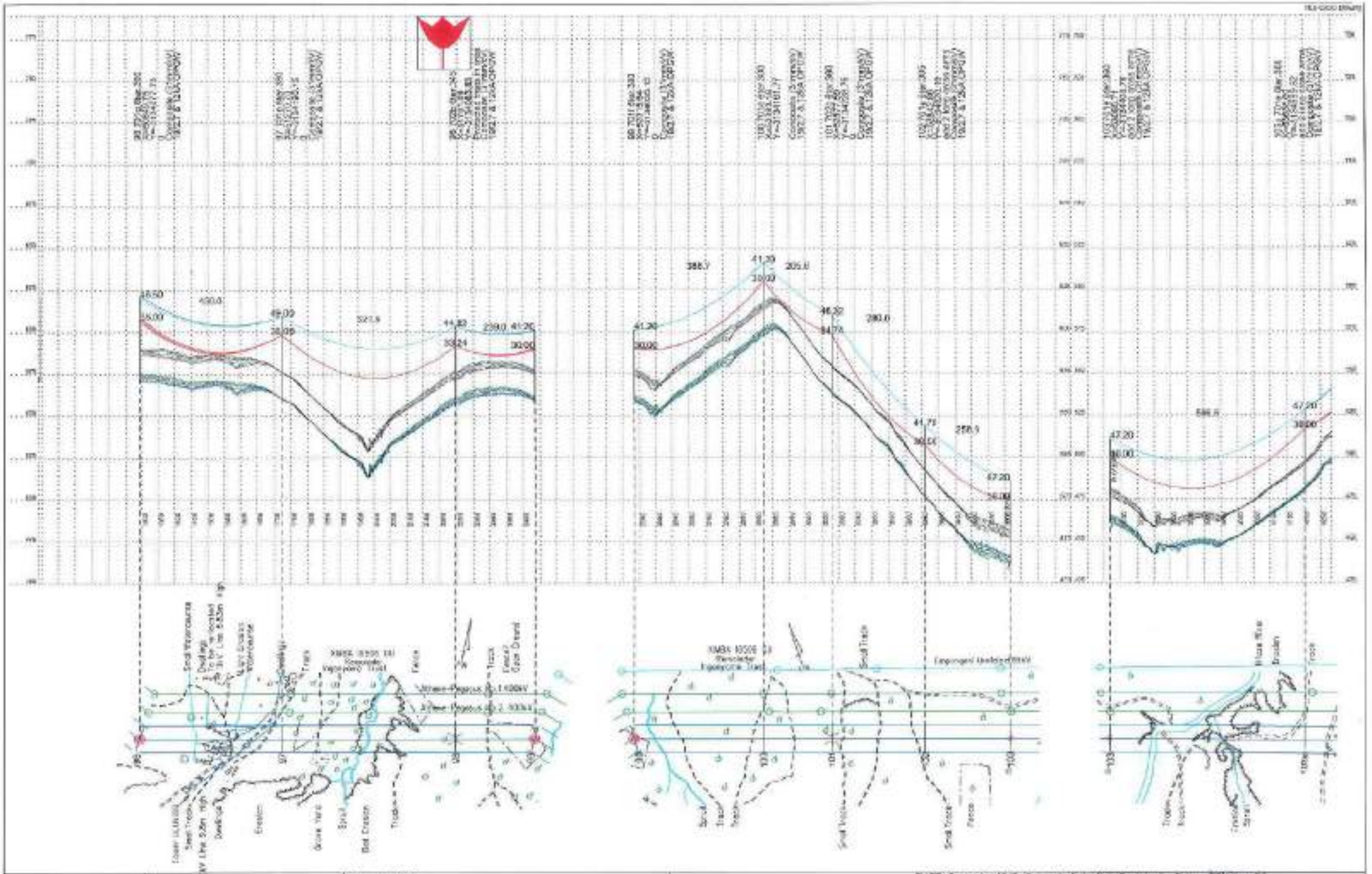
Project No
TX- 205



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 1 Structure Family: 731, 732, 736, 818 Conductor: 6 Tern, 4 Tern Sagging Temperature: 70 Degrees	DATE: September 2017 Sheet 13/14	Project No. Te. 203



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 1 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Temperature: 70 Degrees	DATE: September 2017 Sheet 14/14	Project No.



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

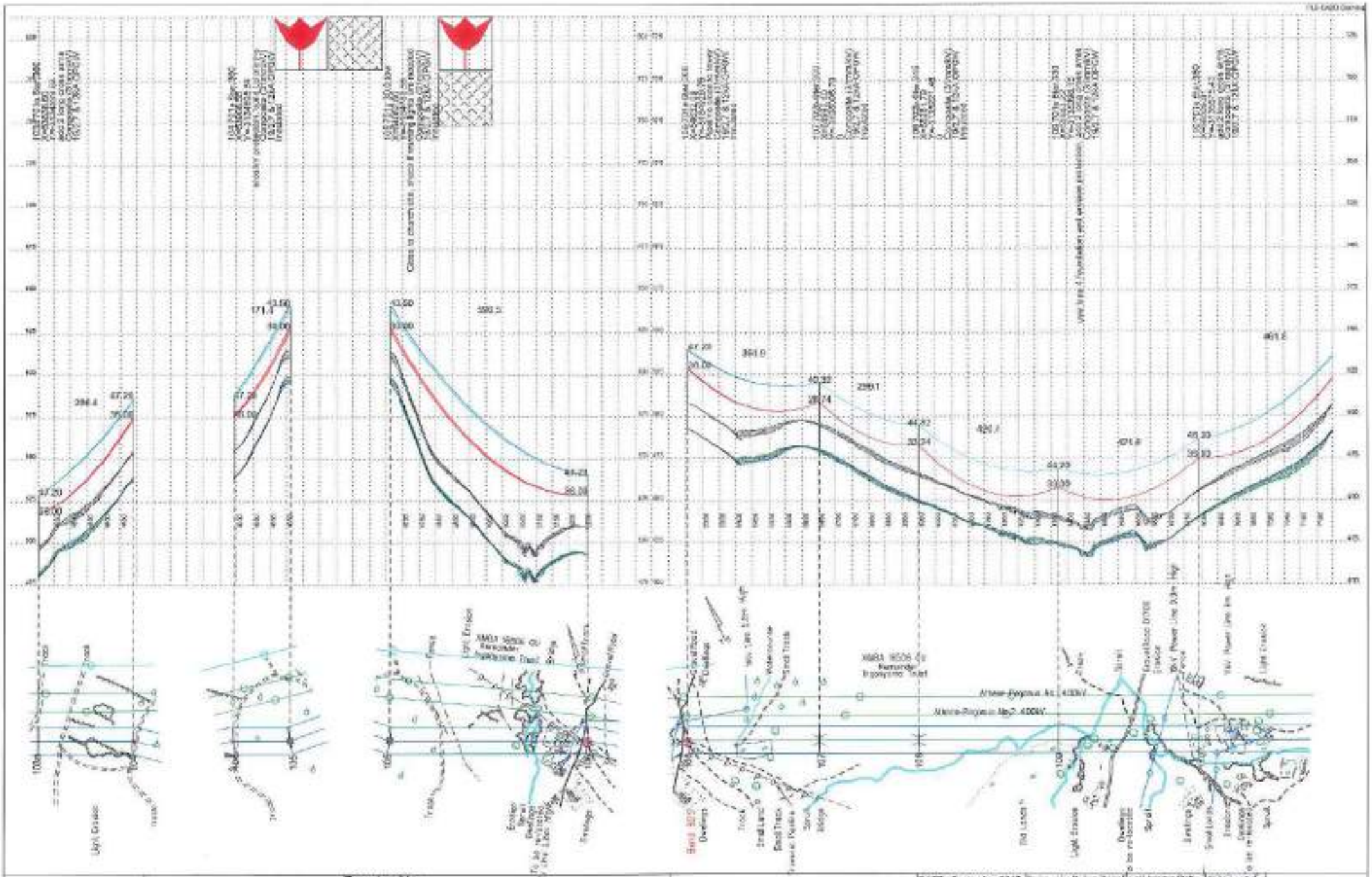
Conductor: 6 TERN, 4 TWIN

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 1/20

Project No.
Tx 203



100.0 m
Horiz. Scale

20.0 m
Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 019

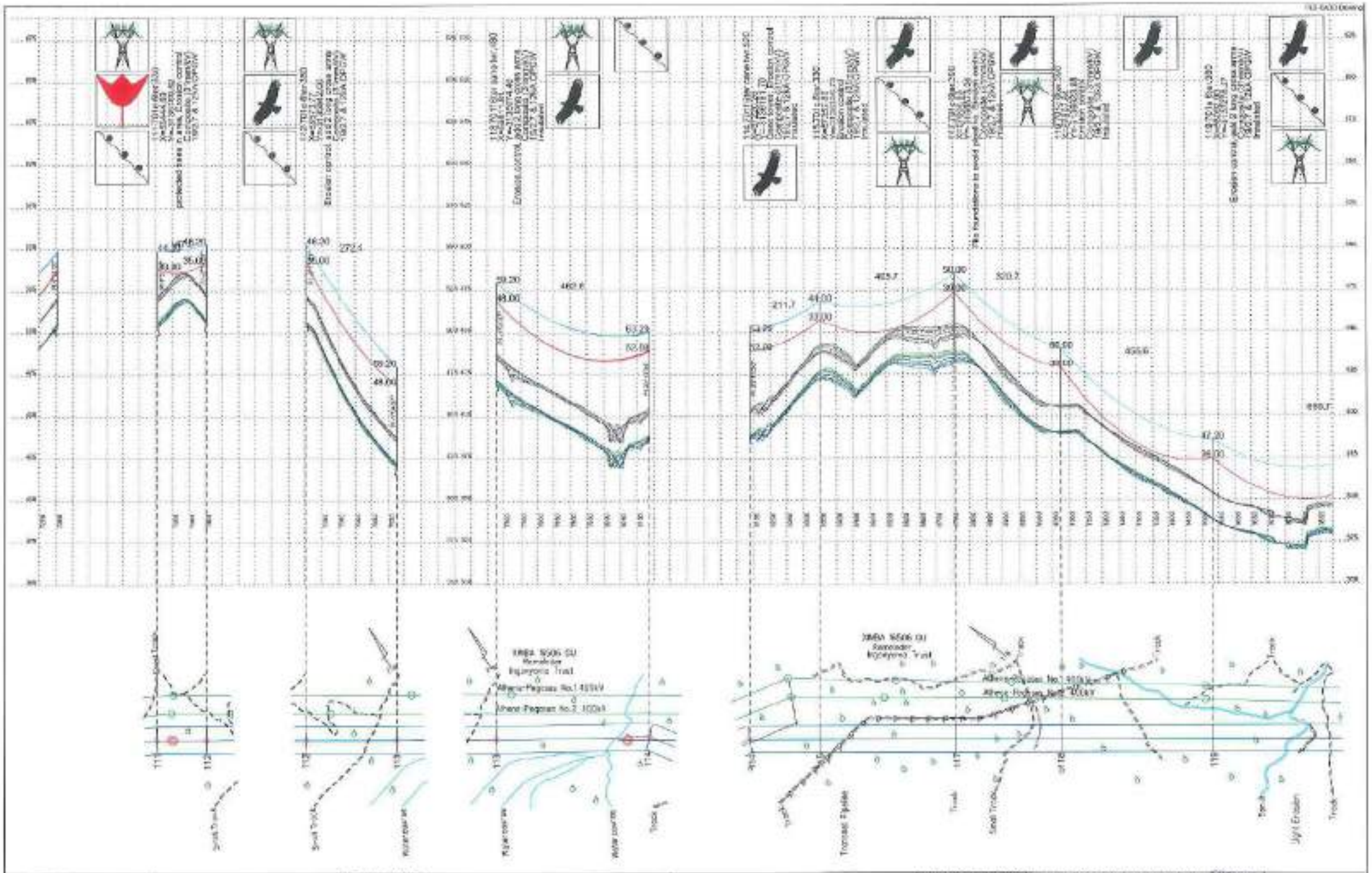
Conductor: 9 Twin, 4 Twin

Temp'erature Temperature: 70 Degrees

DATE: September 2017

Sheet 2/20

Project No.
Tx. 233



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 818

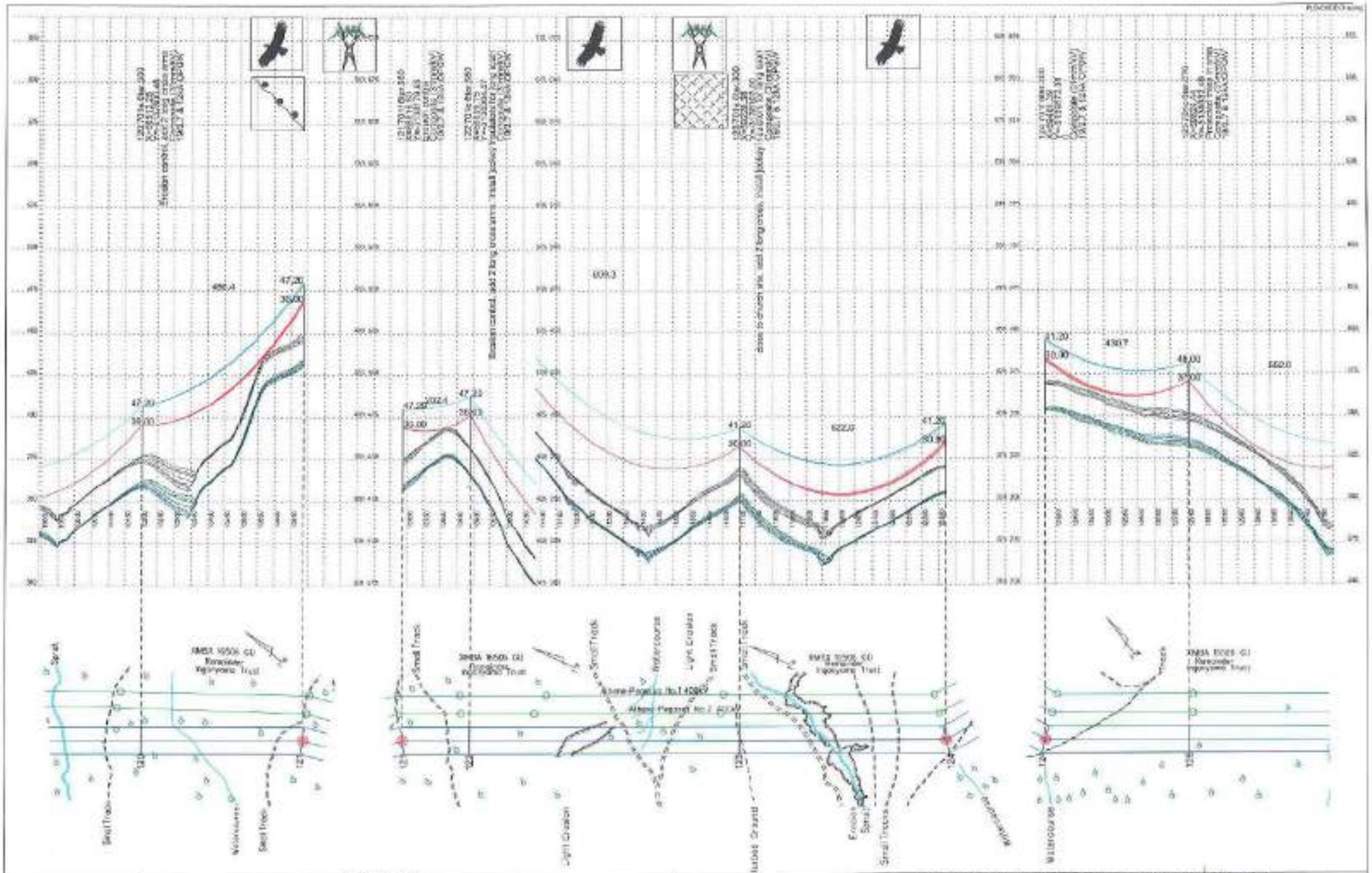
Conductor: 6 Turn, 4 Turn

Tensioning Temperature: 20 Degrees

DATE: September 2017

Sheet 3/20

Project No: Tx 303



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 708

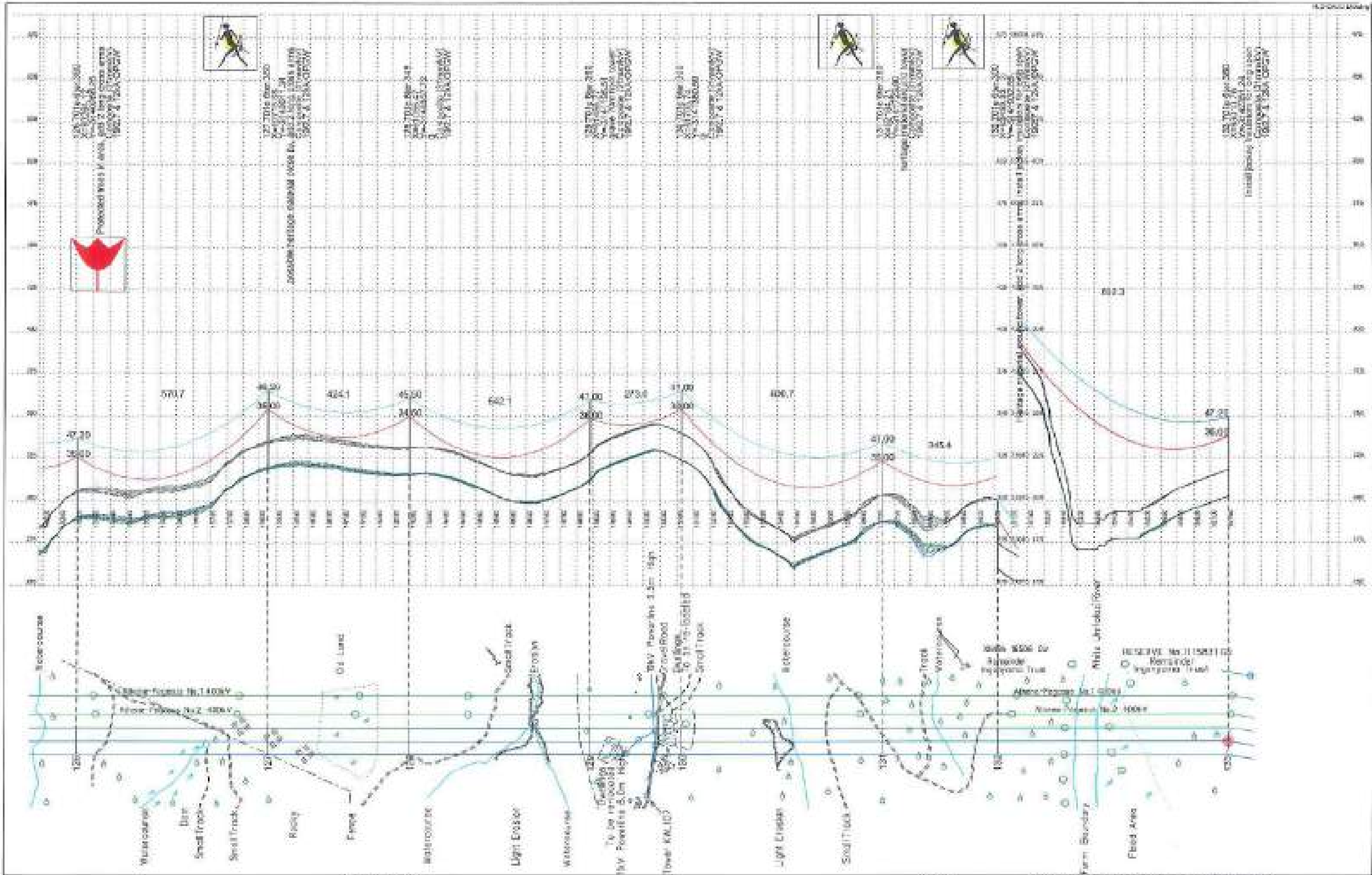
Construction: 0 Tons, 4 Tons

Foreshalling Temperature: 70 Degrees

DATE: September 2017

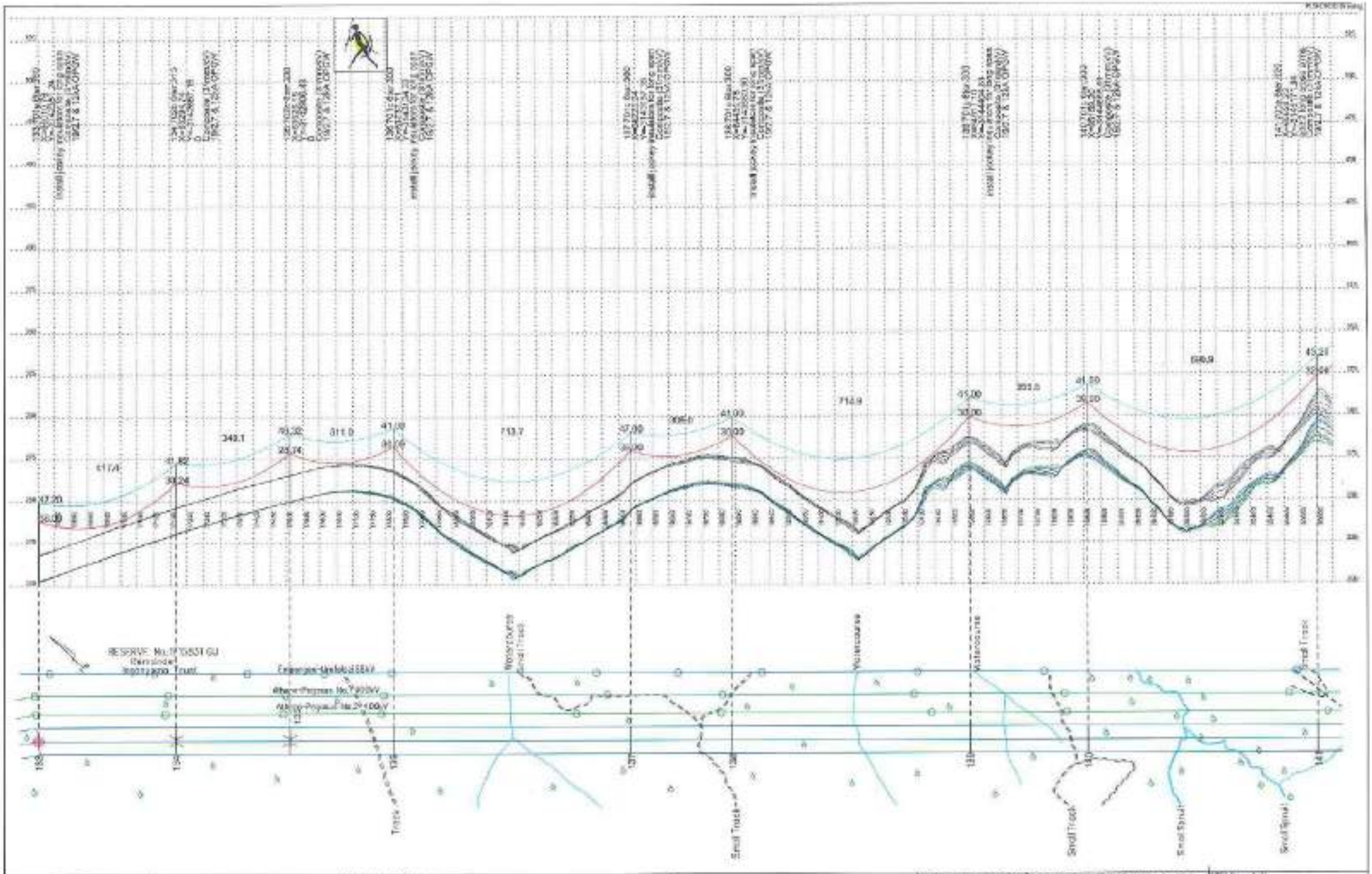
Sheet 4/20

Project No.
TX: 359

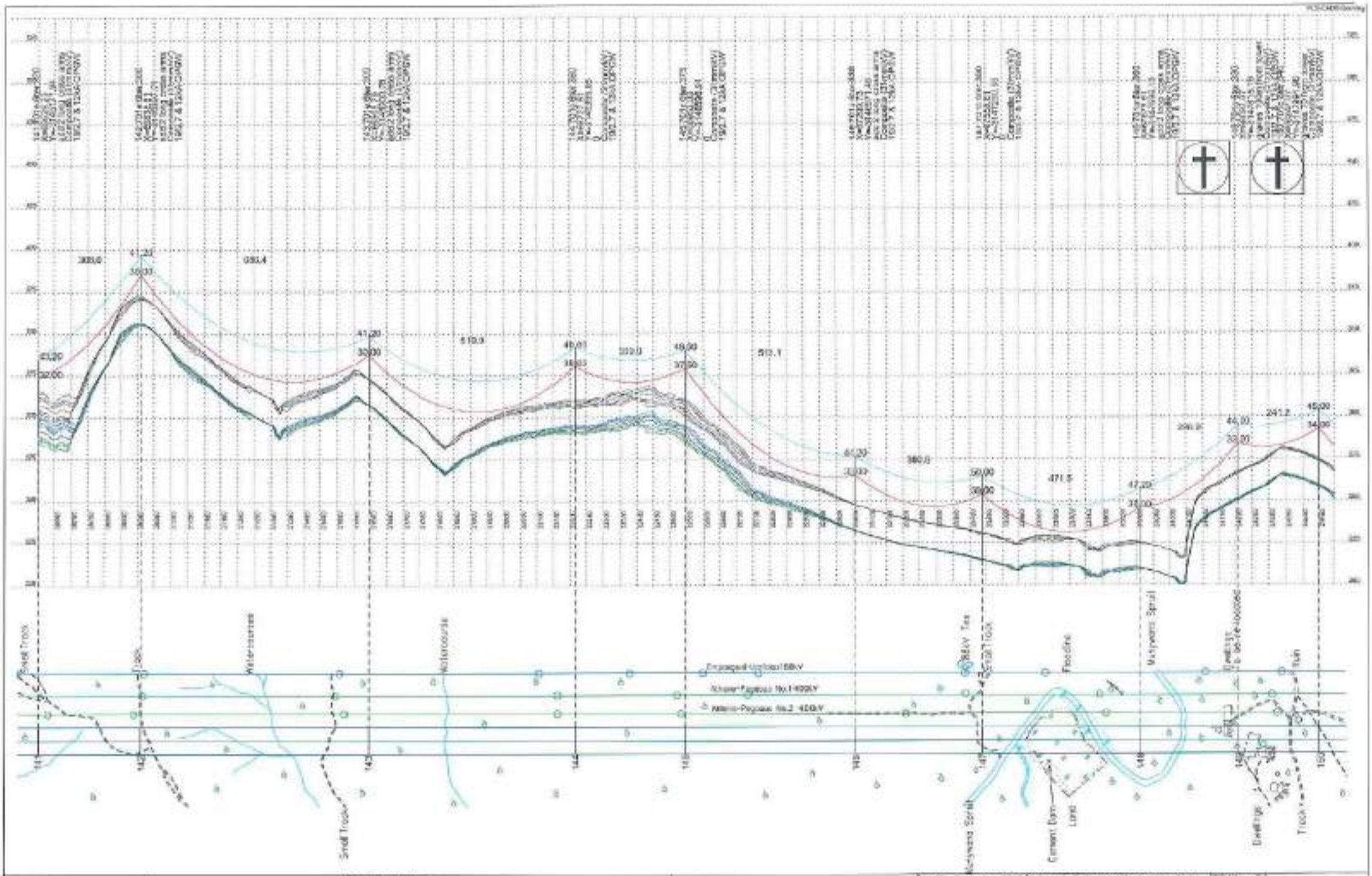


100,0 m Horiz. Scale 20,0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 708, 705, 518 Conductor: 6 Tern, 4 Tern Templating Temperature: 70 Degrees	DATE: September 2017 Sheet 5/20

