HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999)

FOR THE PROPOSED 11KV POWER LINE FROM THE BYNES-WATERBERG LINE TO CAVALIER ABATTOIR, GAUTENG PROVINCE

Type of development:

Powerline

Client:

Setala Environmental (Pty) Ltd

Developer:

Cavalier Abattoir

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Project Reference:
Project number 2201b
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APPROVAL PAGE

Project Name	11KV Power Line from the Bynes-Waterberg Line to Cavalier Abattoir
Report Title	Heritage Impact Assessment for the 11KV Power Line from the Bynes-Waterberg Line to Cavalier Abattoir
Authority Reference Number	TBC
Report Status	Final Report
Applicant Name	Cavalier Abattoir (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
Fieldwork and reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	January 2022
Fieldwork	Ruan van der Merwe - Archaeologist	BA Hons Archaeology	January 2022
Palaeontologist	Prof Marion Bamford	PhD Paleo Botany	January 2022

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Amendments on Document

Date	Report Reference Number	Description of Amendment
20 January	2201b	Technical revision

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REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	*Declaration of Independence*
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA)an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment or activities;	Section 1.3
(k) Mitigation measures for inclusion in the EMPr	Section 10.1
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1.
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 5.
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.3
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to BAR report
(q) Any other information requested by the competent authority	N.A

Executive Summary

Setala Environmental (Pty) Ltd was appointed as the Environmental Assessment Practitioner (EAP) by Cavalier Abattoir (Pty) Ltd to undertake the required Environmental Authorisation Process for the proposed 11KV Power Line from the Bynes-Waterberg Line to Cavalier Abattoir. Cavalier Abattoir is an existing Eskom customer with the notified maximum demand of 1MVA/11kV. Currently the customer is provided with a bulk supply via the Pebble Rock-Noka feeder and has applied for a 3,8MVA supply upgrade.

The proposed project is located approximately 6 km west of Cullinan in the City of Tshwane Metropolitan Municipality, Gauteng Province. Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the project and the study area was assessed on desktop level and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- Large sections of the line are in areas impacted on by infrastructure developments although the section within the Cullinan Game Reserve is undisturbed;
- The landscape is undulating with few focal points that would have attracted human occupation in antiquity apart from a large hill towards the centre of the Cullinan Game Reserve;
- The new proposed line is within an existing power line corridor;
- The Basic Assessment Report investigated a 100m corridor to accommodate any future deviation of the power line. During the HIA this corridor was assessed on a desktop level and the fieldwork component focused on a 40-meter corridor for the wayleave/servitude area (20 m on either side of the centre line);
- A cemetery located more than 30 meters away from the centre line was recorded during the survey but will not be directly impacted on;
- Due to the heavy rains large sections of the line are characterised by dense vegetation that although unlikely could result in some cultural resources (e.g., graves or other cultural material) remaining undetected during the field survey, and a small section of Option 2 towards the southern section was inaccessible due to access constraints;
- The study area is of insignificant to moderate paleontological sensitivity and an independent assessment by Prof Marion Bamford concluded that the impact on the palaeontological heritage would be very low so as far as the palaeontology is concerned the project should be authorised.

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

Recommendations:

- Known sites and the recorded cemetery should be indicated on development plans and avoided with a 30-meter buffer zone from any ground disturbing activities;
- Any changes to the proposed route must be assessed by an archaeologist;
- Implementation of a chance find procedure for the project; and
- Weekly monitoring of pylon excavation areas during the pre-construction and construction phase by the ECO.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I: • I act as the independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	14/01/2022

a) Expertise of the specialist

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia, Guinea and Tanzania. Through this, he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

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ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMPr: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)
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)
The Iron Age (~ AD 400 to 1840)
Historic (~ AD 1840 to 1950)
Historic building (over 60 years old)

1 Introduction and Terms of Reference:

Beyond Heritage was appointed to conduct a HIA for the 11KV Power Line from the Bynes-Waterberg Line to Cavalier Abattoir. The proposed project is located approximately 6 km west of Cullinan in the Gauteng Province (Figure 1-1 to 1-4). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPr) for the development.

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial, and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey, a cemetery was recorded. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

1.2 Project Description

Project components and the location of the proposed power line is outlined under Table 2 and 3.

Table 2: Project Description

Project area	Approximately 12 km on the following farms: • Portion 64 of the farm Oog van Boekenhoutskloof 288JR alias Tweefontein • Portion 6 of the farm Boekenhoutskloof 288JR alias Tweefontein • Portion 17 of the farm Oog van Boekenhoutskloof 288JR alias Tweefontein • Portion 2 of the Farm Beynespoort 335JR • Portion 1 of the Farm Beynespoort 335JR • Portion 82 of the farm Beynespoort 335JR • Portion 26 of the farm Nooitgedacht 333JR • Portion 27 of the farm Nooitgedacht 333JR • Portion 28 of the farm Nooitgedacht 333JR • Portion 29 of the farm Nooitgedacht 333JR • Portion 27 of the farm Elandshoek 337JR • Remainder of the farm Carlsruhe 336JR • Remaining Extent of the farm Carlsruhe 336JR • Portion 27 of the farm Elandshoek 337JR
Magisterial District	City of Tshwane Metropolitan Municipality, Gauteng Province
Central co-ordinate of the development	25°39'56.31"S 28°27'40.93"E
Topographic Map Number	2528CB

Table 3: Infrastructure and project activities

Type of development	Power Line
Size of development	12 km
Project Components	The project will require the construction of a ± 12km Chickadee overhead line from Bynes-Waterberg 11kV feeder (BWA28) to the site of Cavalier Abattoir. Cavalier Abattoir (Pty) Ltd is an existing Eskom customer with the notified maximum demand of 1MVA/11kV. Currently the customer is provided with a bulk supply via the Pebble Rock-Noka feeder and has applied for a 3,8MVA supply upgrade. Cavalier Abattoir is situated 12km from the Bynes substation. The current MV network is unable to cater for additional capacity in the area and the existing 2x20MVA transformers at Bynes substation are loaded at 6.5MVA. This application will take the Bynes Substation base load to 10.3MVA. The project will require an installation of a 12km T-Off line and two Reclosers from the 11kV Bynes- Waterberg feeders. The Application for Authorisation is for the following: ➢ The construction of a ± 12km overhead 11kV line from the take-off point from the Bynes-Waterberg 11kV feeder (BWA28) to the end point at Cavalier Abattoir. ➢ Selective vegetation clearance in the servitude area.

	➢ The construction of a temporary laydown area of approximately 50 metres by 50 metres.

1.3 Alternatives

Two alternatives were provided to be assessed as indicated in Figure 1.1 to 1.4 and both are acceptable from a heritage point of view.