Project No. TX 263



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Deviation: 0 Tens, 4 Tens Templating Temperature: 70 Degrees	DATE: September 2017 Sheet 6/20	Engineer: [illegible] Project No. Tx 393



100.0 m
Horiz. Scale

20.0 m
Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umtolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

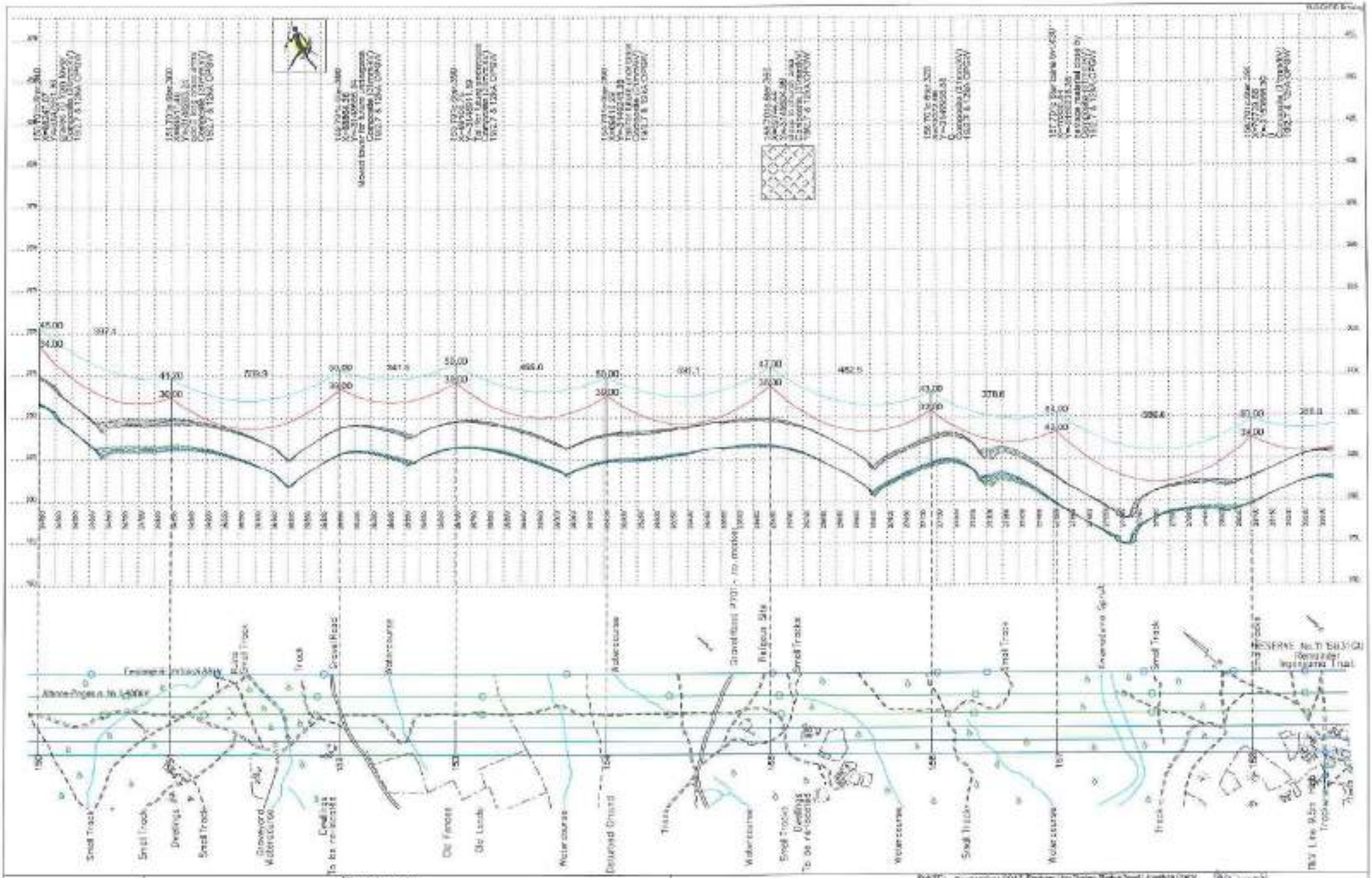
Conductor: 0 Tern, 4 Tern

Templating Temperature: 70 Degrees

DATE: September 2017

Sheet 7/20

Project No.
TX 331



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Description: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 918

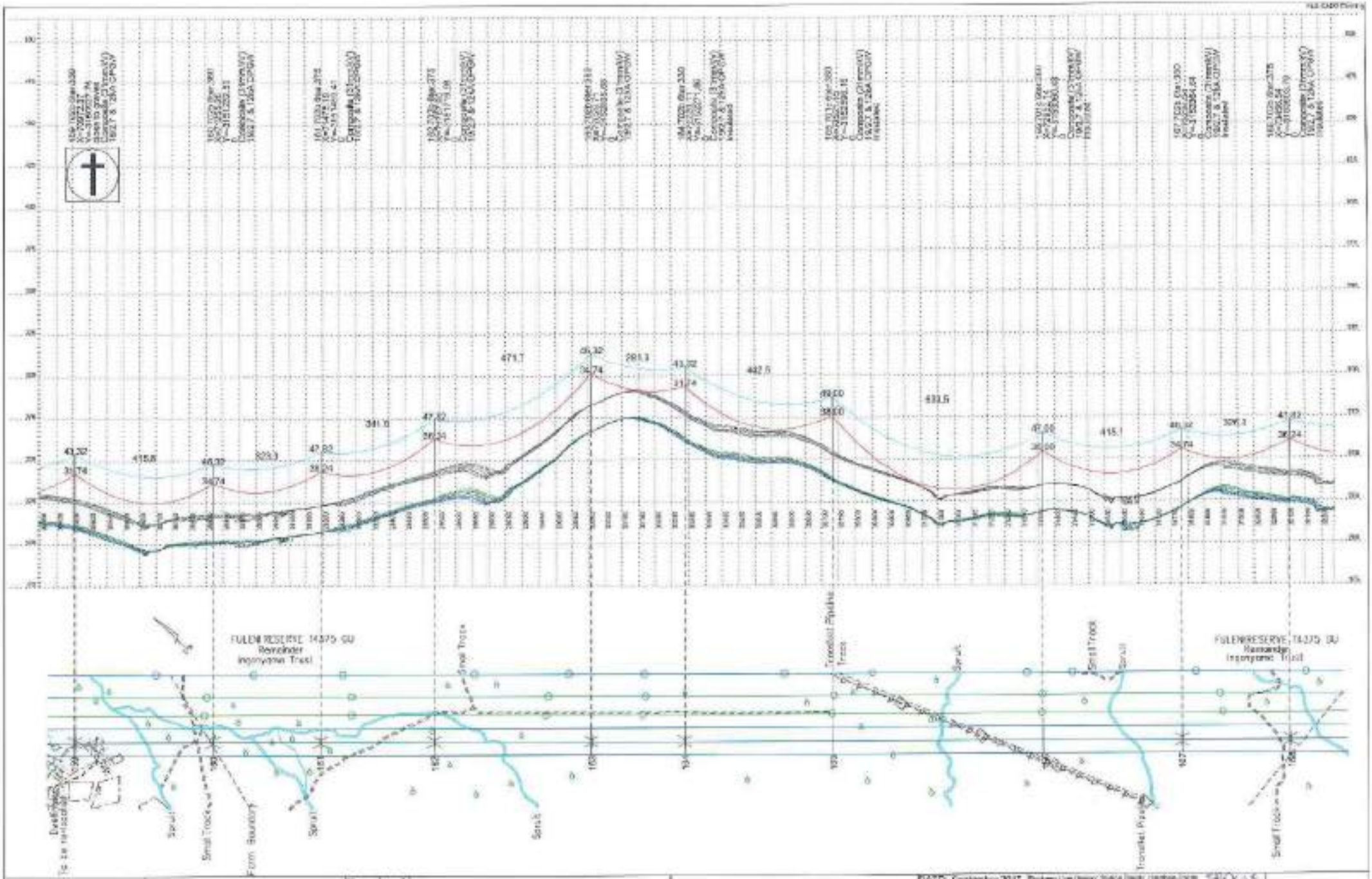
Construction: 6 Tons, 4 Tons

Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 8/20

Project No: Tx 203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Limpopo - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 810

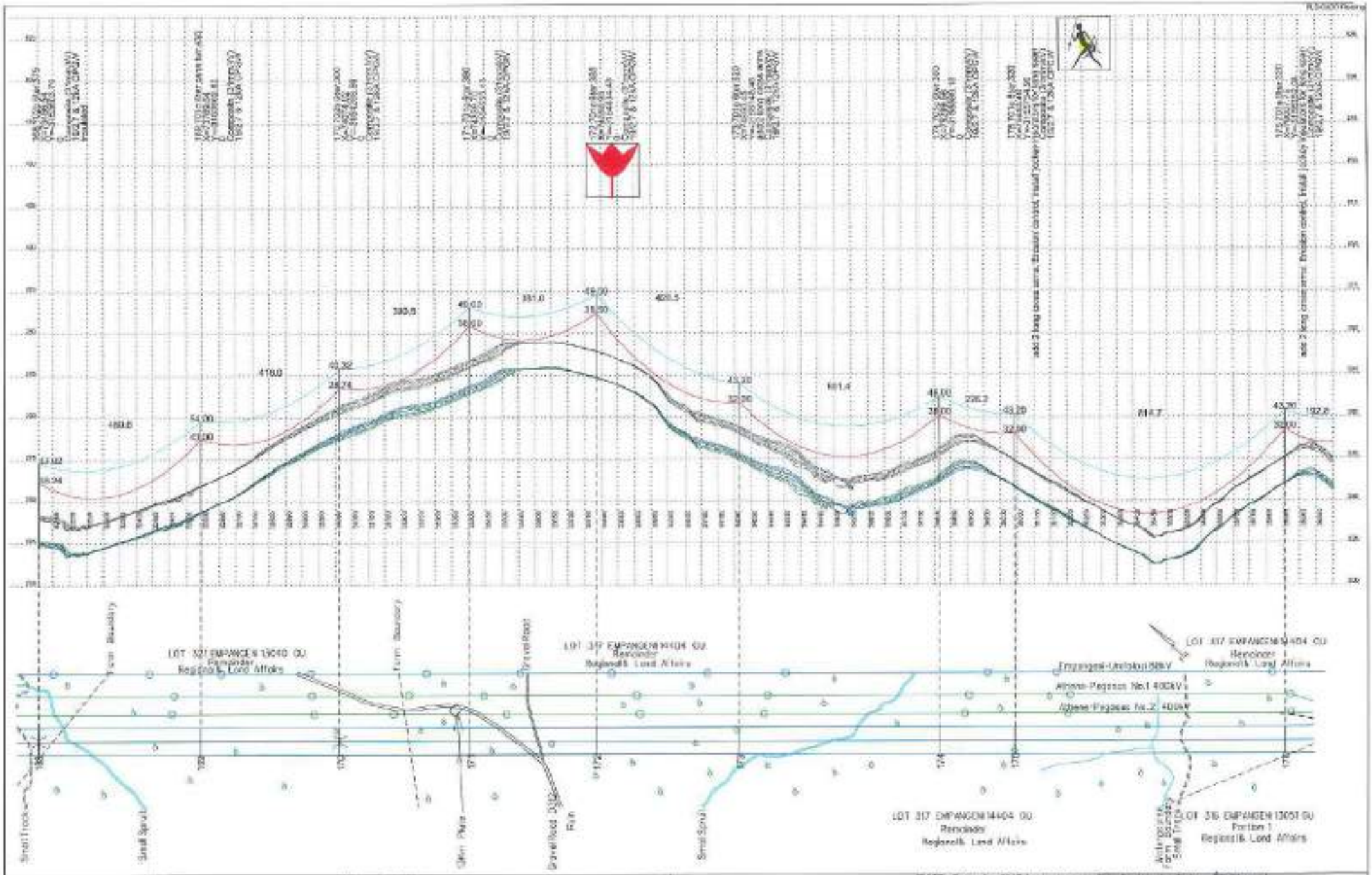
Conductor: 6 Tern, 4 Tern

Templating Temperature: 75 Degrees

DATE: September 2017

Sheet 9/20

Project No. Tx. 203



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 618

Conductor: 6 Twin, 4 Twin

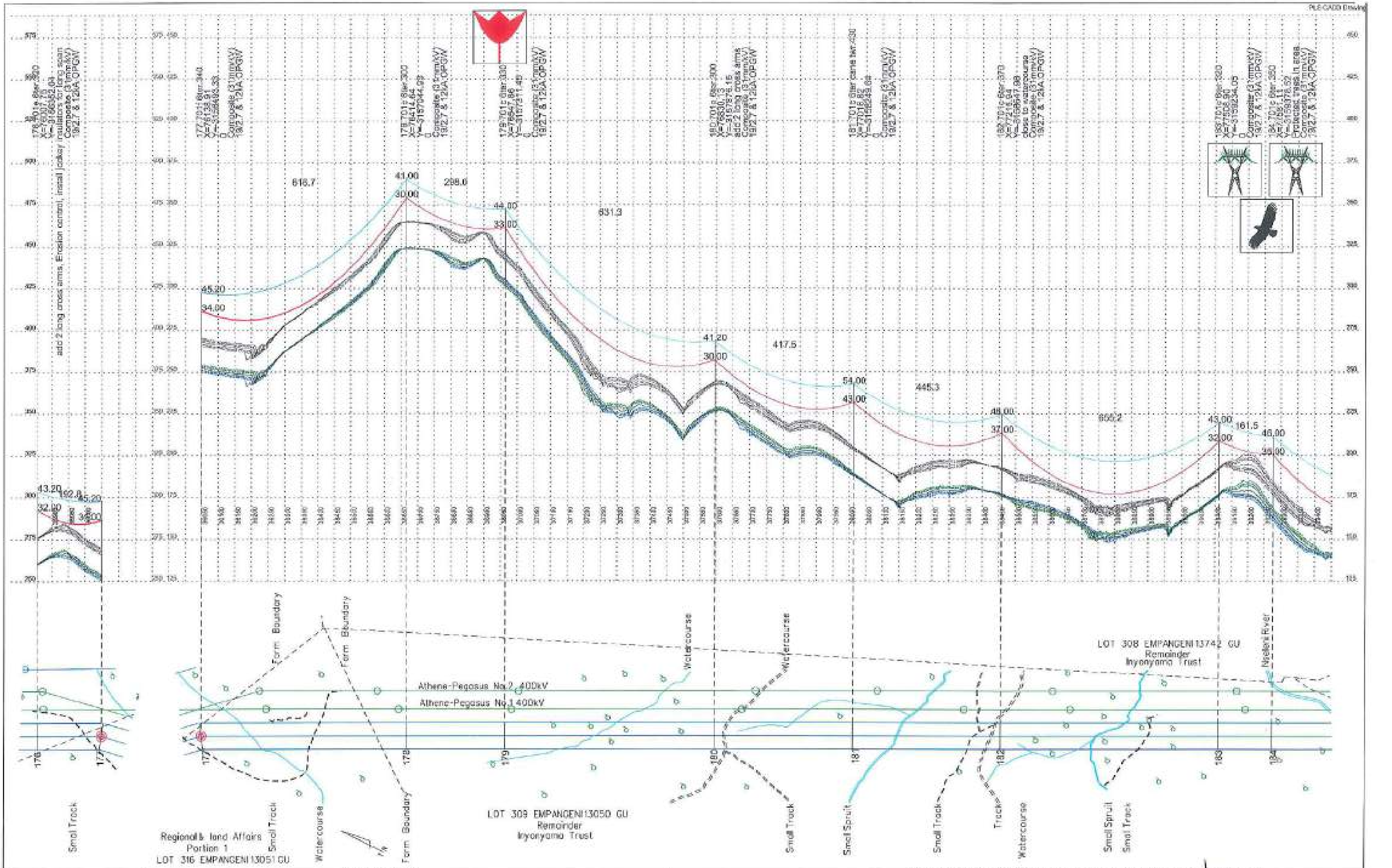
Tensioning Temperature: 70 Degrees

DATE: September 2017

Sheet 10/20

Project No. Te. 203

PLS-CADD Drawing



100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

Conductor: 6 Tern, 4 Tern

Templating Tempreature: 70 Degrees

DATE: September 2017

Sheet 11/20

Engineer Line Design: Shaina Dayal / Jonathan Chetty
Senior Environmental Advisor: Vulindlela Thenyani
Field Environmental Data:
Negotiator: Wimpie Henning
Survey: Sanjeev Hirachund
Mapping: Christa Badenhorst
Profiles Approved: Bruce Ntshuntsha

Project No. Tx. 203

184.701c 6ter 350
X=77531.41
Y=-3159376.82
Protected tree in area
Composite (31mmkV)
19/2.7 & 12kA OPGW

185.701c 6ter same twr 430
X=77867.07
Y=-3159850.58
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

186.702b 6ter 315
X=78090.19
Y=-3160316.96
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

187.702b 6ter 350
X=78224.74
Y=-3160668.10
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

188.701c 6ter 300
X=78326.53
Y=-3160974.06
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

189.701c 6ter 340
X=78619.46
Y=-3161458.80
add 2 long cross arms
Composite (31mmkV)
19/2.7 & 12kA OPGW

190.701c 6ter 340
X=78871.10
Y=-3161859.34
0
Composite (31mmkV)
19/2.7 & 12kA OPGW

191.701c 6ter 335
X=78976.18
Y=-3162209.25
Protected tree in area , add 2 long cross arms, install jockey , insulators for long span
Composite (31mmkV)
19/2.7 & 12kA OPGW

46.00
35.00
639.6
54.00
43.00
409.6
41.82
30.24
390.4
46.32
34.74
232.4
41.00
30.00
660.4
45.20
34.00
662.8
45.20
34.00
269.0
44.70
33.50
728.3

Kwaleni River
Farm Boundary
Small Track
Track
Watercourse
Trees
Land Building
Track
Watercourse
1kV Line 5.96m High
Dwellings
Gravel Road L1415
No Km Pickets
Tower 019004
Gravel Road L1415
1kV Line 6.07m
Tower EM420
Watercourse
Athene-Pegasus No2 400kV
Athene-Pegasus No1 400kV
Tower 019004
Dwellings to be re-located
Lands Mamelles
Farm Boundary
Dwellings
Spruit
Small Track
Farm Boundary

LOT 309 EMPANGENI 13050 GU
Remainder
Inyonyoma Trust

LOT 285 EMPANGENI 13400 GU
Remainder
Inyonyoma Trust

LOT 285 EMPANGENI 13400 GU
Remainder
Inyonyoma Trust

100.0 m Horiz. Scale
20.0 m Vert. Scale

Eskom

Drawing No:
CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518
Conductor: 6 Tern, 4 Tern
Templating Temperature: 70 Degrees

DATE: September 2017

Sheet 12/20

Engineer Line Design: Shuhra Dayal / Jonathon Chetty
Senior Environmental Advisor: Velaidam Thanyani
Field Environmental Data:
Negotiator: Wimpie Herning
Survey: Sanjeev Hiracharid
Mapping: Christo Badenhorst
Profiles Approved: Bruce Mthembu

Project No.
Tx. 203

PLS-CADD Drawing

192.701e 6ter 300
X=79237.76
Y=-3162884.48
add 2 long cross arms, install jickey insulators for long span
Composite (31mm)kV
192.7 & 120A OPGW

192.701e 6ter 340
X=79426.79
Y=-3163361.38
Protected tress in area, add 2 long cross arms
Composite (31mm)kV
192.7 & 120A OPGW

194.701c 6ter conx twr 430
X=79691.36
Y=-3163880.96
0
Composite (31mm)kV
192.7 & 120A OPGW

196.701e 6ter 360
X=79786.92
Y=-3164270.37
0
Composite (31mm)kV
192.7 & 120A OPGW

196.701c 6ter conx twr 440
X=79917.45
Y=-3164463.43
add 2 long cross arms
Composite (31mm)kV
192.7 & 120A OPGW

197.701c 6ter 375
X=80016.14
Y=-3164986.36
protected tress in area
Composite (31mm)kV
192.7 & 120A OPGW

198.701c 6ter 390
X=80410.21
Y=-3165192.52
Protected tress in area
Composite (31mm)kV
192.7 & 120A OPGW

198.701e 6ter 380
X=80172.92
Y=-3165639.81
0
Composite (31mm)kV
192.7 & 120A OPGW

41.20
30.00
513.2
45.20
34.00
834.0
54.00
43.00
343.5
47.20
36.00
47.20
36.00
233.1
55.20
44.00
919.0
48.50
37.50
361.1
50.00
39.00
540.1
48.00
38.00

LOT 285 EMPANGENI 13400 GU
Remainder
Inyonyoma Trust
Watercourse
Farm Boundary
Dwellings
Dwellings
Athene-Pegasus No2 400kV
Athene-Pegasus No1 400kV
Farm Boundary
192
193
194
195
Sugar Cane
Watercourse
Sugar Cane
Sprut
DUBE RIDGE 15220 GU
Portion 1
Tongaat
Sugar Cane
Farm Boundary
Watercourse

LOT 289 EMPANGEVI 13389 GU
Remainder
Watercourse
Dwellings
Farm Boundary
Fence
Watercourse
Small Track
Telephone 5.30m High
Dwellings
Dam
Athene-Pegasus No2 400kV
Athene-Pegasus No1 400kV
195
196
197
198
199
Sugar Cane
Sugar Cane
LOT 290 EMPANGEVI 13388 GU
Remainder
Tongaat
Sugar Cane

100.0 m Horiz. Scale
20.0 m Vert. Scale

Eskom

Drawing No:
CONSTRUCTION PROFILES
Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2
Structure Family: 701, 702, 705, 518
Conductor: 6 Tern, 4 Tern
Templating Temperature: 70 Degrees

DATE: September 2017
Sheet 13/20

Engineer Line Design: Shalina Daval / Jonathan Chetty
Senior Environmental Advisor: Vuledzani Thanyani
Field Environmental Data:
Negotiator: Wimpie Henning
Survey: Sanjeev Hiralchand
Mapping: Christo Badenhorst
Profiles Approved: Bruce Nkhumbha

Project No.
Tx. 203

FLS-CNDO Drawing

100.0 m Horiz. Scale

20.0 m Vert. Scale

Eskom

Drawing No:

CONSTRUCTION PROFILES

Revision Information: Rev 1

Umfolozi - Mbewu 765kV Part 2

Structure Family: 701, 702, 705, 518

Conductor: 6 Tern, 4 Tern

Templating Temprature: 70 Degrees

DATE: September 2017

Sheet 14/20

Engineer Line Design: Shalina Dayal / Jonathan Clarke

Senior Environmental Advisor: Vulledzani Thanyani

Field Environmental Data:

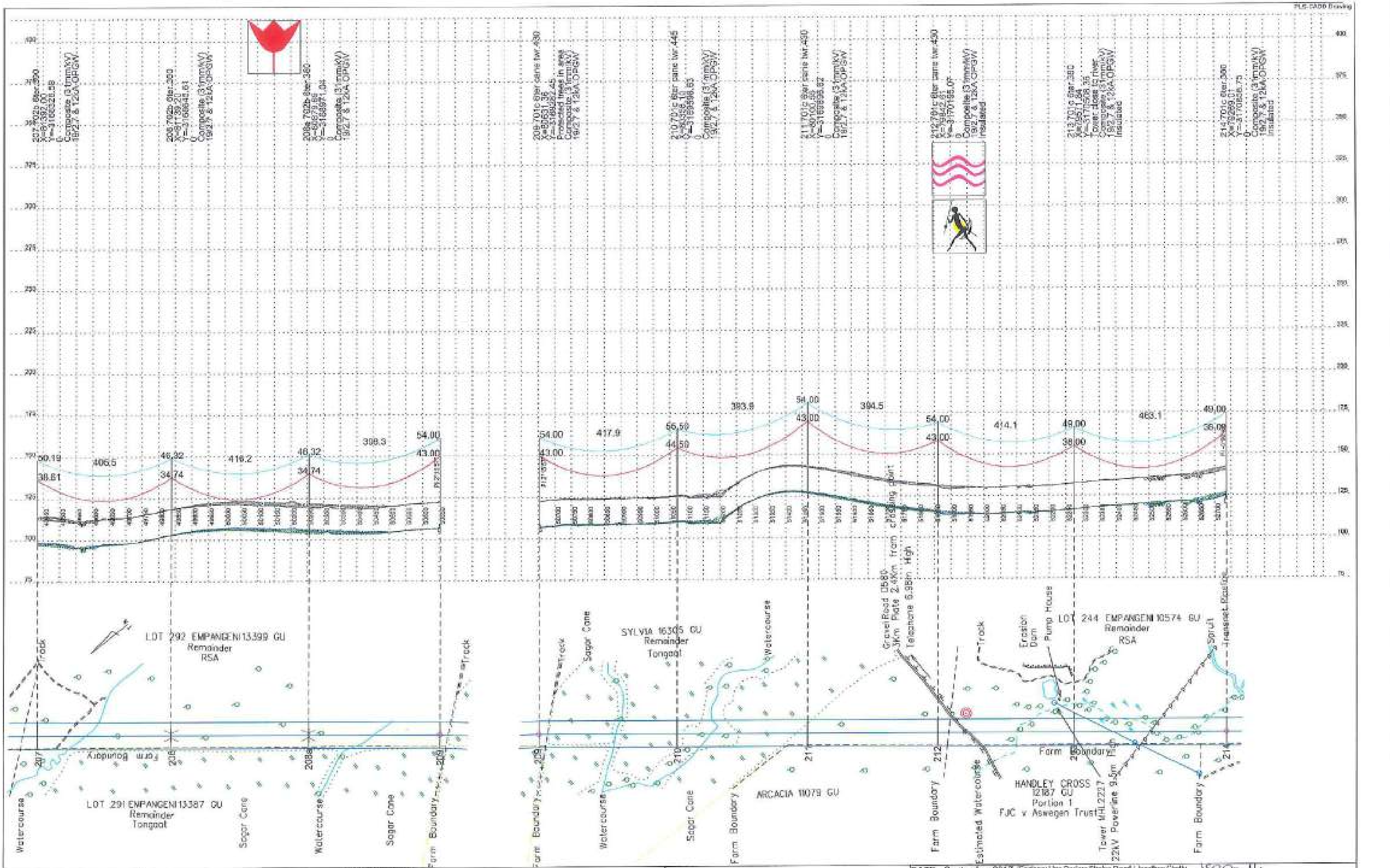
Negotiator: Wimpie Henning

Survey: Sanjeev Hiradhurd

Mapping: Christo Badenhorst

Profiles Approved: Bruce Mahuntsha

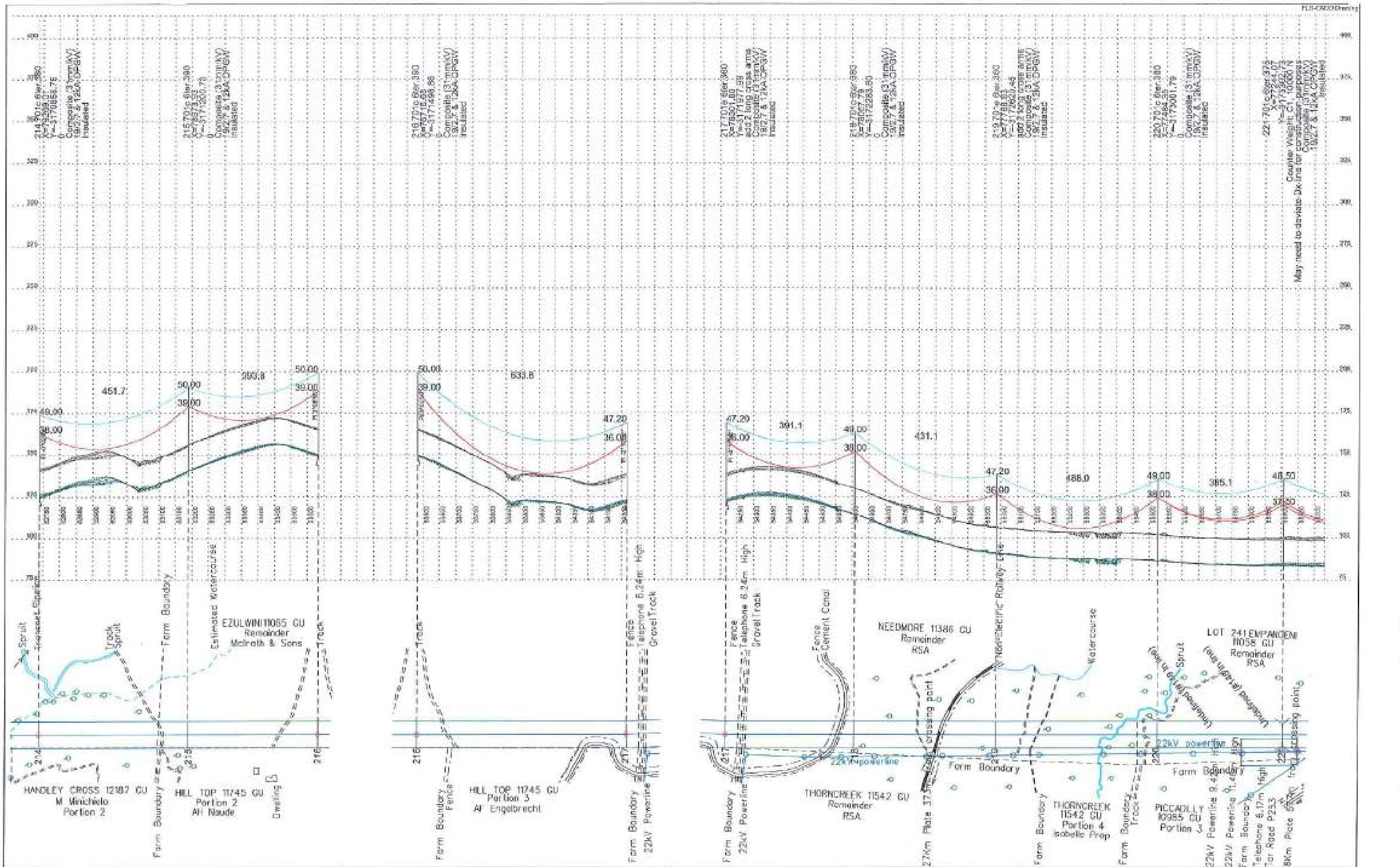
Project No. Tx 203



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: **CONSTRUCTION PROFILES** Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempreature: 70 Degrees	DATE: September 2017 Sheet 15/20

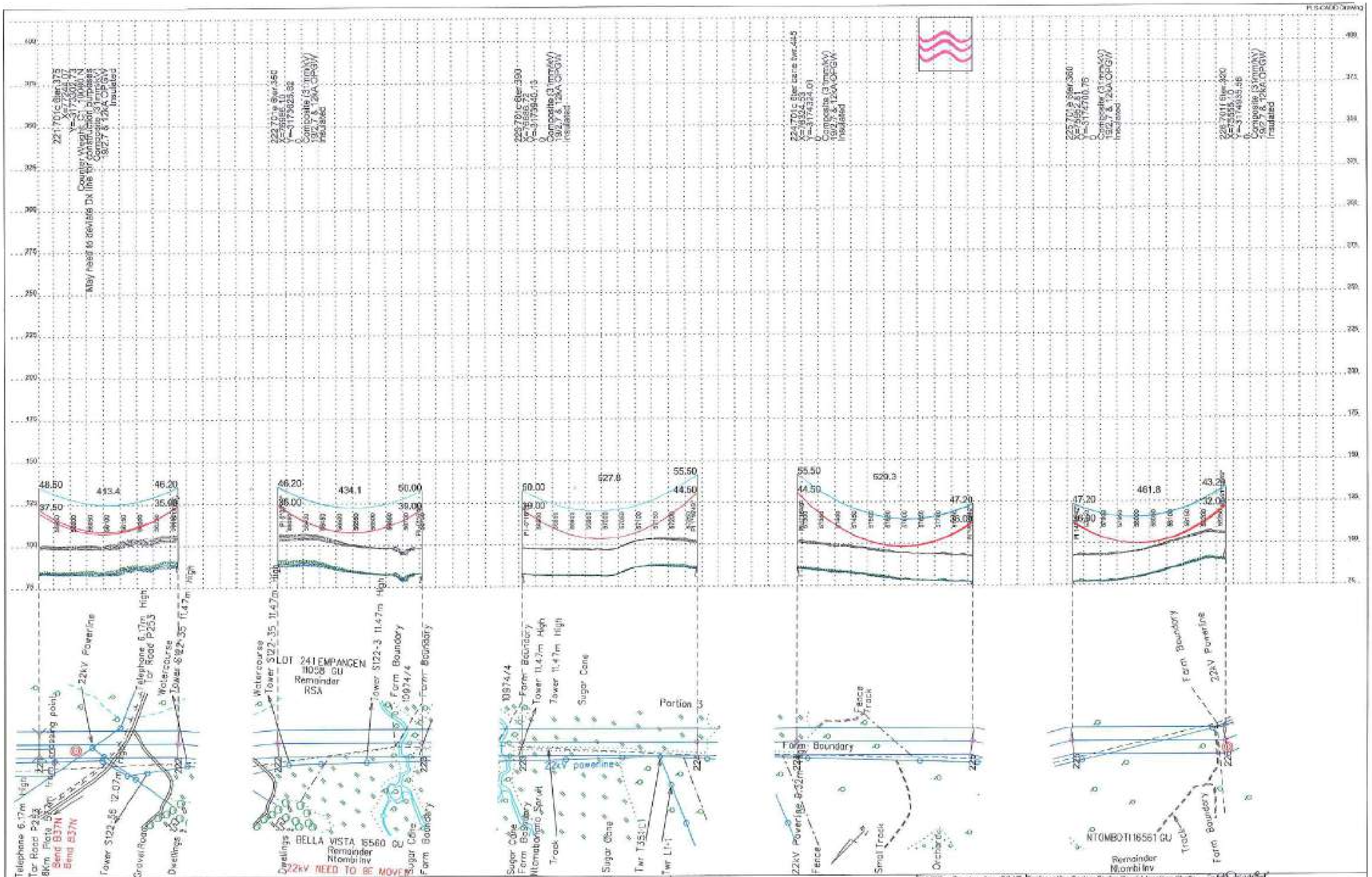
Engineer Line Design: Shalin Dayal / Jonathan Chetty
Senior Environmental Advisor: Velelani Tranner
Field Environmental Data:
Negotiator: Wimple Heining
Survey: Sanjeev Rinchund
Mapping: Chaido Badenhorst
Profiles Approved: Bruce Ntshangise

Project No.
Tx. 203



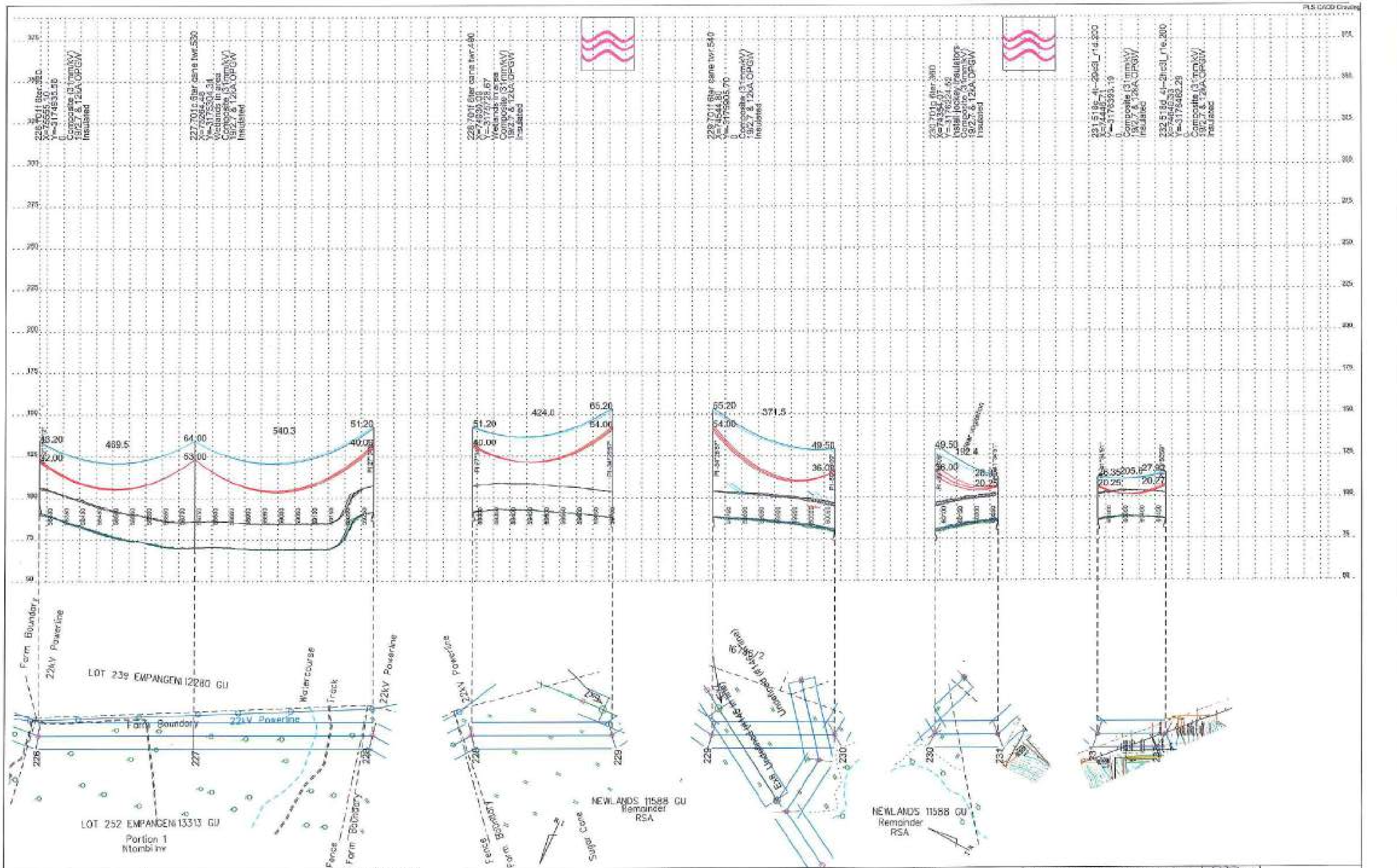
100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Temprerature: 70 Degrees	DATE: September 2017 Sheet 16/20	Engineer Line Design: Shaina Daryal / Jonathan Chetty Senior Environmental Advisor: Vuledzani Thenyani Field Environmental Data: Negotiator: Wimpie Henning Survey: Sanjeev Hiradhand Mapping: Christo Badenhorst Profiles Approved: Bruce Mahlunlahla

Project No.
Tx. 203



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempreature: 70 Degrees	DATE: September 2017 Sheet 17/20	Engineer line Design: Shalina Dayal / Jonathan Chetty Senior Environmental Advisor: Vulezizani Thanyani Field Environmental Date: Negotiator: Wimpie Henning Survey: Sanjeev Hiraschund Mapping: Christo Badenhorst Profiles Approved: Bruce Ntshontsho

Project No.
Tx. 203



100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempreature: 70 Degrees

DATE: September 2017 Sheet 18/20	Engineer Line Design: Shalen Dayal / Jonathan Chetty Senior Environmental Advisor: Vuledzani Thamagu Field Environmental Date: Negotiator: Wimpie Henning Survey: Sanjeev Hiradhund Mapping: Christo Badenhorst Profiles Approved: Bruce Mahantsha	Project No. Tx. 203

100.0 m Horiz. Scale 20.0 m Vert. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES Revision Information: Rev 1	Umfolozi - Mbewu 765kV Part 2 Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempresture: 70 Degrees	DATE: September 2017 Sheet 19/20	Engineer Line Design: Shanil Dayal / Jonathan Chetty Senior Environmental Advisor: Velaidam Thamaga Field Environmental Data: Negotiator: Wimpie Herring Survey: Sanjeev Hirachund Mapping: Christo Badenhorst Profiles Approved: Bruce Nkhumbha	Project No. Tx. 203

100.0 m Horiz. Scale	Eskom	Drawing No: CONSTRUCTION PROFILES	Umfolozi - Mbewu 765kV Part 2	DATE: September 2017	Engineer Line Design: Shaline Dayal / Jonathan Chetty Senior Environmental Advisor: Vuledzani Thangeni Field Environmental Data: Negotiator: Winpie Heming	Project No. Tx. 203
20.0 m Vert. Scale		Revision Information: Rev 1	Structure Family: 701, 702, 705, 518 Conductor: 6 Tern, 4 Tern Templating Tempreature: 70 Degrees	Sheet 20/20	Survey: Sanjeev Hirachand Mapping: Christo Badenhorst Profiles Approved: Bruce Mahambra	

Appendix G : Comments and Response Report

Appendix H: Advertisements and Notices

ISAZISO NGENHLOSO YOKUTHUMELA IZICELO ZOKWAKHIWA KUKALAYINI KAGESI ONGAMA-400KV OKUHLONGOZWAYO PHAKATHI KWESITESHI ESISHA IMBEWU ESISEDUZANE NEMPANGENI UKUYA KULESI ESIVELE SIKHONA NGASOLUNDI IMFOLOZI KOMASIPALA BESIFUNDA I-ZULULAND KANYE NE-KING CETSHWAYO

Lapha kukhishwa isaziso sokuthi u-Eskom uhlela ukurejista ukwakhiwa okuhlongozwayo okuhambisana namazinga okwakhiwa nokunwetshwa kwezintambo zikagesi kanye nesiteshi esincane sikagesi kulezi zindawo ezihlonziwe, kwiGazethi yowezi-2022, nge-GN 2313 yowezi-2022.

OWENZA ISIPHAKAMUSO: Eskom Holdings SOC Limited

INDAWO OZOKWENZIWA KUYO LO MKLAMO: Lo mklamo ohlongozwayo kanye nengqalasizinda ehambisana nawo kuhlelelwe ukuthi ube phakathi kwesiteshi esisha iMbewu esiseduzane naseMpangeni kuya kulesi esivele sikhona iMfolozi esiseduzane nasoLundi koMasipala Besifunda i-Zululand kanye ne-King Cetshwayo.

INQUBO YOKUGUNYAZA NGOKWEMVELO
I-Kimopax (Pty) Ltd ("Kimopax") izokwenza uHlaka lwe-Bar yalo mklamo lube selukhona mhla zingama-23 kuNdasa wezi-2023. Isikhathi sokuphawula sizovuleleka kusukela mhla zingama-23 kuNdasa wezi-2023 kuya mhla zingama-24 kuMbasa wezi-2023.

Umsebenzi ohlwini njengoba kuchaziwe ku-GN R 983 984 no-985	Incazelo yezinhlelo zomklamo okuyizona ezidale kube khona izinhlelo ezosohlwini
I-GN R. 983 (19) njengalokhu ichitshiyelwe yi-1GN R. 327 (19)	Ukuthuthukiswa noma ukwakhiwa kwemigwaqo yokufinyelela khona kuzodinga ukufakwa kwempahla yokwakha ezingaphezu kuka-10 cubic metres, noma ukudonsa, ukumbiwa, ukususwa noma ukuhamba komhlabathi, isihlabathi, amagobolondo, ugedla lwamagobolondo, amatshe noma amadwala okungaphezu kwe-10 cubic metres kususwa endaweni yamanzi.
I-GN R. 983 (24) njengalokhu ichitshiyelwe yi-GN R. 327 (24)	Kuzodingeka imigwaqo yokufinyelela lapho kwakhiwa khona nokusebenza kwemibhoshongo. Zonke lezi zizoba semigudwini egunyaziwe.
I-GN R. 983 (28) njengalokhu ichitshiyelwe yi- GN R. 327 (28)	Ukwakhiwa kolayini bakagesi kuzodinga ukusetshenziswa komhlaba othile osetshenziselwa ezolimo njengamanje, ukufuya izilwane zasendle kanye/noma ukutshalwa kwamahlathi.
I-GN R 984 (9) njengalokhu ichitshiyelwe yi-GN R. 325 (9)	Olayini bakagesi bayingqalasizinda eyingxenye yohlelo lokudluliselwa kukagesi ongama-400 kV ngaphandle kwezindawo zasemadolobheni kanye nendawo yezimboni.
I-GN R. 985 (4) njengalokhu ichitshiyelwe yi-GN R. 324 (4)	Imigwaqo yokufinyelela izokwakhiwa noma ithuthukiswe.
I-GN R. 985 (12) njengalokhu ichitshiyelwe yi- GN R. 324 (12)	Lapho kuhamba noma kume umbhoshongo zizosuswa izitshalo.

KUCELWA UKUPHAWULA KOMPHAKATHI:
Kucelwa ababambiqhaza ukuba barejiste babe ngabanentshisekelo kumbe abathintekayo (I & Aps) futhi babambe iqhaza ezinhlelweni ezididiyele zokuHlola Okuyisisekelo okuhlonza izinto ezikhathazayo kanye nemibono okumele ibhekelelwe ngesikhathi kwenziwa ucwaningo lwezobuchwepheshe. Ukuthola eminye imininingwane ngalo mklamo ohlongozwauo kumbe ukuthumela ukukhathazeka noma ukuphawula kwakho, xhumana nalaba basebenzi abalandelayo base-Kimopax uthinte umutu obhalwe lapha ngezansi:

Lufuno Nengwani
Ikheli Leposi: P.O Box 4077, Halfway House, Midrand, 1685
ISelula: +27 82 832 9378, Ucingo:+27 11 312 9765, iFeksi:+27 11 312 9768, i-imeyili:Lufuno@kimopax.com

99488/I

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21 Mafahleni Street
Impendle
3227
Tel: 033 996 6000
Fax: 033 996 0852
Email: info@impendle.gov.za
www.impendle.gov.za

ISICELO SOKUVUNYELWA KOHLELO LUKAMASIPALA SOKUMMUKELA UHLELO LOKUSETSHENZISWA KOMHLABA NGEMIBANDELA YESIGABA SAMA 24 SOHLELO LOKUHLELA NOKUPHATHWA KOMHLABA, 2013, (UMTHETHO WE-16 KA-2013) ("SPLUMA"), NJENGOBA SICHIBIYELELWE ESINYE), 73, 74 KANYE NOHLELO 4 LOHLELO LWEZINDAWO KAMASIPALA WASEMPENDLE KANYE NOMTHETHO KAMASIPALA WOKUPHATHWA KOMHLABA ("UMTHETHO KAMASIPALA").

uMasipala waseMpendle wazisa umphakathi ukuthi usufake isicelo ngokweSigaba sama 24 seSPLUMA esifundwe neSigaba sama 46(a), 73, 74 kanye noHla lwe 4 loMthetho kaMasipala, ukuze kugunyazwe uhlaka lohlelo olulawula ukusebenza nokusetshenziswa komhlaba kuyo yonke indawo kaMasipala. Loluhlelo lufaka izindawo ezisemadolobheni, izindawo zasemakhaya, noma amaplazi kanye nezindawo ezingaphansi kwamaKhosi.

Amalunga omphakathi ayamenywa ukuba alethe izethulo zawo mayelana nalesisicelo, ngokubhalela uMasipala nge-imeyili noma ngesandla, lungakapheli usuku lomsebenzi ngomhlaka -8 kuMbasa 2023.

Ukwehluleka komuntu ukuletha imibono ephendula lesaziso, noma ukufaka imininingwane engaphelele yokuxhumana, kwenza lowo muntu angakwazi ukuthola isaziso somuntu siqu sanoma yikuphi ukulalelwa komphakathi kanye nelungelo lokukhalaza

Amakhophi alesisicelo kanye nohlaka lohlelo lokusetshenziswa komhlaba kuyatholakala kulezizindawo ezilandelayo: emahhovisi kaMasipala, aku 21 Mafahleni Street, noma eMitapweni yolwazi (eMpendle, Stoffelton noma eNzinga) kanye nase Thusong Community Centre ngezikhathi ezijwayelekile zokusebenza (08h00 kuze kube 16h00).

MR Z.C TSHABALALA
MUNICIPAL MANAGER
PRIVATE BAG X, IMPENDLE, 3227

Ba- imeyile ku: zakhelet@impendle.gov.za bakopishe u- amandah@impendle.gov.za

Abanemibuzo bangashayela uNksz Amanda Hadebe kulenombolo elandelayo: 033-996 6002

Noma bathumele ibimobo yabo e-Town Planning Office
Impendle Local Municipality
21 Mafahleni Street
Impendle

MNU. Z.C Tshabalala
Umphathi Kamaspala waseMpendle

99502/I

KWAZULU-NATAL
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

NOMINATION OF CANDIDATES TO SERVE AS A MEMBER OF THE KZN WOMEN ECONOMIC EMPOWERMENT ADVISORY COUNCIL

The Premier of KwaZulu-Natal, Honourable Mrs Nomusa Dube-Ncube MPL, invites members of the public to submit nominations of candidates representing women organisations, to serve on the KZN Women Economic Empowerment Advisory Council for a period 1 April 2023 to 31 December 2025.

Nominated candidates should be women representing the following organisations:

- PwDs Women Organisation;
- Traditional Leaders Organisation;
- Youth Organisation;
- Organised Business;
- Women Led Civil Society Organisations;
- Academia; and
- A representative from the Gender Commission.

Any organisation wishing to nominate a person for a possible appointment to the KZN Women Economic Empowerment Advisory Council should submit the following:

(a) A resolution letter from the organisation to be represented by the candidate, the letter must also contain full names, address and telephone numbers of the nominee, and reasons for nomination;
(b) A recently updated curriculum vitae and certified copies of qualifications and Identity Document of the nominee, including three contactable references; and
(c) A brief statement signed by the nominee explaining his/her suitability for the appointment.

Any member nominated for the Council or a member of a committee of the Council must be a person with knowledge and experience relevant to the objectives of the Council. He/She must be able to provide inputs, guidance and relevant expertise in advancing Women Economic Empowerment/Development and be willing to function alongside others.

No nomination will be considered unless all of the above information is included and only successfully nominated candidates will be notified of the outcome of this process. Should you not be contacted by 14 April 2023 please consider your nomination as unsuccessful. Please note that prospective candidates will be subjected to suitability checks before appointments are made.

Nominations must reach the Head of Department: Department of Economic Development Tourism and Environmental Affairs no later than 03 April 2023 via e-mail to:
Nonkonzo.Nzama@kznedtea.gov.za

For telephonic enquiries contact Ms Nonkonzo Nzama on 033 264 2708 / 081 730 2601.

iNtwenhle Media Services

Umzumbe

UMZUMBE MUNICIPALITY
UMASIPALA WASEMZUMBE

OFFICE OF THE MUNICIPAL MANAGER

POST FOR THE CHIEF FINANCIAL OFFICER (CFO)
REF: FINHOD001/23

Umzumbe Local Municipality would like to appoint the Chief Financial Officer as a senior manager in the Finance Department on a permanent basis, to be placed at Umzumbe Municipal Offices, Mathulini MPCC Siphofu Road.

Total cost-to-employer remuneration package negotiable within the regulations on the determination of the Upper Limits for Managers directly accountable to the Municipal Manager (excluding performance-based bonus). R827 289.00 (MINIMUM), R 919 210.00 (MIDPOINT), R 1 011 131.00 (MAXIMUM) per annum.

REQUIREMENTS: An NQF level 7 in the field of Accounting, Finance or Economics and Certificate in Municipal Financial Management (SAQA Qualification ID No. 488965); and a Chartered Accountant (CA) being an added advantage.

WORK-RELATED EXPERIENCE: Minimum of 5 years at middle management level.

CORE MANAGERIAL AND OCCUPATIONAL COMPETENCIES: As described in the performance regulations and as contained in the Government Gazette No. 29967 of 15 June 2007.

CORE FUNTIONS: CFO responsibilities are as articulated in section 81(1) of the MFMA. Not limited to the latter the CFO will also have the following responsibilities: Provides strategic financial support and advice to the Accounting Officer and the Council. Ensures compliance with all the applicable legislation, regulations, policies and procedures. Ensures the effective and efficient implementation of Supply Chain Management policy, procedures and regulations. Develops systems for revenue generation and management and expenditure management. Ensures the compilation of GRAP-compliant Annual Financial Statements. Ensures the investment portfolio of the municipality is well managed. Human Resource Management within the department of Finance is upheld at all times.

BENEFITS: An all-inclusive negotiable remuneration package is payable to the successful candidate

PLEASE NOTE:
1. Appointment will be made according to the Council's Employment Equity Plan, which ensures representation of designated groups including the people with disabilities.
2. It would be expected of candidates to be subjected to thorough evaluations including competency assessment. Previous and current employers and references will be contacted. Verification will be done on qualifications, criminal and credit records. The candidates will be required to disclose all financial interests. Original qualification certificates must be produced at any resultant interviews.
3. All applications must be submitted with detailed CV, certified copies of qualifications, ID, driver's license and names of three references with e-mails and contact details to: The Municipal Manager, P.O. Box 561 Hibberdene, 4220 or Hand Delivered to Mathulini Traditional Authority / Mathulini MPCC Siphofu Road, Umthwalume. No Electronic, late or faxed applications will be accepted.
4. Canvassing of Councillors for purpose of being appointed is not permitted. Appointments are subject to the signing of Employment Contract and Performance Agreements in terms of Section 57 of the Municipal Systems Act. This appointment will be done in accordance with the Regulations that governs appointment of senior managers in local government.
5. An application form accompanying a comprehensive CV must be filled as no application will be considered without the application form. The application form can be downloaded from www.umzumbe.gov.za/vacancies/ or ask to be e-mailed a copy of the form.

CLOSING DATE: THURSDAY 21 APRIL 2023 AT 16H00

Shortlisted applicants will be informed of the outcome of the selection process on completion thereof. The Council reserves the right not to make any appointments. **Enquiries should be directed to the office of the Municipal Manager at 039 972 0005 or 066 338 0322 during office hours (08h00 – 16h30 Monday - Thursday and 7h30 – 16h00 Friday).**

TP CELE
MUNICIPAL MANAGER

99493/I

705 FIRST/FINAL NOTICES

MBUTA J. P. K.

ESTATE OF THE LATE

MBUTA: JEAN PIERRE KAMANDA, ESTATE NO: 013097/2022, PROVINCE: GAUTENG, PASSPORT: OP0323898, LAST ADDRESS: 3 WALKERS AVENUE, PRIMROSE, GERMISTON, MAGISTRATE'S OFFICE: GERMISTON MAGISTRATES COURT, MASTER'S OFFICE: JOHANNESBURG.

In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified above will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated. Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

MARTO LAFITTE & ASSOCIATES INC.
11 SMITH STREET, BEDFORDVIEW, JOHANNESBURG, 2007
TEL: 0116166420
(THE STAR)

MODIBA P. G.

ESTATE OF THE LATE

MODIBA: PETER GOBE, ESTATE NO: 028541/2021, PROVINCE: GAUTENG, I.D. NO: 560701 5787 08 5, LAST ADDRESS: 14 MARIE STREET, NEW STATE AREAS TOWNSHIP
SURVIVING SPOUSE: REGINA MODIBA, I.D. NO: 660218 0321 08 2
MAGISTRATE'S OFFICE: JOHANNESBURG
MASTER'S OFFICE: GAUTENG

In terms of Section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated.

Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

NDZONDO KUNENE MOSEA INC.
92 Fourth Street
Springs, 1560
Tel: 011 815 3281

MOKGATLE M. P.

ESTATE OF THE LATE

MOKGATLE: MPO PAULINA, died on 10 August 2022, Identity Number 350826 0245 08 8, of 20 Chilanga Road, Woodhill Estate, PretoriusPark, Pretoria. ESTATE NUMBER: 000504/2023

The First & Final Liquidation and Distribution Account in the above estate will lie for inspection at the offices of the Master of the High Court, PRETORIA and the Magistrate, Pretoria (GP), for twenty-one (21) days from date of publication hereof.

FNB Fiduciary (Pty) Ltd
P.O Box 12619
Brandhof, 9324
Petronella Kemp
+27 87 335 3510
(THE STAR)

NKUNA. A.C.N.

ESTATE OF THE LATE

NKUNA: ABBY CHANCE NKUNA. ESTATE NO: 027597/2022, PROVINCE: GAUTENG, I.D. NO: 790108 5099 085
MAGISTRATE'S OFFICE: TEMBISA
MASTER'S OFFICE: JOHANNESBURG

In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated. Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts

P T MTHOMBENI ATTORNEYS
NO 93 WOOTON AVENUE
BENONI WESTERN EXT
GAUTENG PROVINCE
TEL: 011 421 5619

PANDOR A. E.

ESTATE OF THE LATE

PANDOR: ABDULLAH EBRAHIM, ESTATE NO: 000793/2022, PROVINCE: GAUTENG, I.D. NO: 610502 5233 08 2, LAST ADDRESS: 36 GHAZALI DRIVE, ROSHNEE, VEREENIGING, 1939
MAGISTRATE'S OFFICE: JHB MAGISTRATES COURT
MASTER'S OFFICE: SOUTH GAUTENG HIGH COURT

In terms of Section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated.

Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

KAROLIA JEENA INC.
4 Wabord Road
Parktown, 2193
Tel: 011 482 4141

705 FIRST/FINAL NOTICES

MTHIMKHULU B. J.

ESTATE OF THE LATE

MTHIMKHULU: BOY JOHANNES, ESTATE NO: 029870/2011, PROVINCE: GAUTENG, I.D. NO: 380926 5225 08 7, LAST ADDRESS: 7 FAIRVIEW ROAD, MAPLETON AH TOWNSHIP
SURVIVING SPOUSE: SELLINAH SIBONGILE MTHIMKHULU, I.D. NO: 531010 0675 08 9
MAGISTRATE'S OFFICE: JOHANNESBURG
MASTER'S OFFICE: GAUTENG

In terms of Section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated.

Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

NDZONDO KUNENE MOSEA INC.
92 Fourth Street
Springs, 1560
Tel: 011 815 3281

MOLOKWANE M. G.

ESTATE OF THE LATE

MOTSATSI GLADYS MOLOKWANE, MASTER'S REF: 003074/2022, I.D. NO: 520806 0369 083, who died on 15 NOVEMBER 2021, unmarried, and who was living at ERF 1770 MESOPOTAMIA SECTION, GAKGAPANE DISTRICT, LIMPOPO PROVINCE. No surviving spouse.

In terms of Section 35 (5) of Act 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the Estate specified above, will be open for inspection of all persons with an interest therein for a period of 21 days from the 24th March 2023, being the date of the publication in the Government Gazette hereof, at the Office of the Master of the High Court, POLOKWANE and the Magistrates' Court, GAKGAPANE.

Should no objection thereto be lodged with the Master during the specified period, the Executor will proceed to make payments in accordance with the accounts.

AGENT: ADV PONELE ROBERT SESHAI
OFFICE NO. 3
GROUND FLOOR
NEXT OK
SUGARLOAF MINIMARK
11 CLAUDE WHEATLEY STREET
MEDI PARK
P. O. BOX 676
TZANEEN, 0850
LIMPOPO PROVINCE
CELL: 083 300 6404
E-MAIL: seshaipr@gmail.com
REF: PR SESHAI / ES 02 / 22
EXECUTOR: MADUMANE CLEMENT MOLOKWANE

705 FIRST/FINAL NOTICES

MUTSHAENI H. N.

ESTATE OF THE LATE

MUTSHAENI: HUMBULANI NANCY, ESTATE NO: 1659/2021, PROVINCE: LIMPOPO, I.D. NO: 600313 0252 08 1, LAST ADDRESS: THOHOYANDOU BLOCK A
SURVIVING SPOUSE: FHEDZISANI EDGAR MUTSHAENI, I.D. NO: 601212 6222 08 1
MAGISTRATE'S OFFICE: THOHOYANDOU
MASTER'S OFFICE: THOHOYANDOU HIGH COURT

In terms of Section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated.

Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

NEGONDENI ATTORNEYS
OFFICE NO. B06-B07
EPIKAIZO MEDICAL CENTRE - 784 P EAST
OPPOSITE THAVHANI MALL
TEL: 015 969 1091

PAPE I. E.

ESTATE OF THE LATE

PAPE: INGEBORG ELFRIEDE, ESTATE NO: 24902/2022, PROVINCE: GAUTENG, I.D. NO: 380310 0008 08 9, LAST ADDRESS: 241 Risi Avenue, Linmeyer, Johannesburg, 2190
MAGISTRATE'S OFFICE: Johannesburg Master (66 Marshall Street, Marshalltown, Johannesburg, 2107) - Tel 011 429 8000
MASTER'S OFFICE: Johannesburg (66 Marshall Street, Marshalltown, Johannesburg, 2107) - Tel 011 429 8000

In terms of Section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated.

Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

Renier van der Bank
c/o Thomson Wilks Inc.
(Agent o.b.o. the Executor Mr. Martin Robert Pape)
Pebble Beach Building 8
Inanda Greens Business Park
54 Wierda Road West
Sandton
Johannesburg, 2196
Tel: (011) 784 8984

705 FIRST/FINAL NOTICES

NKUNA. B.H.

ESTATE OF THE LATE

NKUNA: BRENDA HITEKANI. ESTATE NO: 027588/2022, PROVINCE: GAUTENG, I.D. NO: 810715 0433 089, LAST ADDRESS: NO: 1343/445 KERSTEL STREET EXT 2 RABIE RIDGE, GAUTENG PROVINCE
MAGISTRATE'S OFFICE: TEMBISA
MASTER'S OFFICE: JOHANNESBURG

In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated. Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts

P T MTHOMBENI ATTORNEYS
NO 93 WOOTON AVENUE
BENONI WESTERN EXT
GAUTENG PROVINCE
TEL: 011 421 5619

OGGEN E. M.

ESTATE OF THE LATE

OGGEN: ERIC MARTIN, ESTATE NO: 012392/2022, PROVINCE: GAUTENG, I.D. NO: 4511035159088, LAST ADDRESS: 13 FOREST LILY STREET, COUNTRYVIEW MIDRAND, 1687, MAGISTRATE'S OFFICE: ALEXANDRA MAGISTRATE COURT, MASTER'S OFFICE: JOHANNESBURG
MASTER OFFICE.

In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified above will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated. Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

MOJA SIBIYA ATTORNEYS
INCORPORATED
90 ALBERTYN STREET
VORNA VALLEY
MIDRAND
TEL: 0113330437
(THE STAR)

705 FIRST/FINAL NOTICES

MUKASA BUKENYA. A.

ESTATE OF THE LATE

MUKASA BUKENYA: ACHILLIES. ESTATE NO: 006510/2022, PROVINCE: North West, I.D. NO: 400604 5565 085, LAST ADDRESS: 14 INTERLAKEN AVE, RIVIERA PARK, MAFIKENG, 2745
SURVIVING SPOUSE: ANNE MUKASA BUKENYA, I.D. NO: 550328 0835 081
MAGISTRATE'S OFFICE: MAFIKENG
MASTER'S OFFICE: MAFIKENG

In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated. Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts

GUTTA ATTORNEYS
10 WILLIAM DICK AVE, MAFIKENG, 2745
mohamed@guttalegal.com
TEL: 079 494 2227

PHAHLANE P. K

ESTATE OF THE LATE

PHAHLANE: PATRICIA KERILENG, IDENTITY NO: 670530 0516 083; DATE OF DEATH: 30 MAY 1967; LAST KNOWN ADDRESS: 2828 BOHLOKO STREET, EXTENSION 6 ; EBONY PARK, MIDRAND, JOHANNESBURG; ESTATE NO: 000549/2021

Liquidation and Distribution Account - In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the First and Final Liquidation and Distribution accounts in the above, will be open for the inspection of all persons with an interest therein for a period of 21 days from the date of 24 March 2023 of publication hereof, whichever may be the latter, and at the offices of the Master of the High Court, Johannesburg and Magistrates at Tembisa.

Should no objection thereto be lodged with the Masters concerned during the specified period, the Executors will proceed to make payments in accordance with the account

Authorised Agent:
Adv Mabel Molema
Suite 312 Standard Bank Chambers
238 Paul Kruger Str.
Pretoria,
Tel No: 012 – 442 5075
Email: advocate.molema @gmail.com
Mobile No: 012 – 442 5075 081 539 0953
Email: advocate.molema @gmail.com
(THE STAR)

705 FIRST/FINAL NOTICES

STRYDOM J. J.

ESTATE OF THE LATE

STRYDOM: JOHANNES JACOBUS, ESTATE NO: 030132/2022, PROVINCE: GAUTENG, I.D. NO: 521209 5095 08 5, LAST ADDRESS: 192 TRICHARDTS AVENUE, PARKRAND, BOKSBURG
SURVIVING SPOUSE: LILANIE JENEFFER STRYDOM, I.D. NO: 581128 0142 08 9
MAGISTRATE'S OFFICE: BOKSBURG
MASTER'S OFFICE: JOHANNESBURG

In terms of Section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated.

Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

GLOBAL INFINITY LEGAL SERVICES PTY LTD
13 ESPERANCE STREET
FREEWAYPARK
BOKSBURG
TEL: 011 893 3299

TERZI S. J.

ESTATE OF THE LATE

TERZI: SHARON JUNE, ESTATE NO: 1363/2019, PROVINCE: GAUTENG, I.D. NO: 560318 0128 08 0, LAST ADDRESS: 825 NIVE-RING AVENUE, WAPADRAND, PRETORIA
MAGISTRATE'S OFFICE: MAG COURT PRETORIA
MASTER'S OFFICE: MASTER OF THE HIGH COURT, JOHANNESBURG

In terms of Section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated.

Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

NERINA WESSELS ATTORNEYS
57 Valley Road
Robin Hills, Randburg
Tel: 082-560-9479

Theys. B.L.

ESTATE OF THE LATE

Theys: Beryl Lillian. ESTATE NO: 022990/2022, PROVINCE: GAUTENG, I.D. NO: 300227 0305 082, LAST ADDRESS: 35 Smarag Street, Eldorado Park, Johannesburg, 1811
MAGISTRATE'S OFFICE: Protea /Soweto
MASTER'S OFFICE: Johannesburg

In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified below will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated. Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts

Shereene Theys & Rashid Theys c/o Botha Copo Attorneys
67 Nelson Mandela Avenue, Randhart, Alberton, 1449
estates@bothacopo.co.za
TEL: 011-867-0119

VAN ROOYEN E. L.

ESTATE OF THE LATE

VAN ROOYEN: JOHANNES ANDRIES, ESTATE NO: 12839/2020, PROVINCE: GAUTENG, I.D. NO: 4604045105082, LAST ADDRESS: LENITAS RETIREMENT VILLIAGE, UNIT 64, CNR BOSWELL & ELGIN STREETS, BIRCHLEIGH, KEMPTON PARK,
SURVIVING SPOUSE: JOHANNA ELIZABETHA MARIA VAN ROOYEN, I.D. NO: 5006110102086,
MAGISTRATE'S OFFICE: MAGISTRATE'S COURT FOR THE MAGISTERIAL DISTRICT OF EKURHULENI HELD AT KEMPTON PARK,
MASTER'S OFFICE: MASTER OF THE HIGH COURT JOHANNESBURG.

In terms of section 35 (5) of the Administration of Estates Act, No. 66 of 1965, notice is hereby given that copies of the Liquidation and Distribution Accounts (FIRST AND FINAL) in the estates specified above will be open for the inspection of all persons with an interest therein for a period of 21 days from the date specified or from the date of publication hereof, whichever may be the later, and at the offices of the Masters of the High Court and Magistrates as stated. Should no objection thereto be lodged with the Masters concerned during the specified period, the executors will proceed to make payments in accordance with the accounts.

MARK-ANTHONY BEYL ATTORNEYS
SUITE 212, SECOND FLOOR, BLOCK B, CRESTA JUNCTION, JOHANNESBURG
TEL: 0113337790
(THE STAR)

706 INSOLVENCIES

INSOLVENT ESTATES, COMPANIES OR CLOSE CORPORATIONS SEQUESTRATED OR WOUND UP PROVISIONALLY

Pursuant to Section 17 (4) of the Insolvency Act, 1936, and section 356 (1) of the Companies Act, 1973, notice is hereby given by the Masters of the High Court that the estate or company mentioned below have been sequestrated or wound up provisionally by order of the said Court.

• Estate Number or Company Number: 020860/2021
• Full name of Estate or Company: JACOBUS JOHANNES STEFFENS
• ID Number(s) or Registration Number: 4212277508089
• Description of Estate or Company: INSOLVENT
• Date of Order: 2023-01-27
• Division or District of Court by which order is made: JOHANNESBURG
• Upon Application of: INSOLVENCY

TRENDING ACTUARIES AND CONSULTANTS
58 MARSHALL STREET
JOHANNESBURG
TEL: 081 845 8426

710 LIQUOR ACT

Quiet Vibes

MPUMALANGA LIQUOR LICENSING ACT (ACT NO. 5 OF 2006)

INVITATION FOR PUBLIC COMMENTS IN APPLYING FOR A LIQUOR LICENSE IN TERMS OF SECTION 35(2)(a) OF THE MPUMALANGA LIQUOR LICENSING ACT, 2006

A. PERSONAL DETAILS:
* Applicant Name: Monareng Glenrose Pertunia
* ID Number: 8701040753084
* Trading Name: Quiet Vibes
* Application made on behalf of: The Juristic Person
* Full names of Juristic Person: Quiet Vibes (PTY) LTD
* Registration Number of Juristic Person: 2021/542883/07

B. LICENCE TYPE:
The retail sale of liquor in terms of a special liquor license for consumption on and off the premises where the liquor is sold

C. BUSINESS PREMISES
* **Physical Address of the Premises:** Down Street, Stand 2708 Dwarsloop, Bushbuckridge Ehlanzeni, 1280
* **Postal Address of the Premises:** PO Box 351 Mafemani, 1285

D. ADDRESSES TO WHICH COMMENTS MUST BE SUBMITTED:
* **Municipality Name where comments must be submitted:** Bushbuckridge Local Municipality - **District:** Ehlanzeni
* **Municipality Address:** Opposite Mapulaneng DLTC R533 Graskop Road Bushbuckridge, 1280
* **Applicant Address where comments must be submitted:** Down Street, Stand 2708 Dwarsloop, Bushbuckridge Ehlanzeni, 1280

Monareng Glenrose Pertunia
Down Street, Stand 2708
Dwarsloop, Bushbuckridge
Ehlanzeni, 1280
twkprofessional76@gmail.com
Tel: 072 406 2285

MidWater Tops

MPUMALANGA LIQUOR LICENCING ACT (ACT No. 5 OF 2006)

INVITATION FOR PUBLIC COMMENTS IN RESPECT OF THE TRANSFER OF A LIQUOR LICENCE IN TERMS OF SECTION 43 OF THE MPUMALANGA LIQUOR LICENCING ACT, 2006.

A. PERSONAL DETAILS
*Applicant Name: Francisco Fernandes Patricio
*ID Number or Passport Number: 480508 5160 180 hereby invites written public comments concerning my application to the Mpumalanga Liquor Authority for the transfer of:
*Liquor Licence Number: 9-2-1-00628 to trade under the name:
*Trading Name: MidWater Tops
*Application made on behalf of: the juristic person
Full Names of Juristic Person: Enkwanati 18 CC
Registration Number of Juristic Person: 2003/081765/23
B. LICENSE TYPE
*Licence Type: The retail sale of liquor for consumption off the premises where the liquor is sold
C. BUSINESS PREMISES
*Physical Address of the Premises: Shop 18 - Kieskaamma Street, Aerorand, Middelburg, situated on Stand 2415/11, Aerorand, Middelburg
*Postal Address of the Premises: Suite MW 552, Private Bag X1838, Middelburg, 1050
D. ADDRESSES TO WHICH COMMENTS MUST BE SUBMITTED
*Municipality Name where comments must be submitted: Steve Tshwete Local Municipality
District: Nkangala
*Municipality Address: Corner Walter Sisulu and Wanderers Street, MIDDELBURG
*Applicant Address where comments must be submitted: P.O. Box 11230, Queenswood, 0121 / paula@dynamicliq.co.za

Paula da Silva
P.O. Box 11230, Queenswood, 0121
paula@dynamicliq.co.za
Tel: 082 575 3476

710 LIQUOR ACT

Afumi Shisanyama

MPUMALANGA LIQUOR LICENSING ACT (ACT NO. 5 OF 2006)

INVITATION FOR PUBLIC COMMENTS IN APPLYING FOR A LIQUOR LICENSE IN TERMS OF SECTION 35(2)(a) OF THE MPUMALANGA LIQUOR LICENSING ACT, 2006

A. PERSONAL DETAILS:
* Applicant Name: Ngobeni Nyiko Benedict
* ID Number: 8512035156088
* Trading Name: Afumi Shisanyama
* Application made on behalf of: The Juristic Person
* Full names of Juristic Person: NB Ngobeni Investments (PTY) LTD
* Registration Number of Juristic Person: 2013/106976/07

B. LICENCE TYPE:
The retail sale of liquor in terms of a special liquor license for consumption on and off the premises where the liquor is sold

C. BUSINESS PREMISES
* **Physical Address of the Premises:** Stand No. 4008 Old Gaza Road Acornhoek, 1365
* **Postal Address of the Premises:** PO Box 351 Mafemani, 1285

D. ADDRESSES TO WHICH COMMENTS MUST BE SUBMITTED:
* **Municipality Name where comments must be submitted:** Bushbuckridge Local Municipality - **District:** Ehlanzeni
* **Municipality Address:** Opposite Mapulaneng DLTC R533 Graskop Road Bushbuckridge, 1280
* **Applicant Address where comments must be submitted:** Stand No. 4008 Old Gaza Road Acornhoek, 1365

Ngobeni Nyiko Benedict
Stand No. 4008
Old Gaza Road
Acornhoek, 1365
twkprofessional76@gmail.com
Tel: 072 406 2285

ANINOMAZ Seet n Eet Restaurant

INVITATION FOR PUBLIC COMMENT IN APPLYING FOR A LIQUOR LICENCE IN TERMS OF SECTION 35(2) (a) OF THE MPUMALANGA LIQUOR LICENCING ACT, 2006

A. PERSONAL DETAILS:
I, Unathi Bonga Mbanga, ID NUMBER: 860903 5462 08 4, an adult Male residing at address: 133 Braam Fischer Drive, Evander, 2280, hereby invite written comments concerning my application for a liquor a licence to the Mpumalanga Liquor Authority to trade under the name A**NINOMAZ seet n eet Restaurant**. I make this application on behalf of a juristic person, Kuna Dawa Holdings (Pty) Ltd.

B. LICENCE TYPE:
(a) the retail sale of the liquor for consumption on the premises where the liquor is sold;

C. BUSINESS PREMISES
Physical Address:
FF03 & FF08, Minoa Plaza Aachen Street
Evander, 2280, situated within the jurisdiction of Govan Mbeki Municipality, being an address in the Republic of South Africa and within the borders of Mpumalanga Province.
Postal Address:
133 Braam Fischer Drive, Evander, 2280

D. ADDRESS TO WHICH COMMENTS MUST BE SUBMITTED:
Comments should be made in writing and be addressed to the Municipality concerned and a copy to the applicant, to reach the said address within thirty (30) days of this publication.
MUNICIPALITY'S ADDRESS:
Office No. 218
Secunda Business District
Horwood Street
Secunda
2302
APPLICANT'S ADDRESS:
133 Braam Fischer Drive
Evander
2280

The Green Lizard Guest House

MPUMALANGA LIQUOR LICENSING ACT (ACT No. 5 OF 2006) Annexure 2 INVITATION FOR PUBLIC COMMENTS IN APPLYING FOR A LIQUOR LICENSE IN TERMS OF SECTION 35(2)(a) OF THE MPUMALANGA LIQUOR LICENSING ACT, 2006.

A. PERSONAL DETAILS
*Applicant Name: Maureen Karsten
*ID Number or Passport Number: 681216 0105 088
*Trading Name: The Green Lizard Guest House
*Application made on behalf of: the juristic person
Full Names of Juristic Person: Administration Solutions At 49 (Pty) Ltd
Registration Number of Juristic Person: 2014/247609/07
B. LICENSE TYPE
*Licence Type: The retail sale of liquor for consumption on the premises where the liquor is sold
C. BUSINESS PREMISES
*Physical Address of the Premises: 28 Vanwijk St, Sonheuwel, Mbombela, situated on Erf 1381 Nelspruit Extension 9 Township
*Postal Address of the Premises: P.O. Box 12386, Steiltes Extension 11, Nelspruit
D. ADDRESSES TO WHICH COMMENTS MUST BE SUBMITTED
*Municipality Name where comments must be submitted: Mbombela Local Municipality
District: Ehlanzeni
*Municipality Address: 1 Nel St, Sonheuwel Central, Mbombela, 1201
*Applicant Address where comments must be submitted: P.O. Box 11230, Queenswood, 0121 or Paula@dynamicliq.co.za

Dynamic Consultants
P.O. Box 11230, Queenswood, 0121
Paula@dynamicliq.co.za
Tel: 082 575 3476

710 LIQUOR ACT

Ekuthuleni Bar Lounge

MPUMALANGA LIQUOR LICENSING ACT (ACT No. 5 OF 2006) Annexure 2 INVITATION FOR PUBLIC COMMENTS IN APPLYING FOR A LIQUOR LICENSE IN TERMS OF SECTION 35(2)(a) OF THE MPUMALANGA LIQUOR LICENSING ACT, 2006.

A. PERSONAL DETAILS
*Applicant Name: Paulos Madlozi Mahlangu
*ID Number or Passport Number: 56019 5338 082
*Trading Name: Ekuthuleni Bar Lounge
*Application made on behalf of: myself
B. LICENSE TYPE
*Licence Type: The retail sale of liquor for consumption on the premises where the liquor is sold
C. BUSINESS PREMISES
*Physical Address of the Premises: 685 Vulindlela Street, Phola Township, Ogies, situated on Erf 685 Phola
*Postal Address of the Premises: 685 Vulindlela Street, Phola, 2233
D. ADDRESSES TO WHICH COMMENTS MUST BE SUBMITTED
*Municipality Name where comments must be submitted: Emalahleni Local Municipality
District: Nkangala
*Municipality Address: Civic Centre, Mandela Street, Emalahleni, Witbank, 1035
*Applicant Address where comments must be submitted: P.O. Box 11230, Queenswood, 0121 or Paula@dynamicliq.co.za

Dynamic Consultants
P.O. Box 11230, Queenswood, 0121
Paula@dynamicliq.co.za
Tel: 082 575 3476

Lodayiza Tavern

MPUMALANGA LIQUOR LICENSING ACT (ACT NO. 5 OF 2006)

INVITATION FOR PUBLIC COMMENTS IN APPLYING FOR A LIQUOR LICENSE IN TERMS OF SECTION 35(2)(a) OF THE MPUMALANGA LIQUOR LICENSING ACT, 2006

A. PERSONAL DETAILS:
* Applicant Name: Nkosi David
* ID Number: 4805195578081
* Trading Name: Lodayiza Tavern
* Application made on behalf of: MYSELF

B. LICENCE TYPE:
The retail sale of liquor for consumption on the premises where the liquor is sold

C. BUSINESS PREMISES
* **Physical Address of the Premises:** Stand No. 583 Madala Location Belfast, 1100
* **Postal Address of the Premises:** P. O. Box 930 Hazyview, 1242

D. ADDRESSES TO WHICH COMMENTS MUST BE SUBMITTED:
* **Municipality Name where comments must be submitted:** Emakhazeni Local Municipality - **District:** Nkangala
* **Municipality Address:** 25 Scheepers Street eMakhazeni, 1100
* **Applicant Address where comments must be submitted:** Stand No. 583 Madala Location Belfast, 1100

Nkosi David
Stand No. 583
Madala Location
Belfast, 1100
twkprofessional76@gmail.com
Tel: 072 406 2285

711 LOST DEED

FORM KKK
LOST OR DESTROYED DEED

Notice is hereby given in terms of regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of:

Mortgage Bond Number SB57263/2021

Passed by REGISTAR OF DEEDS at PRETORIA

For a capital amount of R1 259 900.00 in favour of Standard Bank Guarantee CO (RF) Proprietary Limited in respect of certain
A Unit consisting of

(a) Section No. 3706 as shown and more fully described on Sectional Plan No SS 144/2019 in the scheme known as **FISH EAGLE VIEW** in respect of the land and building or buildings situated at **ERF 81 LONGLAKE EXTENSION 6 TOWNSHIP AND ERF 89 LONGLAKE EXTENSION 11 TOWNSHIP,** LOCAL AUTHORITY ; CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, of which section the floor area, according to the said sectional plan is 92 (Ninety Two) square metres in extent and

(b) An undivided share in the common property in the scheme apportioned to the said section in accordance with the participation quota as endorsed on the said sectional plan.

HELD BY DEED OF TRANSFER ST82863/2021

which has been lost or destroyed.
All persons having objection to the cancellation are hereby required to lodge the same in writing with the Registrar of Deed at Pretoria within two weeks from the date of publication of this notice.

Dated at CENTURION this 9th day of March 2023

APPLICANT:
NNE DUBE
ADDRESS:
11 BYLSBRIDGE BOULEVARD CENTURION
EMAIL ADDRESS: nadia@imlaw.co.za
CONTACT NUMBER: 012 676 8727
(THE STAR)

711 LOST DEED

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937 of the intention to apply for the issue of a certified copy of **Deed of Transfer Number T6685/1995**, passed by **M H F PROPERTIES LIMITED, REGISTRATION NUMBER: 1990/007573/06**, in favour of:
1. KEDIBONE JACQUIRE LEKGETHO, IDENTITY NUMBER: 560317 0800 08 6, UNMARRIED
2. MARY SHONOKO LEKGETHO, IDENTITY NUMBER: 300306 0231 08 2, UNMARRIED
in respect of certain **ERF 858 DOBSONVILLE TOWNSHIP, REGISTRATION DIVISION I.Q., THE PROVINCE OF GAUTENG**, which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at Johannesburg at Deeds Office Information Section, Mezzanine Floor, 208-212 Marble Towers Building, c/n Von Weilligh & Pritchard Street, Johannesburg, within 2 (two) weeks from the date of the publication of this notice.
Dated at Krugersdorp on this 17 day of March 2023
APPLICANT:
Kedibone Jacquire Lekgetho & The Executrix: Estate Late Mary Shonoko Lekgetho
ADDRESS:
c/o Etienne D. Vlok Inc.
21 Clew Street
Monument
Krugersdorp
E-MAIL ADDRESS: githa@etiennevlok.co.za
TEL: 011 664 6330

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of the Deed of Transfer ST37482/2003 passed by **PROSTART PROPERTIES 45 (PRORIETARY) LIMITED,** No. 2000/031352/07, in favour of 19A KLOOF ROAD PROPERTIES CC, No. 2003/020680/23, in respect of

A Unit consisting of

(a) Section No. 1 as shown and more fully described on Sectional Plan No SS 139/2002 in the scheme known as **ORIEL BUSINESS CENTRE** in respect of the land and building or buildings situated at **ORIEL TOWNSHIP;** LOCAL AUTHORITY CITY OF EKURHULENI METROPOLITAN MUNICIPALITY, of which section the floor area, according to the said sectional plan is 100 (One Hundred) square metres in extent and

(b) An undivided share in the common property in the scheme apportioned to the said section in accordance with the participation quota as endorsed on the said sectional plan.

HELD BY Deed of Transfer Number ST 37482/2003

which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at Johannesburg, Deeds office Information Section, Mezzanine Floor, 208/212 Marble Towers Building, c/n Von Weilligh & Pritchard Street, Johannesburg within two (2) weeks from the date of the publication of this notice.

Applicant: **c/o Marto Lafitte & Associates**
Address: 11 Smith Street, Bedfordview
E-mail address: maria@martolafitte.co.za
Contact number: 011 6166420
(THE STAR)

711 LOST DEED

FORM JJJ

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of **CERTIFICATE OF REGISTERED SECTIONAL TITLE NUMBER ST140/1984(8) (UNIT)**, passed by **MALCOLM MOSS, IDENTITY NUMBER: 3512185061083 AND CYNTHIA JEAN MOSS, IDENTITY NUMBER: 3912250065086, MARRIED IN COMMUNITY OF PROPERTY TO EACH OTHER**, in respect of certain:
A Unit consisting of -
(a) **Section No. 8** as shown and more fully described on **Sectional Plan No. SS 140/1984** in the scheme known as **LAS PALMAS** in respect of the land and building or buildings situated at **HELDERKRUIN EXTENSION 7 TOWNSHIP, LOCAL AUTHORITY: CITY OF JOHANNESBURG**, of which section the floor area, according to the said sectional plan is 188 (One Hundred and Eighty Eight) square metres in extent; and
(b) An undivided share in the common property in the scheme apportioned to the said section in accordance with the participation quota as endorsed on the said sectional plan, which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at Johannesburg at Deeds Office Information Section, Mezzanine Floor, 208-212 Marble Towers Building, c/n Von Weilligh & Pritchard Street, Johannesburg, within 2 (two) weeks from the date of the publication of this notice.
Dated at Krugersdorp on this 10th day of MARCH 2023
APPLICANT:
EXECUTRIX:
ESTATE LATE MALCOLM MOSS
ADDRESS:
Etienne D. Vlok Inc.
21 Clew Street
Monument, Krugersdorp
E-MAIL ADDRESS: Debbie@etiennevlok.co.za
TEL: (011) 664 6330
APPLICANT:
CYNTHIA JEAN MOSS
ADDRESS:
Etienne D. Vlok Inc.
21 Clew Street
Monument, Krugersdorp
E-MAIL ADDRESS: Debbie@etiennevlok.co.za
TEL: (011) 664 6330

711 LOST DEED

NOTICE FOR A LOST OR DESTROYED DEED

NOTICE is hereby given in terms of regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of :

T56251/2006, passed by SUPER FIVE PROPERTIES (PROPRIETARY) LIMITED, Registration Number 2004/020504/07, in favour of: **PIETER STEWART PARKIN,** Identity Number 660309 5019 08 4, Married out of community of property, in respect of certain

ERF 621 EASTLEIGH TOWNSHIP
REGISTRATION DIVISION I.R., THE PROVINCE OF GAUTENG

IN EXTENT: 1552 (ONE THOUSAND FIVE HUNDRED AND FIFTY TWO) SQUARE METRES

HELD BY DEED OF TRANSFER NUMBER T56251/2006

Which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at JOHANNESBURG within 2 (TWO) weeks from the date of the publication of this notice.

MICHAEL FREDERICK BARNARD
(THE STAR)

711 LOST DEED

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 (1) of the Deeds Registries Act 47 of 1937, of the intention to apply for the issue of a certified copy of Deed of Transfer T32511/2021 in favour of

AWELANI PORTIA NEMAANGANI
Identity Number: 871212 1174 08 2
Unmarried

In respect of certain

PORTION 149 OF ERF 810 HOMES HAVEN EXTENSION 24 TOWNSHIP
REGISTRATION DIVISION I.Q., PROVINCE OF GAUTENG
MEASURING 405 (FOUR HUNDRED AND FIVE) SQUARE METRES

HELD BY DEED OF TRANSFER T32511/2021, which has been lost or destroyed.

All interested persons having objections to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at Johannesburg, situated at Deeds Office Information Section, Mezzanine Floor, 208-212 Marble Towers Building, c/n Von Weilligh and Pritchard Street, Johannesburg, within two weeks from the date of the publication of this notice.

Dated at Johannesburg on the March 2023.

APPLICANT: AWELANI PORTIA NEMAANGANI
ADDRESS: MOSES SILINDA INCORPORATED
33 Hoofd Street, Braampark, Forum 2
E-MAIL ADDRESS: moss@silindainc.co.za
TELL: 011 403 2070
(THE STAR)

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of the Notarial Cession of Exclusive Use Areas SK1944/2003S passed by **PROSTART PROPERTIES 45 (PRORIETARY) LIMITED, No. 2000/031352/07,** in favour of **19A KLOOF ROAD PROPERTIES CC,** No. 2003/020680/23, in respect of

1. An Exclusive Use Area described as PARKING BAY No. P1 measuring 16 (Sixteen) square metres, being as such part of the common property, comprising the land and the scheme known as ORIEL BUSINESS CENTRE in respect of the land and building or buildings situate at ORIEL TOWNSHIP; LOCAL AUTHORITY CITY OF EKURHULENI METROPOLITAN MUNICIPALITY, as shown and more fully described on Sectional Plan No. SS 139/2002

HELD BY Notarial Deed of Cession SK1944/2003S

2. An Exclusive Use Area described as PARKING BAY No. P2 measuring 14 (Fourteen) square metres, being as such part of the common property, comprising the land and the scheme known as ORIEL BUSINESS CENTRE in respect of the land and building or buildings situate at ORIEL TOWNSHIP; LOCAL AUTHORITY CITY OF EKURHULENI METROPOLITAN MUNICIPALITY, as shown and more fully described on Sectional Plan No. SS 139/2002

HELD BY Notarial Deed of Cession SK1944/2003S

3. An Exclusive Use Area described as PARKING BAY No. P3 measuring 14 (Fourteen) square metres, being as such part of the common property, comprising the land and the scheme known as ORIEL BUSINESS CENTRE in respect of the land and building or buildings situate at ORIEL TOWNSHIP; LOCAL AUTHORITY CITY OF EKURHULENI METROPOLITAN MUNICIPALITY, as shown and more fully described on Sectional Plan No. SS 139/2002

HELD BY Notarial Deed of Cession SK1944/2003S

which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at Johannesburg, Deeds office Information Section, Mezzanine Floor, 208/212 Marble Towers Building, c/n Von Weilligh & Pritchard Street, Johannesburg within two (2) weeks from the date of the publication of this notice.

Applicant: c/o Marto Lafitte & Associates
Address: 11 Smith Street, Bedfordview
E-mail address: maria@martolafitte.co.za
Contact number: 011 6166420
(THE STAR)

711 LOST DEED

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68(1) of the Deeds Registries Act, 47 of 1937, of the intention to apply for the issue of a certified copy of **Title Deed T19350/2017**, passed by **CITY OF JOHANNESBURG**, in favour of **DINGAAN JOHANNES MOKOENA, Identity Number: 451216 5182 080, Unmarried**, in respect of certain **ERF 802 LUFHERENG TOWNSHIP, REGISTRATION DIVISION IQ.,GAUTENG PROVINCE, MEASURING 467 (FOUR HUNDRED AND SIXTY SEVEN) SQUARE METRES**, which has been lost or destroyed.
All persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at JOHANNESBURG, within two weeks from the date of publication of this notice.
Applicant:
MUDAU HULISANI ATTORNEYS
Address:
Office 708B
Klamson Towers
151 Commissioner Street
Johannesburg
E-mail: hulisanisydney@gmail.com
Tel: 067 098 1535 / 011 331 0135

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of Deed of Transfer ST 12435/2003 passed by

JORG HUBERTUS BERND SCHWUCHOW IDENTITY NUMBER 640528 5187 18 8 UNMARRIED

in favour of

YOLANDA ELSIE MULLER
IDENTITY NUMBER 700905 0200 08 2 UNMARRIED

in respect of certain:-

A Unit consisting of –

(a) Section No. 13 as shown and more fully described on Sectional Plan No. SS606/2002, in the scheme known as **TEHILLA** in respect of the land and building or buildings situated at **ERF 1649 ROOIHUISKRAAL NOORD EXTENSION 18 TOWNSHIP,** LOCAL AUTHORITY: CITY OF TSHWANE METROPOLITAN MUNICIPALITY of which section the floor area, according to the said sectional plan, is 90 (NINETY) SQUARE METRES in extent; and

(b) an undivided share in the common property in the scheme apportioned to the said section in accordance with the participation quota as endorsed on the said sectional plan.

which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at PRETORIA, Deeds Office Information Section, Merino Building, 140 Pretorius Street, Pretoria Central, Pretoria within two weeks from the date of the publication of this notice.

DATED at Pretoria on this day of 2023

APPLICANT
c/o JOLANDA MC INTYRE ATTORNEYS
ADDRESS: 391 QUEENS CRESCENT, LYNNWOOD, PRETORIA, 0081
E-MAIL: amanda @jmlaw.co.za
TEL: 012 365 1567
(THE STAR)

LOST OR DESTROYED DEED

Notice is hereby given in terms of regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of Deed of Transfer Number T83397/2011

passed by :

The Provisional Liquidators of
BLUEDUST 65 PROPRIETARY LIITED (IN LIQUIDATION)
Registration Number: 2005/029708/07
Number T3445/2011

in favour of

SERVTEL ADMINISTRATION PROPRIETARY LIMITED
Registration Number: 1999/000933/07

in respect of certain:

PORTION 7 (PORTION OF PORTION 6) OF ERF 751 PRETORIA TOWNSHIP
REGISTRATION DIVISION JR, PROVINCE OF GAUTENG

MEASURING 1276 (ONE THOUSAND TWO HUNDRED AND SEVENTY SIX) Square metres

HELD BY Deed of Transfer Number T83397/2011

which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at PRETORIA, within two weeks from the date of the publication of this notice.

Dated at RANDBURG this 15 MARCH 2023

SEAN JOHNSTON
duly authorised hereto by a resolution of the Directors of
SERVTEL ADMINISTRATION PROPRIETARY LIMITED
Registration number 1999/000933/07
Address: **c/o Lee and McAdam Attorneys**, 435 Vale Avenue, Ferndale
E-mail address: jackie@leeandmcadam.co.za;
Contact number: 0763814536
(THE STAR)

711 LOST DEED

NOTICE IN TERMS OF REGULATIONS 68 OF THE DEEDS REGISTRIES ACT, 1937 (No. 47 OF 1937)

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of DEED OF TRANSFER No. T19515/2021 dated 13 May 2021 passed by World Power Products Proprietary Limited in favour of **KAMAS PROPRIETARY LIMITED,** Registration Number 1973/002704/07 in respect of **ERF 42 WEST TURFFONTEIN** Township, REGISTRATION DIVISION IR, PROVINCE OF GAUTENG which has been lost or destroyed.

All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the REGISTRAR OF DEEDS at JOHANNESBURG, Deeds Office Information Section, Mezzanine Floor, 208-212 Marble Towers Building, Cnr Von Weilligh & Pritchard Street, Johannesburg within 2 (two) weeks after the date of publication of this notice.

APPLICANT – KAMAS PROPRIETARY LIMITED
CVL ATTORNEYS & CONVEYANCERS
PALM BLOCK - SAVANAH OFFICE ESTATE,
RUGBY ROAD
WELTEVREDENPARK, 1709
Tel. No.: 011 475 1076
Ref : K078/HM
(THE STAR)

711 LOST DEED

NOTICE FOR A LOST OR DESTROYED DEED

NOTICE is hereby given in terms of regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of :

1. K5121/2016S, passed by The Executor's in the Estate Late PETER JULIUS GEORGE KING, Estate Number 25070/2014 in favour of MICHAEL PETER KING, Identity Number 611219 5043 08 5, Married out of community of property; LYNETTE MARY ROUX, Identity Number 600813 0057 08 3, Married out of community of property and SANDRA KATHLEEN HOWARD, Identity Number 640921 0046 08 9, Married out of community of property; Yvonne Gloria King, Identity Number 490913 0082 08 2, Unmarried, in respect of certain :

A unit consisting of -

(a) Section Number 64 as shown and more fully described on Sectional Plan Number SS 637/2015, in the scheme known as **COUNTRY LIFE RETIREMENT VILLAGE** in respect of the land and building or buildings situate at **POMONA EXTENSION 83 TOWNSHIP**; LOCAL AUTHORITY: CITY OF EKURHULENI METROPOLITAN MUNICIPALITY, of which section the floor area, according to the said Sectional Plan, is 105 (ONE HUNDRED AND FIVE) SQUARE METRES in extent; and

(b) an undivided share in the common property in the scheme apportioned to the said section in accordance with the participation quota as endorsed on the said sectional plan.

HELD BY DEED OF TRANSFER NUMBER ST68273/2016

Which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at PRETORIA, within 2 (TWO) weeks from the date of the publication of this notice.

MICHAEL PETER KING
LYNETTE MARY ROUX
SANDRA KATHLEEN HOWARD
YVONNE GLORIA KING
(THE STAR)

LOST OR DESTROYED DEED

Notice is hereby given in terms of the Regulation 68 of the Deeds Registries Act, 1937, of intention to apply for the issue of a certified copy of:

Deed of Transfer Number ST82863/2021

Passed by REGISTAR OF DEEDS at PRETORIA in favour of

NTOMBIKANINA NELISIWE ELIZABETH DUBE
IDENTITY NUMBER: 9006220342081
UNMARRIED

A Unit consisting of

(a) Section No. 3706 as shown and more fully described on Sectional Plan No SS 144/2019 in the scheme known as **FISH EAGLE VIEW** in respect of the land and building or buildings situated at **ERF 81 LONGLAKE EXTENSION 6 TOWNSHIP AND ERF 89 LONGLAKE EXTENSION 11 TOWNSHIP,** LOCAL AUTHORITY ; CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, of which section the floor area, according to the said sectional plan is 92 (Ninety Two) square metres in extent and

(b) An undivided share in the common property in the scheme apportioned to the said section in accordance with the participation quota as endorsed on the said sectional plan.

HELD BY DEED OF TRANSFER ST82863/2021

which has been lost or destroyed.
All persons having objected to issue of such copy are hereby required to lodge writing with the Registrar of Deeds at Pretoria within (2) weeks after the date of the publication of this notice.

Dated at CENTURION this 9th day of March 2023

APPLICANT: NNE DUBE
ADDRESS:
11 BYLSBRIDGE BOULEVARD CENTURION
EMAIL ADDRESS: nadia@imlaw.co.za
CONTACT NUMBER: 012 676 8727
(THE STAR)

711 LOST DEED

LOST OR DESTROYED DEED

Notice is hereby given in terms of regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of Title Deed No ST55025/1995 passed by MARIUS BOTHA AND ANTOINETTE BOTHA in favour of **ISABELLA SUSANNA CAZES** in respect of certain **SECTION 26 RHODESFIELD TERRACE VIEW RHODESFIELD EXTENSION 1 TOWNSHIP** which has been lost or destroyed.
All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deed at Johannesburg within two weeks from the date of publication of this notice.

Applicant: ISABELLA SUSANNA CAZES
C/O Manong Badenhorst Abbott van Tonder Attorneys
Address: 18 Badenhorst Road; Blackheath, 2195
E-mail address: stella@mbat.co.za
Contact number: 011 326 2111
(THE STAR)

714 PUBLIC NOTICES

DISSOLUTION OF PENSION/PROVIDENT FUND

FundsAtWork Umbrella Pension Fund

p/e Wild Beef (Pty) Ltd

Notice is hereby given in terms of Section 28(7) of the Pension Funds Act (No 24 of 1956) that a preliminary liquidation account, a preliminary balance sheet and preliminary distribution statement of FundsAtWork Umbrella Pension Fund p/e Wild Beef (Pty) Ltd will be open for inspection for the period 24/03/2023 to 22/03/2023, at the offices of:

1. The registered office of the fund, Momentum, 268 West Avenue, Centurion

2. The Financial Sector Conduct Authority, Riverwalk Office Park, 41 Matroosberg Road, Ashley Gardens, Ext 6, Pretoria.

The account can also be viewed on the liquidator's website: www.calibrewealth.co.za

Any person who has objections to the aforesaid accounts and statements may lodge his objection in writing with the Financial Sector Conduct Authority, P O Box 35655, Menlo Park, 0102 by 06/04/2023.
(THE STAR)

NOTIFICATION OF INTENT FOR THE PROPOSED CONSTRUCTION OF A 400KV TRANSMISSION POWER LINE, A NEW SUBSTATION AND LOOP IN AND LOOP OUT POWERLINES IN THE ZULULAND AND KING CETSHWAYO DISTRICT MUNICIPALITIES, KWAZULU-NATAL PROVINCE

Notice is hereby given that Eskom intends to construct a 400 KV Transmission line which is in-line with Standard for the Development and Expansion of Power Lines and Substation within Identified Geographical Areas, 2022 as gazetted by GN 2313 of 2022.

PROPONENT:
Eskom Holdings SOC Limited

PROJECT LOCATION:
The proposed project and associated infrastructure is situated between the proposed new Mbewu substation near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and King Cetshwayo District Municipalities.

ENVIRONMENTAL AUTHORISATION PROCESS:
Kimopax (Pty) Ltd ("Kimopax") will make the Draft BAR be available on the 23rd of March 2023 for the proposed Project. The comments period is will be opened from 23 March to 24 April 2023.
Detailed description of listed activities associated with the project.

Listed activity as described in GN R 983 984 and 985 and Description of project activity that triggers listed activity:

• **GN R. 983 (19) as amended by GN R. 327 (19)**
The upgrading or construction of access roads will require the infilling or depositing of material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.

• **GN R. 983 (24) as amended by GN R. 327 (24)**
Access roads for the construction and operation of the towers will be required. These will all be in the authorised corridors.

• **GN R. 983 (28) as amended by GN R. 327 (28)**
The construction of the power lines will require the use of some land that is currently being used for agriculture, game farming and/or afforestation.

• **GN R 984 (9) as amended by GN R. 325 (9)**
The power lines are infrastructure that is part of the system for the transmission of 400 kV of electricity outside of urban areas and industrial complexes.

• **GN R. 985 (4) as amended by GN R. 324 (4)**
Access roads will be constructed or upgraded.

• **GN R. 985 (12) as amended by GN R. 324 (12)**
The tower footprints will be cleared of vegetation.

PUBLIC COMMENT INVITED:
Stakeholders are invited to register as Interested and Affected Parties (I&APs) and to participate in the integrated Basic Assessment processes by identifying issues of concern and suggestions for consideration during the technical studies. To obtain additional information about the proposed project, or to submit concerns and comments, contact the following personnel at Kimopax to the contact person indicated below:

Lufuno Nengwani
Postal Address:
P.O. Box 4077
Halfway House
Midrand, 1685
Cell: +27 82 832 9378
Tel: +27 11 312 9765
Fax: +27 11 312 9768
E-mail:
Lufuno@kimopax.com

Appendix H : EMPr

ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE CONSTRUCTION OF A 400KV TRANSMISSION POWER LINE, A NEW SUBSTATION AND LOOP IN POWERLINES IN THE ZULULAND AND UTHUNGULU DISTRICT MUNICIPALITIES, KWAZULU-NATAL PROVINCE

MARCH 2023

Directors: ST Netshiozwi | C Monokofala | MS Masoga

Email: info@kimopax.com | Website: www.kimopax.com

ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE CONSTRUCTION OF A 400KV TRANSMISSION POWER LINE, A NEW SUBSTATION AND LOOP IN POWERLINES IN THE ZULULAND AND UTHUNGULU DISTRICT MUNICIPALITIES, KWAZULU-NATAL PROVINCE

MARCH 2023

Conducted on behalf of:

Eskom

Compiled by:

_____

Lufuno Nengwani

Reviewed by:

_____

Simon Netshiozwi (Pr. Sci. Nat.)

kimopax GROUP

Document History and Distribution List

Project Number	Date	Revision Number
KIM-ENV-2022-023	March 2023	00

Name	Institution
Vuledzani Thanyani	ESKOM SOC Ltd
Kimopax Library	Kimopax (Pty) Ltd

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DEFINITIONS

In this **EMPr** any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"**Clearing"** means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"**Construction camp**" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"**Contractor"** - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"**Hazardous substance**" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"**Method statement**" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

"**Solid waste**" means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

"**Spoil"** means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

"Topsoil" means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil;

"Works" means the works to be executed in terms of the Contract.

ACRONYMS ANDABBREVIATIONS

CA	**Competent Authority**
CEO	**Contractors Environmental Officer**
EAR	**Environmental Audit Report**
ECA	**Environmental Conservation Act No. 73 of 1989**
ECO	**Environmental Control Officer**
EA	**Environmental Authorisation**
EIA	**Environmental Impact Assessment**
ERAP	**Emergency Response Action Plan**
EMPr	**Environmental Management Programme Report**
EAP	**Environmental Assessment Practitioner**
FPA	**Fire Protection Agency**
HCS	**Hazardous chemical Substance**
NEMA	**National Environmental Management Act, 1998 (Act No. 107 of 1998)**
NEMBA	**National Environmental Management: Biodiversity Act ,2004 (Act No. 10 of 2004)**
NEMWA	**National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)**

CONTENTS

List of Figures

INTRODUCTION

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended, (EIA Regulations) or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice, that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the applicant and the competent authority (CA). Kimopax (Pty) (Kimopax) as independent Environmental Consultant compile Environmental Management Program on behalf of Eskom Soc Ltd for the construction of 400kV lines from the Umfolozi to Mbeu Substations. The construction of new Mbewu (Theta) Substation near Empangeni. Construction of associated 400 kV turn in lines (loop in & loop out Athene-Umfolozi and Invubu-Umfolozi 400 kV lines), Kwazulu-Natal Province.

1 BACKGROUND

Eskom's transmission network supplying electricity into the Eastern Region requires strengthening to meet the growing demand in KwaZulu Natal in-order to avoid load shedding as a result of limited Transmission capacity, as well as to improve service quality and reliability. The strengthening of the power corridor will entail phased construction of 400kV lines into the Empangeni and Pinetown Customer Load Networks (CLN). Studies have also indicated that in order to evacuate the power out of the proposed new Theta (Mbewu) Substation and to meet Grid Code requirements, there is a need to construct an additional 400kV line between the proposed new Mbewu (Theta) Substation near Empangeni.

Before construction of a National Environmental Management Act (NEMA) listed activity such as the construction of a substation and powerlines of this magnitude, an Environmental Authorisation (EA) is required from the Department of Forestry, Fisheries and the Environment (DFFE) before construction can commence. This EIA process will enable construction authorisation of this project.

2 PURPOSE

The main driving force behind the compilation of this EMPr is to outline measures that are to be implemented in order to minimise adverse environmental impacts that are either direct, indirect or cumulative impacts associated with the proposed construction of Substation and Transmission line. This is done by encouraging good management practices through planning and commitment of environmental issues and complying with all applicable laws, regulations, standards and guidelines for the protection of the environment. The EMPr serves as a guide for contractors, sub-contractors and employees on their roles and responsibilities concerning environmental management on site. Furthermore, it provides a framework for environmental monitoring throughout the development's life cycle. This document Provides appropriate mitigation measures designed to minimise or eliminate the significant adverse impacts that may be caused as a result of the proposed project and to also enhance positive impacts.

3 OBJECTIVE

a) To provide a structure or framework within the environmental management requirements which will be implemented, audited and reported on, in order to ensure that potential impacts on the environment are minimized.

b) To set out the mitigation measures and environmental specifications which are required to be implemented during various phases of then order to minimize the extent of environmental impacts, to manage environmental impacts and where possible to improve the condition of the environment.

c) To state standards and guidelines that are required to be achieved in terms of environmental legislation and authorization conditions.

d) To provide a clear indication of the environmental management requirements of each of the role players involved.

4 SCOPE

The scope of this document is to give guidelines for environmental best practice to the Contractor commissioned to construct the proposed Substation and Transmission lines. This document shall be seen as part of the contract and supplementary to Eskom's . The EMP will

thus be part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract

5 STRUCTURE OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

It is intended to be an overview document that specifies the on-site environmental management philosophy of the proposed development and the organisational structure necessary to achieve that vision. In addition, it specifies common environmental management and monitoring principles that will be applied to all aspects of the proposed project. The EMPr provides mitigation and management measures for the following phases of the project.

5.1 Planning Phase

This section of the EMPr incorporates pro-active environmental management measures with the goal of attaining sustainable development which can be achieved during this phase. Pro-active environmental measures help minimize the chance of negative impacts occurring. Necessary corrective actions are proposed to further limit potential impacts. The planning phase should include measures that will dictate how the reprocessing activities should be carried out.

5.2 Construction Phase

This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. This specification will form part of the contract documentation and, therefore, the contractor will be required to comply with the specifications to the satisfaction of the project manager and Environmental Control Officer (ECO), in terms of the construction contract.

5.3 Operation and maintenance phase

This section provides management for the operational and maintenance phase of the project. Environmental actions, procedures and responsibilities as required within these phases are specified. Taking pro-active measures during the design and planning phases as well as the construction phase; potential environmental impacts originating during the operational phase can be minimized or even prevented

6 DESCRIPTION OF THE STUDY AREA

6.1 Pre-construction and Construction phase

- Establishment of the contractor's camp;
- Clearing the proposed site of any vegetation;
- Removal and stockpiling of topsoil;
- Fencing of the construction sites;
- Personnel conduct;
- Storage of hazardous material;
- Handling and disposal of construction waste; and
- Protection of archaeological sites.

6.2 Rehabilitation phase

- Removal/decommissioning of Contractor's camp;
- Removal of all construction, hazardous and domestic waste;
- Rehabilitation of the disturbed areas as a result of construction works.

6.3 Operational phase

- Maintenance of the power line.

6.4 LOCALITY

The proposed project and associated infrastructure is situated between the proposed new Mbewu substation near Empangeni to the existing Umfolozi sub-station near Ulundi in the Zululand and King Cetshwayo District Municipalities. The figure 1 below shows the locality of the transmission line and the estimated 97,23km from the Umfolozi-Mbewu Transmission Line.

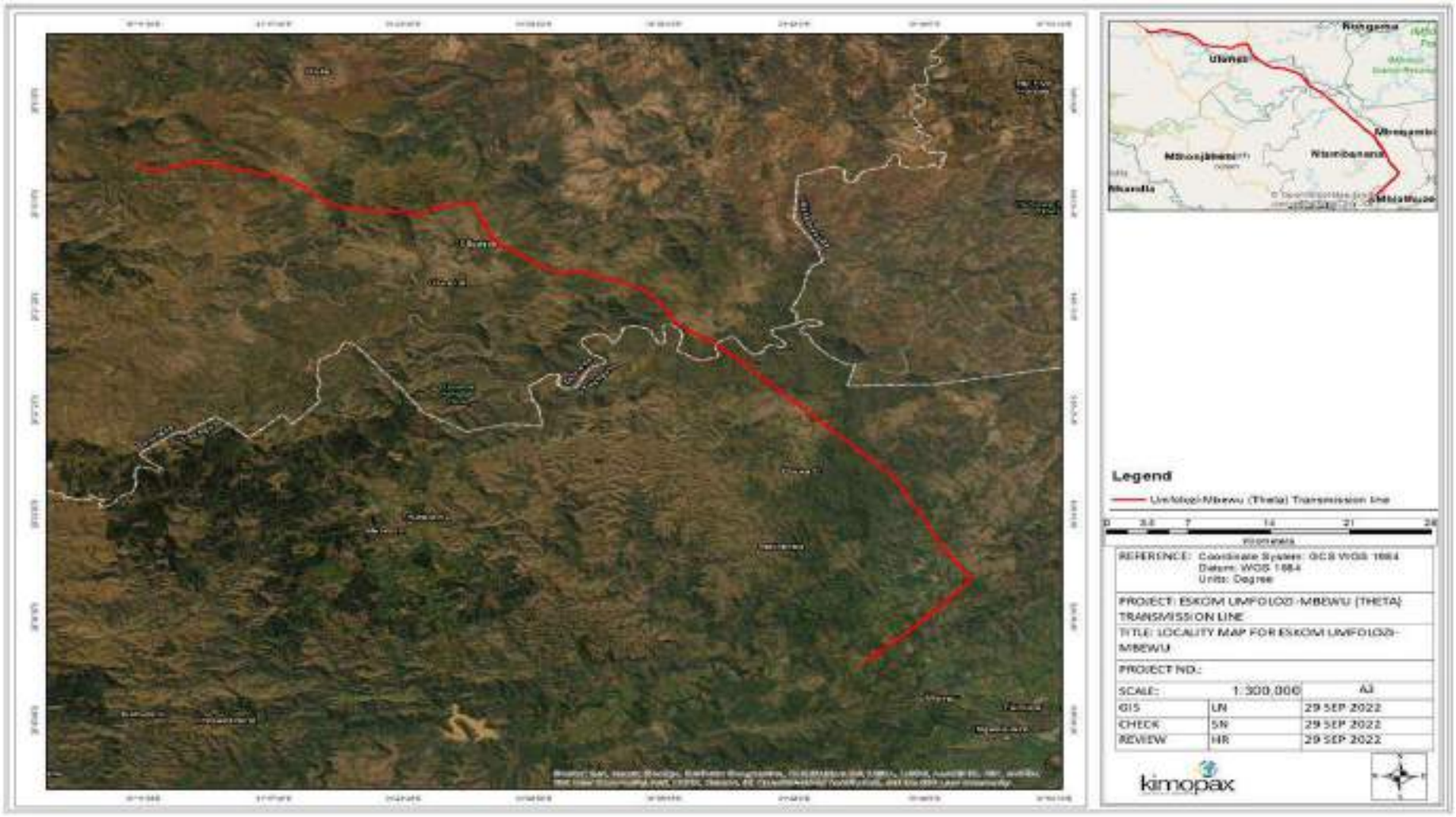

Figure 1: Locality Map for the proposed construction of the Umflolozi-Mbewu (Theta) transmission line.

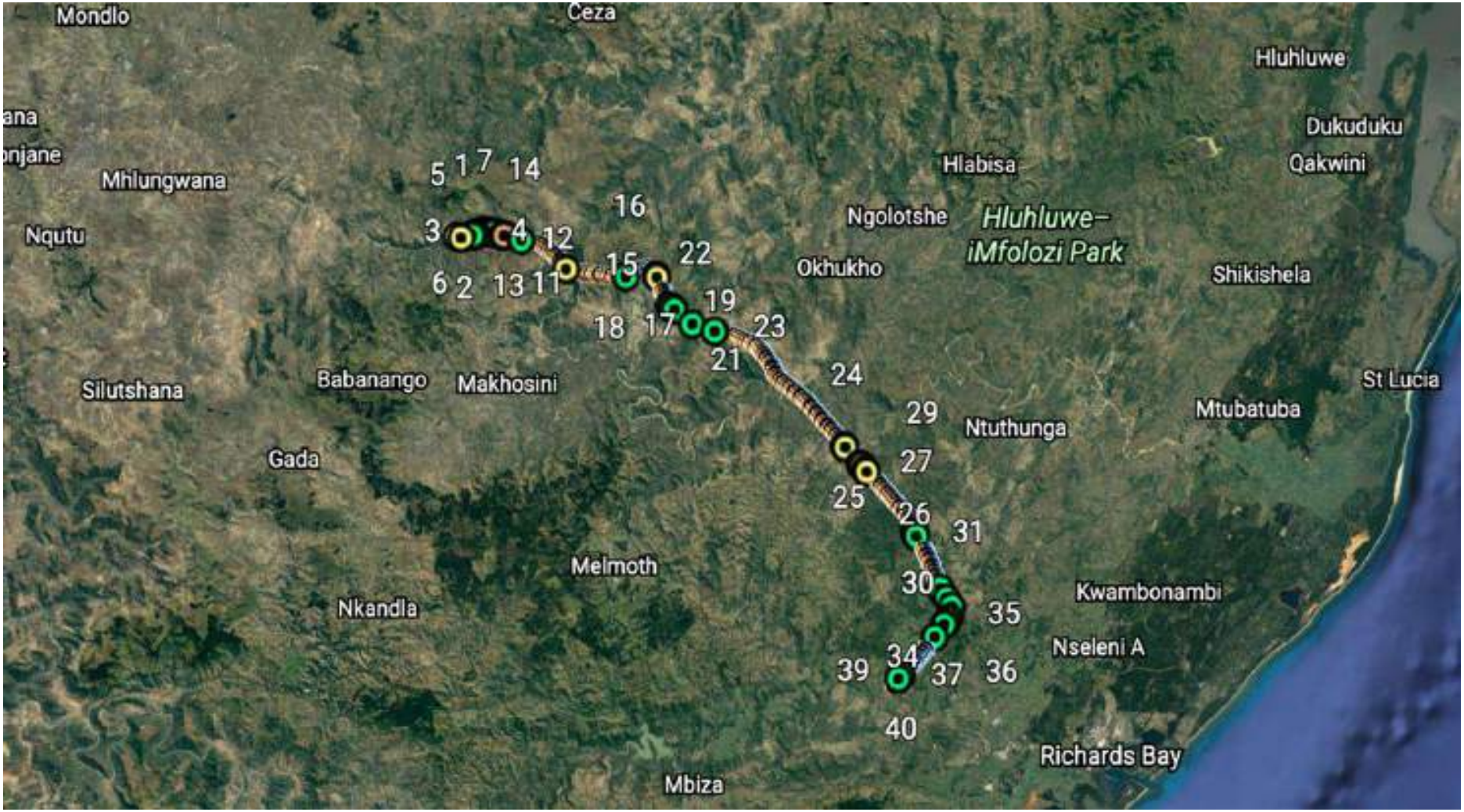

Figure 2: Umfolozi-Mbewu Transmission Line Study Map, Provided by Google Earth, kmz. (97,23km)

7 ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) IMPLEMENTATION

The most important role players in the management of the environment on site may include but are not limited to:

a) Project Proponent/ Developer

b) Engineer design

c) Construction Manager

d) Contractor

e) Environmental Control Officer (ECO)

f) Competent Authority (CA)

7.1 Proponent/ Developer(Eskom)

Eskom remains ultimately accountable for the site and remains liable for any environmental damage caused by activities undertaken on the site. It is from this point of view that the Proponent set out a range of requirements in terms of the management of the environmental aspects for the site, to which the Contractor has to adhere as a prerequisite to his appointment.

It is the responsibility of the Eskom to ensure that the principles of integrated environmental management, in terms of the requirements of Chapter 5 of NEMA, are implemented and maintained on the site and that environmentally sustainable practices are undertaken on the site. The Proponent has to ensure that an approved EMPr and the conditions of the Environmental Authorisation (EA) be supplied to the Contractor for the activities undertaken on the site and also monitor the Contractor's compliance to the requirements set out in the EMPr and EA and take disciplinary action for non-compliance.

Eskom must appoint an independent Environmental Control Officer (ECO) during the construction phase to oversee all the environmental aspects relating to the development. Regular reports from the ECO regarding the compliance of the Contractor must be taken into

consideration by the Eskom when evaluating the performance of the Contractor and taking corrective or punitive decisions towards eliminating the occurrence of the noncompliance incidents in future and to rectify current issues. Should the EMPr require to be reviewed due to its effectiveness the Eskom must submit the recommended changes to the Competent Authority (CA) for approval, prior to implementation.

7.2 Engineer

The Engineer responsible for the design of the transmission lines will be an Eskom appointment. It will be the responsibility of the Engineer to oversee the overall implementation of the project as well as the compliance of the EMP and incorporate any potential environmental aspects mentioned into the design.

7.3 Contractor

The Contractor is responsible for ensuring that all activities pertaining to the project/development complies with the requirements of the EMPr and the principles of Chapter 5 of the National Environmental Management Act (Act 107 of 1998) and any other relevant environmental legislation. The Contractor has the prerogative to appoint specific role players to perform functions on its behalf, delegating the responsibility to whoever is appointed.

It is furthermore the responsibility of the Contractor to allocate sufficient resources (time, financial, manpower, equipment, etc.) in order to ensure that compliance with the recommendations and specifications of the EMPr is achieved by all parties involved in the proposed project. The Contractor must ensure that the Contractors ECO has access to all relevant documentations related to the project – this includes any environmental authorizations, permits, licenses, EMPr, and other relevant documentation.

The Contractor is responsible to inform and update any person or Sub-contractor in its employ of the requirements of the EMPr and environmental legislative requirements and put reporting and compliance monitoring measures in place to ensure conformance by the Subcontractors in relation to the EMPr or applicable environmental legislation.

7.4 Environmental Control Officer (ECO)

The ECO operates independently to objectively monitor the implementation of the EMPr and its conditions and requirements. It is the responsibility of the ECO to monitor the degree of

compliance to environmental legislation and the conditions stipulated in the EMPr by means of regular compliance audits.

All audit reports need to include a general description of the sites general state and if applicable identify and highlight specific areas of non-conformance. In the instance of major non-compliance (non-conformance) the ECO may in conjunction with the Construction Manager suggest corrective action measures to the Proponent to eliminate the occurrence of the noncompliance incidents in future and to rectify the current issue.

The ECO has the authority to stop works if in his/her opinion the operation poses a serious threat to the environment or if an incident has occurred due to neglect or disregard of the imposed measures. Any non-compliance recorded in terms of the conditions of the EMPr, constitutes as a breach of Contract allowing the ECO to suspend part or all of the works, as required and report the matter to the relevant authorities.

The ECO must conduct inspections to assess compliance of the Contractor with the EMPr and report and provide feedback to the Proponent/Lessor on any environmental matters associated with the development.

8 ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE

A copy of the EMPr should always be available on site in an Environmental File/Compliance Record. All employees, Contractors and sub-contractors are required to receive training regarding the contents of the EMPr relevant to their function, level of responsibility and accountability.

The following measures aim to provide pre-empted solutions for common project issues during the execution of the project. These measures have been derived from prior experiences and are based on anticipated environmental issues:

a) Where existing infrastructure is being utilized for project activities, and are in a state of disrepair, a photographic record must be kept – documenting the status before, during and after the project activities;
b) No personnel are to be housed on site. Housing arrangements need to be made away from the Construction area
c) The Proponent and any person or Contractor in its employ must adhere to all conditions of the EMPr;

d) Adequate storage and control of hazardous substances and hydrocarbons are required;
e) All equipment must be maintained at regular intervals to prevent spillages and or environmental incidents; and
f) Control and monitoring of storm water runoff are essential during operations.

8.1 Environmental Compliance Records

The Contractors and the ECO will follow the Environmental Governance framework on site whereby records will be kept on all matters environmentally related. All records kept must adhere to the following standards:

- Records must be legible;
- Records must be compiled as soon as practicable and should form part of the external audit report; and
- If amended, amendment must be done in such a way that the original and any subsequent amendments remain legible and are easily retrievable.

Records will include but not be limited to:

A) Induction and Environmental Awareness Training Register.

It is the responsibility of the Contractors ECO to ensure that all persons working on site has received a suitable degree of environmental training. This allows the Contractor to keep its environmental obligations in check. Environmental induction/training may take the form of inductions, toolbox talks, demonstrations, media or a written test – whereby the employees' understanding of environmental issues pertaining to his/her job is explained and assessed.

The degree of specialised training/induction is dependent on the function performed by the employee and will be determined by the ECO. All levels of management and employees need to undergo environmental training and training attendance records has to be kept and available for review by the ECO. Copies/samples of the toolbox talks/induction/training material also need to be kept in the Environmental File available for review by the ECO.

B) Complaints Register

A Complaints Register has to be kept on site at all times. This register has to be easily accessible to all stakeholders and Interested and Affected Parties (I & APs) and made available for review to the ECO during audits. The Register must illustrate what measures have been implemented to address the complaints as well as indicate what the timeline was in resolving the complaints.

C) Stakeholder Liaison and Communications

Copies of all documents referring to stakeholder liaisons must be kept on record (preferably signed) and maintained. All communications need to be made available to the ECO during auditing.

D) Method Statements

The Contractor shall provide Method Statements for approval by the ECO and the Construction Manager prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the construction phase of the EMPr, when called upon to do so by the ECO and the Construction Manager. A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the ECO and the Construction Manager, as circumstances unfold. All Method Statements will form part of the construction phase of the EMPr documentation and are subject to all terms and conditions contained within the construction phase of the EMPr.

Note that a Method Statement is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment, changes to, and adaptations of Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Construction Manager to understand the Contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks. All Method Statements are to be to the satisfaction of the ECO and the Construction Manager.

E) Emergency Procedure

The Contractors ECO must ensure that there is an Emergency Procedure on site that provides a detailed explanation of actions to be taken in the event of emergency situations. This procedure has to be known to all persons working on site and has to also provide contact information of the emergency services. The plan is to be reviewed annually and after each emergency and or accident. The procedure needs to address, amongst other the following emergencies:

a) Fire

b) Accidental leaks and spillages of hydrocarbons (oil, fuel; etc.);

c) Destruction of habitat or animal fatalities; and

d) Acts of nature such as floods, lightning storms, etc.

e) Site Documentation

A copy of the EMPr has to be available on site and easily accessible to any and all persons working for and or on behalf of the Contractor. Issues and conditions of the Site Documentation need to be explained to all employees.

F) Declaration of Understanding (DoU)

The Declaration of Understanding in the Contractor's Guideline Document will be signed and provided by the Contractor as part of his Tender Document. The signed DoU is a written confirmation by the Contractor that the requirements of the EMPr, Environmental Standards and authorised conditions are understood and will be complied with for the duration of their works on site.

G) Appointment of Contractor's Environmental Officer

The Contractor will appoint an Environmental Officer or assign to a competent person roles and responsibilities for environmental management during construction. The Contractor will forward details of the appointment to the Construction Manager and Environmental Officer for their review and approval. Should the Contractor's Environmental Officer or the person originally assigned with responsibilities for environmental management change from that person identified during either the tender stage, or the construction period, the Contractor will submit the details of such appointment or assignment for the Project Manager's approval. No work will proceed until the new Environmental Officer is assigned or appointed

8.2 Non-Compliance with Documentation

Any non-compliance with the EMPr, the recommendations and conditions contained in the EA, and any written instruction issued by the Construction Manager/ Project Manager will be treated as serious. Eskom will be responsible for the implementation of said documentation and will be held accountable for any non-compliance thereof. A penalties/disciplinary schedule will be developed and agreed to by the project Proponent and Contractor prior to and during the Construction Phase. These measures will be

implemented where practical based on the scale and complexity of the construction activities associated with the proposed project.

8.3 Site Inspections- Internal Audits

In order to ensure all information pertaining to the management of the site is recorded the EO will have to undertake monthly audit inspections to record all forms of non-compliance and incidents. These findings have to be compiled into a monthly Internal Environmental Audit report and needs to be provided to the ECO on a monthly basis. This internal report will inform the Proponent of all environmental matters that require addressing and will provide a detailed review of the degree of compliance with the EMPr. The ECO and Contractors ECO needs to be available for the monthly compliance audits as well as be able to attend environmental meetings with the Proponent.

8.4 Monthly Inspections-External Audits

In order to ensure compliance with the EMPr is achieved it is the ECO's responsibility to undertake monthly site inspections or external audits. These inspections will aim to ensure that all persons working for and on behalf of the Eskom adheres to the EMPr and other relevant site documentation.

8.4.1 During these external audits the ECO will determine if:

a) The Contractors EO's record of major incidents (e.g. spills, impacts, complaints, and legal transgressions) is updated and that corrective and preventive actions identified and recommended have been implemented;
b) A review of the public complaints register is conducted and that adequate measures have been employed by the Contractors ECO to address these complaints;
c) Findings of the weekly Site Inspection Forms are adequately recorded and addressed;
d) Notice of any major incidents and complaints was given to the relevant authorities or the Proponent, whichever is relevant depending on the severity of the incident, and that adequate follow up actions were taken;
e) The Method Statements and Management Programme being used are reviewed and updated regularly and records of variations to the EMPr /Method Statements are kept;
f) Environmental monitoring is conducted, findings recorded, and remedial action is taken where limits are exceeded;

g) Appropriate environmental training of personnel is undertaken;
h) Adequate emergency procedures are in place, visibly displayed and effectively communicated to personnel; and
i) The system for implementing the EMPr is operating effectively.

8.4.2 Each monthly audit will entail:

a) A site visit accompanied by the ECO.
b) The recording of findings of the site visit in the Environmental Checklist and reported on in the Environmental Audit Report.
c) Action steps resulting from non-compliance with the EMPr:

- Any non-compliance with the EMPr will be treated as very serious and will be handled in accordance with the agreed schedule of penalties/disciplinary actions and/or Section 32, 33 and 34 of the National Environmental Management Act, Act 107 of 1998.

8.5 ENVIRONMENTAL INCIDENTS

An environmental incident is defined as any unplanned event that results in actual or potential damage to the environment, whether of a serious or non-serious nature. An incident may involve non-conformance with any of the following:

a) Legal requirements
b) Requirements of the EMP
c) Any verbal or written order given by the ECO on site

In the event of any incident, the Environmental Incident Log should be completed. Corrective action to mitigate the impact (appropriate to the nature and scale of the incident) should be conducted immediately and affected parties notified. In the case of serious incidents or emergencies, the incident report should be sent to the relevant authority as soon as possible after the incident has been recorded.

8.6 Document Status

This EMP serves as a binding document enforcing guidelines to the contractor during the construction phase as well as anyone who might be handed an opportunity to contribute in the development of this establishment. This specification shall be read in conjunction with all the documents that comprise the contract documents for this contract. In the event that any conflict occurs between the terms of the Construction EMP and the Project Specification or the EA, the terms of the Construction EMP shall stand.

9 IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

9.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Time frame for implementation	Responsible person	Frequency	Evidence of compliance
- All staff must receive environmental awareness training prior to commencement of the activities; - The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; - Refresher environmental awareness training is available as and when required; - All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering.	contractor	As defined in EMPr	Throughout construction period	ECO	monthly	ECO reporting

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Time frame for implementation	Responsible person	Frequency	Evidence of compliance
- Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation;						

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Time frame for implementation	Responsible person	Frequency	Evidence of compliance
h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention. - A record of all environmental awareness training courses undertaken as part of the EMPr must be available; - Educate workers on the dangers of open and/or unattended fires; - A staff attendance register of all staff to have received environmental awareness training must be available. - Course material must be available and presented in						

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Time frame for implementation	Responsible person	Frequency	Evidence of compliance
appropriate languages that all staff can understand						

9.2 PRE-CONSTRUCTION AND CONSTRUCTION SITE

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Engineering Design	All aspect in the EMPr	Design incompatible with Environment	Objective: To ensure the design of the transmission line and Mbewu substation considers the environment. Target: - Assimilate requirements of the EMP in the design and construction - management giving special attention to the proposed pylon positions.	Design meets objectives and does not degrade the environment	Design meets objectives and does not degrade the environment	Engineering Design Consultant	During Tender Design & Design Review Stage	Engineering design consultant	Design Phase
Establishment of the construction camp sites	Construction camp	Damage or loss of existing vegetation and changes	Objective: To prevent negative influence to the surrounding surface and groundwater. Target:	Construction camp established in compliance with objectives.	Contractor, CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of Site	EC0	Once off

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
		to the area's water quality	- Site establishment shall take place in an orderly manner and all amenities shall be installed at Camp sites before the main workforce move onto site - A method statement is required from the Contractor at tender stage that includes the layout of the camp, management of ablution facilities and wastewater management - The planning and design for the construction camp must ensure that there is a minimum impact on the environment. - A site plan of the construction camp must be provided indicating waste areas, storage areas and placement of ablution facilities. - The Contractor camp shall have the necessary ablution facilities with chemical						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- toilets where such facilities are not available at commencement of construction - The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to Eskom - Where Eskom facilities are available the Contractor shall make use of such - facilities where it is viable and possible - The Contractor shall inform all site staff to the use of supplied ablution - facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- The Contractor shall supply waste collection bins where such is not available - and all solid waste collected shall be disposed of at a registered waste dump - A certificate of disposal shall be obtained by the Contractor and kept on file - Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste - management. Under no circumstances may solid waste be burned on site unless a suitable incinerator is available - Refuse bins will be emptied and secured. All waste will be collected and disposed of at a						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			registered waste disposal site. Proof of this must be provided to the ECO. - The construction camp must be placed on already disturbed land as far as possible. - The construction camp should be fenced off so as to limit the removal of unnecessary vegetation. - Fences and security access must be maintained, throughout the project. - All fences removed to facilitate access will be replaced by the contractor once - machinery and personnel have been removed from the site to the satisfaction of all the relevant landowners - Emergency and contact numbers of the contractors must be available and						

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			prominently displayed on a signage board that is clearly visible. - No labourer is allowed to reside on site						
Establishment of the construction camp site	Construction camp.	Loss of soil fertility.	Objective The environmental objective when establishing the contractor's camp is to minimise the footprint of disturbance thereby preventing the degradation and loss of topsoil. Target: - Allowance for one contractors camp along the alignment. - Once the site has been cleared of vegetation, the topsoil should be stripped. - Topsoil must be stored in a demarcated area which protected from wind and rain.	Established construction camp in compliance with objectives and no evidence of environmental degradation	Contractor, CECO	Contract and allowance in P&G's	Pre-construction, Establishment of Site	ECO	Once off

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- The topsoil stockpiles must not exceed 1.5m in height. - The area must be rehabilitated once the construction camp has been decommissioned.						
Closure of the construction camp	Construction camp	Potential impacts associated with the closure of the construction camp	Objective(s): To limit potential impacts on the environment for the period for which the construction camp is closed. Target : - Should the construction camp be closed for a period of more than one week, a report on compliance will be lodged with the Contractor, Engineer and Project manager confirming the following:-	Closure of the construction camp in line with the requirements of the EMP.	Engineer, Contractor and CECO	Contract and allowance in P&G's	Closure of camp	Engineer ECO	Whenever the construction camp is closed for longer than a week.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- No persons allowed other than project employees; - Minimal materials will be stored; - Materials will be stored in leak-proof, sealable containers or packaging; - The store area will be secure and locked; - Fire extinguishers will be serviced and accessible; - The area will be secure from accidental damage through vehicle collision, etc.; - Emergency and contact numbers of the contractor will be available and prominently displayed; - All stores will be secured;						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- Chemical toilets will be empty, kept hygienically clean and secured; - All minimal hazardous material which have the potential to catch fire may be stored onsite. - 24 hour security will be on site during this period.						
Storage of topsoil	Striping and stockpiling of topsoil.	Mixing of topsoil and subsoil. Erosion of topsoil. Contamination of top soil. Dust.	- The topsoil in the specific region is regarded as the top 300 mm (maximum) of the soil profile irrespective of the fertility appearance or physical depth, unless otherwise confirmed by the ECO. - Topsoil is to be stripped up to a depth of 300mm when it is in as dry a condition as possible in order to prevent compaction. - The topsoil, including the existing grass cover is to be shallowly ripped (only the		Contractor, CECO.	Contract and allowance in P&G'		ECO	

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process. - Topsoil stockpiles shall not be stored for a period longer than 4 months. - Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation. - The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. - All grass and other vegetation should be left on the topsoil stockpiles so that they colonize the area after construction.						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- Photographic record must be kept of the topsoil stockpiles. - Dust and erosion of topsoil from runoff must be minimised through appropriate watering and the avoidance of transporting and placing of topsoil in areas exposed to high wind or excessively rainy conditions. - The contractor shall devise a soil conservation and stockpiling approved by the ECO and Engineer, which shall detail:- Stockpile sizes, layout and form; - Means of erosion (wind and water) prevention for stockpiles; - The rehabilitation measures to be taken for the area occupied by the stockpile;						

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- A generic schedule of soil replacement for areas where work has been completed. Soil replacement should preferably run in parallel (where feasible) with the construction process; - Soil erosion prevention measures for general site use						
Construction of site buildings	Site buildings materials	Soil pollution and permanent alternation to the natural environment	Objectives To ensure the material for site buildings are recyclable and to minimise the impacts of the construction of the buildings on the environment. Target : - No permanent structures will be permitted at the contractor's camp.	On site buildings constructed according to the requirements of the EMP.	Contractor and CECO.	Contract and allowance in P&G's	construction, Establishment of site	ECO	Once off

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- Temporary structures shall be founded on a platform, either subsoil or screed slab. - Buildings should preferably be pre-fabricated or constructed of re-usable/recyclable materials. - All temporary structures must be soundly built and not pose a danger to workers. - Containers are to be used for the storage of materials which have the potential to release pollutants into the environment. - All structure footprints to be rehabilitated and re-vegetated after construction is complete.						
Fencing of the	Demarcation of the site	Unnecessary removal of vegetation.	Objective(s); The environmental objective when establishing the site is to minimise the footprint of disturbance, the	demarcated according to the requirements of	Contractor and CECO.	Contract and allowance	Construction sites must be fenced off along the	Engineer, ECO	As construction proceeds

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
construction sites that will be affected by the proposed project		Lost of soil Safety	extent of soil erosion, loss of vegetation and the potential for the pollution of soils. Target: - The construction sites must be demarcated as indicated in the EMP using danger tape with steel droppers or other methods approved by the ECO. - The width of the construction footprint must be agreed upon by the ECO and the Engineer and as far as possible must be kept to a minimum. - No personnel or construction materials will be allowed to move outside the designated/demarcated site.	this section of the EMP.		in P&G's	alignment before site clearance		along the alignment.

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- Do not perform any activities or operations that are likely to adversely affect the aesthetic quality of the environment.						
Operation of the sanitation system(s)	Sanitation systems	Bad odours on site. Inadequate number of latrines on site. Position of latrines and shower systems. Bad management of waste water.	Objective(s): To ensure good sanitation system and management throughout the construction period. Targets: - Adequate chemical toilets must be provided for all staff. Alternatively, existing ablution facilities on site can be utilised if available. - Chemical toilets must be emptied / serviced on a regular basis to prevent them overflowing. Proof of this must be provided to the ECO.	Adequate as per the EMP and ECO.	Contractor	Contract and allowance in P&G's	Pre-construction, Establishment of site	ECO	Once off

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- A minimum of one toilet must be provided per 11 persons at each working area within 100m from worker activity.						
Vehicle parking area. Storage of equipment	Vehicle parking and parking area(s). Storage of equipment.	Pollution of soils. Disturbance of soils due parking of vehicles outside of designated areas.	Objective(s): To ensure vehicles are parked according to the specifications in the EMP and that equipment is handled appropriately. Target: - No storage of vehicles or equipment will be allowed outside of the designated area. - Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use	Drip trays must be provided and placed under vehicles and equipment which are not being utilised on site.	Contractor and CECO.	Contract and allowance in P&G's	Throughout the construction period	ECO	Whenever there are stationary vehicles or equipment present on site.

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Personnel conduct	Personnel	Infringement of the EMP requirements by personnel	Objective(s): To ensure that personnel are adhering to the EMP requirements. Target: - The Contractor will adhere to all requirements of the Occupational Health and Safety Act (Act 56 of 2004), including the drafting of a suitable Health and Safety Plan which will be implemented during the construction phase. - All personnel to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. - Eskom induction must be attended by all partied involved in the construction.	Personnel wearing proper safety uniform. Absence of trespassers on site.	Contractor And labourers.	Contract and allowance in P&G's	Approved PPE must be issued to all employee's pre-Construction but must be used for the duration of the construction period.	ECO	Throughout construction period.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- Tool box talks to include aspects of the EMP. - Labourers associated with the contractor must be easily recognizable (i.e. company issued overalls with company name/logo etc.), and no non- labourer will be allowed within the construction camp at any time. - The Contractor shall take all necessary precautions against trespassing on private properties. - Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements. - Adequate first aid services must be provided by the contractor at the contractor's camp.						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- The contractor will be responsible for his own security arrangements and shall comply will all site security instructions. - Basic fire fighting equipment must be available on site. - PPE to be provided and well maintained at contractor's camp. - All incidents should be reported to ECO, investigated, documented and kept in safety file.						
Construction activities	Site buildings materials	Injuries to Public. Health of Public	Objective(s): To ensure that the Public at large is not injured or affected negatively in any way. Target:	Drip trays must be provided and placed under vehicles and equipment which are not	Contractor and CECO.	Contract and allowance in P&G's	Throughout the construction period.	ECO	Whenever there are stationary vehicles or equipment present on site.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- The Contractor shall recognise that the Site is situated close to inhabited areas and shall therefore take all reasonable measures to ensure the safety of people in the surrounding area. - Where the public could be exposed to danger by any of the Works or Site activities, the Contractor shall as appropriate provide suitable flagmen, barriers and/ or warning signs in English, Afrikaans and Xhosa, all to the approval of the Project Manager - All unattended open excavations shall be adequately demarcated (fencing shall consist of a minimum of three strands of wire and made clearly visible). Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding. No firearms shall be	being utilised on site.					

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			permitted on Site without the prior approval of the Project Manager						

9.3 Materials

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Transport-ation of material	Material transport	Traffic congestion. Dust during transportation. Excessive noise	OBJECTIVE To ensure that when material is transported, it is not in a position to do harm to the surrounding environment. Target: - The contractor should note that existing roads are sufficient to facilitate access to the alignment	Mufflers and silencers fitted to construction vehicles and equipment. Covering of material during transportation.	Contractor and CECO	Contract and allowance in P&G's	Prior to construction start.	ECO	Throughout construction period or as required by the ECO.

			of the transmission line but the following should be adhered to: - Access to privately owned land will be arranged with the various landowners along the alignment by the contractor. - Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads. - The Contractor shall take preventative measures (e.g. screening, muffling, timing, pre-notification of affected parties, especially when entering residential areas) to minimise complaints regarding noise and vibration nuisance from sources) .	Emergency reaction plan (for spills/accidents) must always be readily available on site.					

			- Fine materials (such as sand) must be covered during transportation. - Appropriate response plans must be prepared by Contractors to ensure the fastest possible reaction to spills or accidents. - Deliveries must be scheduled for off-peak hour traffic times. - All trucks and vehicles removing spoil from the site must have load areas and must be covered by a tarpaulin to prevent rocks and spoil falling onto the road surfaces. - Vehicle speeds on site should not exceed 30km/hr. - All drivers are to have licences for driving and moving of plant on site.						

			- All road vehicles to be road worthy						
Storage of Hazardous Material	Hazardous Material storage areas	Contamination of soil by hazardous material. Inadequate remediation measures for spills.	Objective(s): To ensure adequate protection of soil and soil remediation measures in case of spills. Target: - Hazardous materials – such as paint, cement, fuels, bitumen, fuel, oil, herbicides, battery acid or detergents – must be stored in sealed, lockable containers when not in use - A register shall be kept on all substances and be available for inspection at all times. Areas shall be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately	Storage of hazardous materials in sealed and lockable containers. No evidence of spills on site. Absorbent and clean-up material readily available on site.	Contractor and CECO.	Contract and allowance in P&G's	Construction period	ECO	For the duration of the construction period dependent on the presence of hazardous material on site.

			- No decantation in to unmarked containers or containers with irrelevant labels. - No decanted fuel to be left unattended in the sun to avoid fire. - When handling hazardous materials, manufacturer's specifications must be complied with. The 16 point Material Safety Data Sheet is available on site. - All reasonable care must be taken to prevent spills of any hazardous material when in use. - All spills (minor and major) must be cleaned and remediated to the satisfaction of the ECO and CECO within 24 hours of occurrence. - The contractor must ensure that there is a supply of absorbent						

			material (e.g. Drizit) and clean-up materials readily available to absorb, breakdown and, where possible, encapsulate minor hazardous material spillages. - No material may be stacked higher than 2m. - All products are to be stored with compatibility in mind - Storage areas shall display the required safety signs depicting "No smoking", "No naked lights" and "Danger". Containers shall be clearly marked to indicate contents as well as safety requirements - The contractor shall supply a method statement for the storage of hazardous materials at tender stage						

Storage of Fuel	Storage areas	Contamination of soil by fuel. Inadequate remediation measures for spills.	Objective(s): To ensure that there is optimum environmental protection (especially soil) from fuel spills. Target: - Fuel must be stored in above ground storage tanks or sealed containers, contained within a bunded area with sump drainage. - Fuels for vehicles are not allowed to be stored on-site. - All bunds must be designed to contain at least 110% of the tank or drum storage capacity (this shall apply to above ground storage, and include fuels, welding equipment and oxy-acetylene cutting equipment). - No drainage from fuel storage areas shall be permitted.	Established fuel storage areas in compliance with the objectives of the EMP.	Contractor and CECO	Contract and allowance in P&G's	Pre-construction, Establishment of site	ECO	Once off

			- Any other hazardous substances stored in bulk will require bunding.						
Use of cement	Cement	Contamination of soil and surrounding environment by cement. Cement dust can decrease the quality of the air.	Objective(s): To ensure that the environment is protected from cement that will be used on site. Target: - Cement must be delivered in sound and properly secured bags or in approved bulk containers. - Cement products in bags must be stored in storage containers to be provided at the construction camp and should only be opened when needed. - The storage facility and surrounding area must be swept and cleaned regularly as required to ensure that cement	Cement delivery, storage and use will be in line with the EMP requirements	Contractor and CECO.	Contract and allowance in P&G's	Construction period.	ECO	If cement is in use on site

			products do not the pollute the surrounding environment. - Cement bags are not to be burnt on site but should be disposed of at a registered hazardous waste disposal site. - No concrete batching on bare soil.						

9.4 WASTE MANAGEMENT PLAN

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Storage, removal and disposal of construction waste	Construction waste	Land pollution. Compaction of soil by rubble. Decreased aesthetic	Objective(s): To ensure that waste is correctly stored and disposed of, decreasing the visual impact during the construction and post construction period. To keep the servitude neat and clean. Disposal of rubble and	Construction waste stored, collected and disposed of as per the requirements of this EMP	Contractor and CECO	Contract and allowance in P&G's	Waste bins/ skips must be available prior to construction. Removal of waste throughout the	ECO	The ECO will determine the frequency of waste removed from site.

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
		integrity of the site.	refuse in an appropriate manner. Minimise litigation. Minimise Landowner complaints. Targets: - No material shall be left on site that may harm man or animals. Any broken insulators shall be removed and all shards picked up - Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site - Surplus concrete may not be dumped indiscriminately on site, but shall be disposed of in				construction period.		

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			designated areas as agreed by the Landowner - Concrete trucks shall not be washed on site after depositing concrete into foundations - Any spilled concrete shall be cleaned up immediately - Bins and containers must be made available by the contactor for the storage of construction waste. - Temporary storage of construction waste will take place within the site, and within areas designated by the ECO and the Contractor.						

Activity	Aspect	**Potential Impact**	**Mitigation Measure** **(Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- Construction waste will not be stored on site for longer than 30 days - The Contractor will be responsible to remove and transport all construction waste material off site to a registered waste disposal facility (proof of this as well as a copy of the sites Registration Permit, must be provided by the Contractor to the ECO) - No burning of waste permitted on site						
Storage, removal and disposal of	Domestic waste	Land pollution. Bad odours.	Objective(s) To ensure that waste is correctly stored and disposed of, decreasing the visual impact during the	Evidence of domestic waste stored, removed and disposed of	Contractor and CECO	Contract and allowance in P&G's	The waste bins/ skips must be available prior to construction.	ECO	The ECO will determine the frequency of

Activity	Aspect	**Potential Impact**	**Mitigation Measure** **(Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
domestic waste		Decreased aesthetic integrity of the site.	construction and post construction period. Target: - The Contractor must supply sealable waste bins at the construction camp for the storage of domestic waste. - Clearly marked waste bins are to be provided for the separation of waste. - Recyclable waste, including glass, paper and plastic must be separated at the construction camp, stored and recycled, where economically feasible.	according to the requirements indicated in this EMP.			Removal of waste throughout the construction period.		waste removal from site.

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- Personnel must be informed about the necessity of using the waste drums. - The Contractor must do site clean-ups of litter other than construction waste on a daily basis, and dispose of it in the designated refuse bins provided at the Contractor's Camp. - The contractor must ensure that general site-wide litter clean-up will occur at least once a week. - No burning of waste permitted on site.						

Activity	Aspect	**Potential Impact**	**Mitigation Measure** **(Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- The Contractor must dispose of all domestic refuse generated by his staff and Sub-Contractors on a weekly basis at a registered waste disposal facility. The Contractor must provide proof of this to the ECO in the form of a safe disposal certificate. - Sealable waste drums should be provided at least every 100m along the construction of the transmission line.						
Storage removal and disposal of hazardous waste.	Hazardous waste.	Soil pollution.	Objective(s): To ensure that soil and the rest of the surrounding environment on	All mitigation measures with regards to Hazardous waste	Contractor and CECO	Contract	Hazardous Wastes must be collected in sealable, safe containers.	ECO	Old hydrocarbons and other hazardous materials must be

Activity	Aspect	**Potential Impact**	**Mitigation Measure** **(Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			site is protected from hazardous waste Target: - The Contractor is required to refer to the Hazardous Substances Act No 15 of 1973 act to determine whether any substance (new or waste) stored on site is subject to controls contained within the act. - All hazardous waste must be stored in sealed and suitably marked containers for removal to a registered hazardous waste disposal facility. - Any oil spillage on site will be excavated to a depth of	mentioned in the EMP are implemented			Removal of hazardous waste throughout the construction process.		removed every 7 days.

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			150 mm and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative in-situ remediation techniques could be used, if approved by the ECO. - Grey water must be stored in sealable marked containers and disposed of with other wastewater from the construction works.						

9.5 SURROUNDING LAND

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Storage, removal and disposal of construction waste	Construction waste	Land pollution. Compaction of soil by rubble. Decreased aesthetic integrity of the site.	Objective(s): To ensure that waste is correctly stored and disposed of, decreasing the visual impact during the construction and post construction period. To keep the servitude neat and clean. Disposal of rubble and refuse in an appropriate manner. Minimise litigation. Minimise Landowner complaints. Targets: - No material shall be left on site that may harm man or animals. Any broken insulators shall be removed and all shards picked up	Construction waste stored, collected and disposed of as per the requirements of this EMP	Contractor and CECO	Contract	Waste bins/ skips must be available prior to construction. Removal of waste throughout the construction period.	ECO	The ECO will determine the frequency of waste removed from site.

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site - Surplus concrete may not be dumped indiscriminately on site, but shall be disposed of in designated areas as agreed by the Landowner - Concrete trucks shall not be washed on site after depositing concrete into foundations - Any spilled concrete shall be cleaned up immediately. - Bins and containers must be made available by the						

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			contactor for the storage of construction waste. - Temporary storage of construction waste will take place within the site, and within areas designated by the ECO and the Contractor. - Construction waste will not be stored on site for longer than 30 days - The Contractor will be responsible to remove and transport all construction waste material off site to a registered waste disposal facility (proof of this as well as a copy of the sites Registration Permit, must						

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			be provided by the Contractor to the ECO) - No burning of waste permitted on site						
Storage, removal and disposal of domestic waste	Domestic waste	Land pollution. Bad odours. Decreased aesthetic integrity of the site.	Objective(s) To ensure that waste is correctly stored and disposed of, decreasing the visual impact during the construction and post construction period. Target: - The Contractor must supply sealable waste bins at the construction camp for the storage of domestic waste.	Evidence of domestic waste stored, removed and disposed of according to the requirements indicated in this EMP.	Contractor and CECO	Contract and allowance in P&G's	The waste bins/ skips must be available prior to construction. Removal of waste throughout the construction period.	ECO	The ECO will determine the frequency of waste removal from site.

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- Clearly marked waste bins are to be provided for the separation of waste. - Recyclable waste, including glass, paper and plastic must be separated at the construction camp, stored and recycled, where economically feasible. - Personnel must be informed about the necessity of using the waste drums. - The Contractor must do site clean-ups of litter other than construction waste on a daily basis, and dispose of it in the designated refuse bins						

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			provided at the Contractor's Camp. - The contractor must ensure that general site-wide litter clean-up will occur at least once a week. - No burning of waste permitted on site. - The Contractor must dispose of all domestic refuse generated by his staff and Sub-Contractors on a weekly basis at a registered waste disposal facility. The Contractor must provide proof of this to the ECO in the form of a safe disposal certificate.						

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- Sealable waste drums should be provided at least every 100m along the construction of the transmission line.						
Storage removal and disposal of hazardous waste.	Hazardous waste.	Soil pollution.	Objective(s): To ensure that soil and the rest of the surrounding environment on site is protected from hazardous waste Target: - The Contractor is required to refer to the Hazardous Substances Act No 15 of 1973 act to determine whether any substance (new or waste) stored on site is subject to controls contained within the act.	All mitigation measures with regards to Hazardous waste mentioned in the EMP are implemented	Contractor and CECO	Contract and allowance in P&G's	Hazardous Wastes must be collected in sealable, safe containers. Removal of hazardous waste throughout the construction process.	ECO	Old hydrocarbons and other hazardous materials must be removed every 7 days.

Activity	Aspect	**Potential Impact**	**Mitigation Measure** **(Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			- All hazardous waste must be stored in sealed and suitably marked containers for removal to a registered hazardous waste disposal facility. - Any oil spillage on site will be excavated to a depth of 150 mm and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative in-situ remediation techniques could be used, if approved by the ECO. - Grey water must be stored in sealable marked containers and disposed						

Activity	Aspect	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
			of with other waste water from the construction works.						

9.6 FLORA, FAUNA, SURFACE WATER AND GROUND WATER

Activity	**Aspect**	**Potential Impact**	**Mitigation Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Site establishment; Access Road construction and during construction	Flora	Vegetation clearance	Objective Protection of endanger species and indigenous plant Targets - Indigenous vegetation which does not interfere	Environmental Awareness Training Monthly audits	Contractor and CECO.	Contract and allowance in P&G's	Site establishment and Construction Period	ECO	Throughout the Life of project

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			with the development must be left undisturbed; - Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species; Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing - Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			affected species, and they must be filed; - The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; - Trees felled due to construction must be documented and form part of the Environmental Audit Report; - Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained; - A daily register must be kept of all relevant details of herbicide usage; - No herbicides must be used in estuaries. - All protected species and sensitive vegetation not removed must be clearly						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			marked and such areas fenced off in accordance to Section 5.3: Access restricted areas. - Alien invasive vegetation must be removed and disposed at a licensed waste management facility.						
Site establishment, access road and during	Flora	Lost of biodiversity and Animal species	Objective Protection of endanger species and habitant area Targets - No interference with livestock must occur without the landowner's written consent and with the landowner or a person	Environmental Awareness Training. Monthly audits	Contractor and CECO	Contract and allowance in P&G's	Site establishment and Construction Period	ECO	Throughout the Life of project

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			representing the landowner being present; - The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme; - Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present. - Special recommendations of the avian specialist must be adhered to at all times to prevent						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			unnecessary disturbance of birds; - No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas. - No deliberate or intentional killing of fauna will be allowed. - In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or - relocated without appropriate authorisations/permits.						
Site Establishment and construction period	watercourses or estuary	Water Contamination and destruction of river bank	Objective To protect the water course or estuaries against contaminant Targets - All watercourses must be protected from direct or indirect spills of pollutants such as solid	Environmental Awareness Training. Monthly audits	Contractor and CECO	Contract and allowance in P&G's	Site establishment and Construction Period	ECO	Throughout the Life of project

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; - In the event of a spill, prompt action must be taken to clear the polluted or affected areas; - Where possible, no development equipment must traverse any seasonal or permanent wetland - No return flow into the estuaries must be allowed and no disturbance of the						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			Estuarine functional Zone should occur; - Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; - There must not be any impact on the long term morphological dynamics of watercourses or estuaries; - Existing crossing points must be fevered over the creation of new crossings (including temporary access)						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction No altering of the bed, banks, course or characteristics of a watercourse b) 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; c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials,						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and d) 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.						
Vehicles and Machinery Movement	Ground water	Oil spillages and chemical spillages	Objectives Protection of ground water oil and spillages Targets - A Servicing of construction vehicles will take place only in	Vehicles daily checklist	Contractor and CECO	Contract and allowance in P&G's	Construction period and demission period	ECO & vehicles drivers	Throughout the Life of project

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			dedicated areas that are equipped with drip trays; - Bunded containment and settlement facilities will be provided for hazardous materials, such as fuel and oil; Spill-sorb or a similar product will be kept on site, and used to clean up hydrocarbon spills if they should occur; - Hazardous material will be placed in bunded areas; - Spill kits to clean up hydrocarbon spills will be available;						

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			- Clean upslope runoff will be diverted around construction areas. - Prevent all effluent from the construction activities from entering the wetland habitat.						

9.7 ARCHAEOLOGICAL AND HERITAGE SITES

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
site Establishment and during construction	Cultural and Heritage	Potential impact on heritage Resources	Objectives To protect cultural and Heritage resources Targets - Conduct heritage impact assessment to identify heritage sites within the project area; - If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken	Palaeontology and Heritage Impact Assessment	Contractor and CECO	Contract and allowance in P&G's	Site establishment and construction	ECO	Throughout the Life of project

			- education and training on heritage resources will be given to Construction employees - If any human remains are exposed during construction, all work must cease and it must be reported immediately to the nearest museum/archaeologist or to the South African Heritage Resource Agency (SAHRA), so that a systematic and professional investigation can be undertaken						

9.8 PLANNING AND ENGINEERING CONSIDERATIONS

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
Construction activities	Existing infrastructure	Disruption of services, damage to installations, damage or loss of plant	Objective(s): To have control and prevent over temporary or permanent damage to plant and installations. To prevent interference with the normal operation of plant and installations. Securing of the safe use of infrastructure, plant and installations have control over actions and activities in close proximity to inhabited areas Target: - Telephone lines shall not be dropped during the stringing operations. - All crossings shall be with at least with rugby posts to protect the lines - Where pipe lines are found along the route, the depth of the pipes	No unplanned disruptions of services. No damage to any plant or installations. No complaints from authorities or Landowners regarding disruption of services.	Contractor, CECO.	Contract and allowance in P&G's			During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			under the surface shall be determined to ensure that proper protection is afforded to such structures - Any damage to pipelines shall be repaired immediately. - All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties - Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect - Upon completion of the project all roads shall be repaired to their original state - Power cuts to facilitate construction planned. If possible, disruptions must be kept to a minimum and should be	No litigation due to losses of plant, installations, and crops.					

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			- Will-advertised and communicated to the Landowners - Care must be taken not to damage irrigation equipment, lines, channels and crops - The position of all pipelines and irrigation lines must be obtained from the Landowners and be shown on the physical access plantation, especially stringing, must be carefully well advertised and communicated to the Landowners - Care must be taken not to damage irrigation equipment, lines, channels and crops - The position of all pipelines and irrigation lines must be obtained from the Landowners and be shown on the physical access plan						
Pylon site selection	Tower positions	Damage to topsoil.	Objective(s):	No loss of topsoil due to	Contractor, CECO.	Contract and		ECO	During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
		Erosion.	To minimise damage to topsoil and environment at tower positions. Successful rehabilitation of all damaged areas. Prevention of erosion Target: - Refer to TRMSCAAC1 REV 3 SECTION 4.4.5 for specifications concerning tower sites on slopes - Disturbance of topsoil on tower sites with severe slopes shall be minimised at all costs - At any tower sites where conventional foundations are installed, the Contractor shall remove the topsoil separately and store it for later use during rehabilitation of such tower sites - During backfilling operations, the Contractor shall take care not to dump the topsoil in the bottom of the foundation and then put spoil on top of that	construction activities. All disturbed areas successfully rehabilitated within three months of completion of the Contract. No visible erosion scars three months after completion of the contract		allowance in P&G's			

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			- Re-seeding shall be done on disturbed areas as directed by the ECO - In accordance with the Conservation of Agricultural Resources Act, No 43 of 1983, slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced her methods of rehabilitation of tower sites may also be used at the discretion of the ECO, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slope on tower sites. The type of soil shall also be taken into consideration. A mixture of grass seed can be used provided the mixture is carefully selected to ensure the following: - Annual and perennial grasses are chosen.						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			- Pioneer species are included. - All the grasses shall not be edible. - -Species chosen will grow in the area without many problems. - Root systems must have a binding effect on the soil. - The final product should not cause an ecological imbalance in the area to get the best results in a specific area, consult with a specialist or the local extension officer of the Dept of Agriculture. Seed distributors can also give valuable - Advice as to the mixtures and amount of seed necessary to seed a certain area - Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the ECO, unless specifically requested by a Landowner						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
Winching & Tensioning	Winch and Tensioner Stations	Damage to vegetation. Damage to topsoil.	Objective(s): To minimise damage to vegetation. To minimise damage to topsoil. Successful rehabilitation of barren areas Target: - The siting of winch and tensioner stations shall be done in conjunction with the ecologist/botanist and archaeologist that participated in the compilation of the EMP where required: see detail mitigation measures in later sections - Specifications require the protection of Eskom supplied material on site, especially conductor drums. This normally means that a firebreak is bladed around a drum station in the veld - These areas are left to rehabilitate on their own which could be disastrous.	No damage to vegetation outside the servitude. No loss of topsoil. No visible erosion three months after completion of the contract. All disturbed areas successfully rehabilitated three months after completion of the contract	Contractor, CECO.	Contract and allowance in P&G's			During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			- Once the stringing of conductor has been completed in a certain area, the winch- and tensioner stations shall be rehabilitated where necessary - If the area was badly damaged, re-seeding shall be done and fencing in of the area shall be considered and carried out - Fencing in of the storage areas for drums on site is also recommended - Should the Contractor want to leave guards on site, this should be discussed and negotiated with the Landowner. Proper facilities must be provided to ensure sanitation standards are met. Mobile chemical toilets shall be installed at such sites where a large number of the workforce is concentrated.						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
Batching concrete	Batching plants	Damage to vegetation. Damage to topsoil. Surface water contamination. Disturbance to area.	Objectives To ensure all agreements with Landowners are adhered to. To prevent complaints from Landowners. Successful rehabilitation of disturbed areas Target: - The siting of batching plants shall be done in conjunction with the ecologist/botanist and archaeologist that participated in the compilation of the EMP - where required: see detail mitigation measures in later section - The batching plant area shall be operated in such a way as to prevent contaminated water to run-off the site and polluting nearby streams or water wastewater to a catchment area. - Eskom shall ensure that all agreements reached with the	No complaints from Landowners. All disturbed areas successfully rehabilitated three months after completion of the Contract.	Contractor, CECO.	Contract and allowance in P&G's			During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			Landowner are fulfilled, and that such areas be rehabilitated once construction is completed - Should any claim be instituted against Eskom, due to the actions of the Contractor at a batching plant site, Eskom shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
Stringing of pylons	Stringing operations	Damage to expensive structures and crops. Disruption of services.	Objective(s): To prevent damage to expensive structures and crops. To prevent disruption of services Target: - The necessary scaffolding must be installed to prevent damage to structures supporting certain perennial crops, such as grapes, as well as the crops itself - All structures supplying services such as telephone and smaller power lines, as well as farm roads, shall be safeguarded by measures to prevent disruption of services.	No claims emanating from damage to supporting structures and crops. No complaints or claims arising from disruption of services.	Contractor, CECO.	Contract and allowance in P&G's		ECO	During construction
Construction activities on private land	Interaction with Landowners	Damage to expensive structures and crops. Disruption of services	Objectives To maintain good relationships with Landowners Target:	No delays in the project due to Landowner interference.	Contractor, CECO	Contract and allowance in P&G's		ECO	During construction

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Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			- The success of the project depends a lot on the good relations with the Landowners. It is required that the Contractor will supply one person to be - the liaison officer (CLLO) for the entire contract, and that this person shall be available to investigate all problems arising on the work sites concerning - the Landowners - All negotiations for any reason shall be between Eskom, the Landowner and the Contractor - No verbal agreements shall be made. All agreements shall be recorded properly and all parties shall co-sign the documentation - The Contractor shall keep a photographic record of access roads. This will then be available should any claims be instituted by any Landowners						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			- All claims instituted by the Landowners shall be investigated and treated promptly. - Unnecessary delays should be avoided at all costs - The Landowners shall always be kept informed about any changes to the construction program should they be involved - If the ECO is not on site the Contractor's liaison officer should keep the Landowners informed - The contact numbers of the Contractor's liaison officer and the Eskom ECO shall be made available to the Landowners. This will ensure open channels of communication and prompt response to queries and claims. - All contact with the Landowners shall be courteous at all times.						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	**Frequency**
			- The rights of the Landowners shall be respected at all times and all staff shall be sensitised to this.						
Actions by site staff	Littering on site	Untidy and polluted site and surrounding land	objectives To maintain a neat and tidy workplace Target: - Littering by the employees of the Contractor shall not be allowed - The ECO shall monitor the neatness of the work sites as well as the - campsite.	No visible sign of littering. No complaints from Landowners	Contractor, CECO	Contract and allowance in P&G's		ECO	During construction

9.9 Socio-Economic Environment

Activity	**Aspect**	**Potential Impact**	**Mitigatory Measure (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Site establishment and construction	Social	Employment	Objective(s) Employment of local people Targets: - Benefits resulting from employment and income	Requitement should done at local tradition authority	Contractor, CECO		Contract and allowance in P&G's	Contractor	Throughout the life of the project

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			opportunities created by the construction. - Spontaneous settlement and increased pressure on social services due to the influx of workers to the area - Loss of employment and enterprise development opportunities during the decommissioning phase. - Develop and implement Labour and Human Resources Plan (LHRP) that address the impacts associated with retrenchment, job losses and reduced demand for local goods and services. - Develop a closure plan which will aim to reinforce the objectives of the SLP by						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			reducing the reliance on LCM for employment by promoting skills transfer to ensure alternative livelihoods portable skills.						
Construction Period	Economic	Improvement of income	Objectives To supply sufficient and reliable electricity required for sustainable developments and the future growth of the country's economy Targets - injection into the local and regional economies, benefitting businesses and SMMEs. Due to Eskom safety standards and servitude requirements, relocation of houses and other assets may be necessary. - electricity for a growing KZN economy and a monetary injection into the		Contractor, CECO		Contract and allowance in P&G's	Contractor	Throughout the life of the project

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			area (as a result of the construction and purchasing of the servitude areas) by Eskom will result in positive economic impacts in the region. - negative economic impacts may include the loss of productive farmland and a potential loss in yield as result of the power lines and servitude zones						
After construction	health	Electro-magnetic fields	Objectives Due to Eskom safety standards and servitude requirements, relocation of houses and other assets may be necessary Targets Exposure to electric and magnetic fields may be a risk to health in human settlements.	Compensation to relocations houses and other assets	Contractor, CECO		Contract and allowance in P&G's	Eskom	Throughout the life of the project

9.10 Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Compile an Emergency Response Action Plan (ERAP) prior tothe commencement of the proposed project. The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation; - All staff must be made aware of emergency procedures as part of environmental awareness training. - In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented - Outline the steps to be taken in the event of key incidents based on the response, including personal protection for those involved in the response - Locate roles and responsibilities – including the set-up of on-site rapid response teams and emergency response center's	Contractor	As defined in EMPr	Throughout construction period	ECO	Monthly	ECO reporting

9.11 Emergency Preparedness' and response procedures

Impact management outcome: emergency preparedness' and response procedures in dealing with environmental incident						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- The Contractors ECO has to ensure that there is an Emergency Procedure on site that provides a detailed explanation of actions to be taken in the event of emergency situations. This procedure has to be known to all persons working on site and has to also provide contact information of the emergency services. - Hazardous material must be placed in bunded areas. - Spill kits to clean up hydrocarbon spills must be available. - Fire extinguisher will be available on site - No poaching of any form. - All significant spills must be reported to the ECO within 24 hours. - Medical toolbox will be available on site - Emergency assemble point must be indicate by signed	Contractors ECO	As defined in EMPr	Throughout construction period	ECO	Monthly	ECO reporting

9.12 Procedures to be followed when working near or within sensitive areas.

Impact management outcome: Access or working with highly sensitive area						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Identification of access high sensitive areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development; - Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access high sensitive area with color coding could be used if appropriate; and - Unauthorized access and development related activity inside access restricted areas is prohibited. - Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the ECO, unless specifically requested by a Landowner. - Identify and implement restoration opportunities for disturbed environmentally sensitive areas. - Protection measures for environmentally sensitive areas, including the management of recreational access. - Protect the ecological values of environmentally sensitive areas during and after development.	Contractor	As defined in EMPr	Throughout construction period	ECO	Monthly	ECO reporting

- A temporary fence or demarcation must be erected around the works area to prevent access to sensitive environments. The works areas generally include the construction camp(s) and areas where material is stored. - Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. - Cordon-off areas that are under rehabilitation as no-go areas using appropriate measures. If necessary, these areas should be dropped off to prevent vehicular, pedestrian and livestock access. - Runoff from roads must be managed to avoid erosion and pollution problems. - Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.						

10 HIGHLIGHTED EXPECTED PROBLEMS DURING THE PROJECT

10.1 Pre-construction

Most Landowners will see the construction period as interference with their daily activities. There will be a negative attitude towards the whole construction process. Landowners are always apprehensive toward changes they do not control. Landowners shall therefore be informed timeously of the construction programme, duration and all interference with their daily activities.

10.2 During construction

Due to the current security situation Landowners are not comfortable when strangers come on to their properties. They will look for reasons to interfere with the construction process and may therefore cause delays in the process that can be very costly to Eskom and the Contractor.

The Contractor is reminded that access shall not be continuous along the servitude and allowance must be made for the translocation of equipment around obstacles such as rivers and irrigation channels. No camping shall be allowed on any private property. If the contractor wants to leave guards on site, it shall only be done with the written consent of the Landowners involved. Damage to fences, gates and other infrastructure may occur at any time. This will create problems with the Landowners and should be avoided as far as possible. All damage to be repaired immediately and to the satisfaction of the landowner. The use of private roads for construction purposes always leads to damage due to heavy equipment and frequent use. It is foreseen that the Contractor will receive many complaints in this regard, especially during the rainy season.

10.3 After construction

If damaged infrastructure is not repaired to the expectations of the Landowners, they may refuse to sign the release forms and even engage in litigation. Outstanding claims may also result in release forms not being signed by the Landowners

10.4 Possible solutions to the problems

a) Proper liaison between Eskom, the Contractor and Landowners.

b) A physical access plan along the servitude shall be compiled and the Contractor shall adhere to this plan at all times. Proper planning when the physical access plan is drawn up by the Environmental Control Officer in conjunction with the Contractor shall be necessary to ensure access to all tower sites.

c) The Landowners shall be informed of the starting date of construction as well as the phases in which the construction shall take place.

d) The Contractor must adhere to all conditions of contract including the Environmental Management Plan.

e) Proper planning of the construction process to allow for disruptions due to rain and very wet conditions.

f) All servitude gates on a section of the line route shall be completely installed before any construction activities are undertaken.

g) Where existing private roads are in a bad state of repair, such roads' condition shall be documented before they are used for construction purposes. If necessary some repairs should be done to prevent damage to equipment and plant.

h) All manmade structures shall be protected against damage at all times and any damage shall be rectified immediately.

i) Rehabilitation of the servitude roads shall be done properly to ensure all Landowners sign the release forms. The Contractor shall ensure that all damaged areas are rehabilitated to the satisfaction of Eskom and each and every property owner and that outstanding claims are settled.

j) Proper site management and regular monitoring of site works.

k) Proper documentation and record keeping of all complaints and actions taken.

l) Regular site inspections and good control over the construction process throughout the construction period.

m) A positive attitude towards Environmental Management by all site personnel.

n) Appointment of a Landowner Liaison Officer on behalf of the Contractor to implement this EMP as well as deal with all Landowner related matters.

o) Environmental Audits to be carried out on a monthly basis during and upon completion of construction (at least two for the project).

p) The Contractor shall not be released from site until all Landowners have signed off the release documentation to the satisfaction of the ECO.

11 REHABILITATION

Rehabilitation must be carried out as soon as possible after the construction is completed. All rehabilitation is to be done with approval of Eskom environmental management's approval. Consent must be given in writing to EMS section for rehabilitation.

11.1 Rehabilitation of construction camps

The removal of all construction facilities and materials from the construction camp will be required, and rehabilitation will have to be carried out, including the removal of the following:-

a) Concrete and compacted earth platforms;

b) Fuel storage tanks; and

c) Chemical toilets.

Access roads will need to be rehabilitated according to the requirements below.

Any contaminated material or soil must be removed to a registered hazardous waste disposal facility and the prescribed re-vegetation process must then be followed thereafter.

11.2 Eradication of alien vegetation

All alien vegetation spread over the entire construction footprint must be removed, irrespective of its existence prior to construction. Chemical removal shall be used in accordance with

manufacturer's specification for weeds. All chemicals used must be approved by the ECO. Once the weeds have perished they shall be removed mechanically by use of an offset disk plough thereby digging up the vegetation including the root ball.

11.3 Control of alien vegetation

The remainder of the site including the revegetated areas shall be kept free of weeds and alien vegetation.

11.4 Rehabilitation

a) Filling of the open trench with subsoil and topsoil to a minimum of 300 mm above ground level to allow for subsidence;

b) Shaping of the disturbed areas to blend with the surrounding landscape;

c) Placing of topsoil on all disturbed areas (minimum depth 150 mm);

d) Organic fertilizers must be added to the topsoil prior to seeding (if required).

e) Re-vegetation of all areas where topsoil is placed using a mixture of indigenous grasses and bushes;

f) Maintenance of these areas until an acceptable cover has been established. Acceptable cover shall mean 75% ground cover with no gaps exceeding 500 mm. Maintenance may include watering, mowing and weeding as well as preventing the development of

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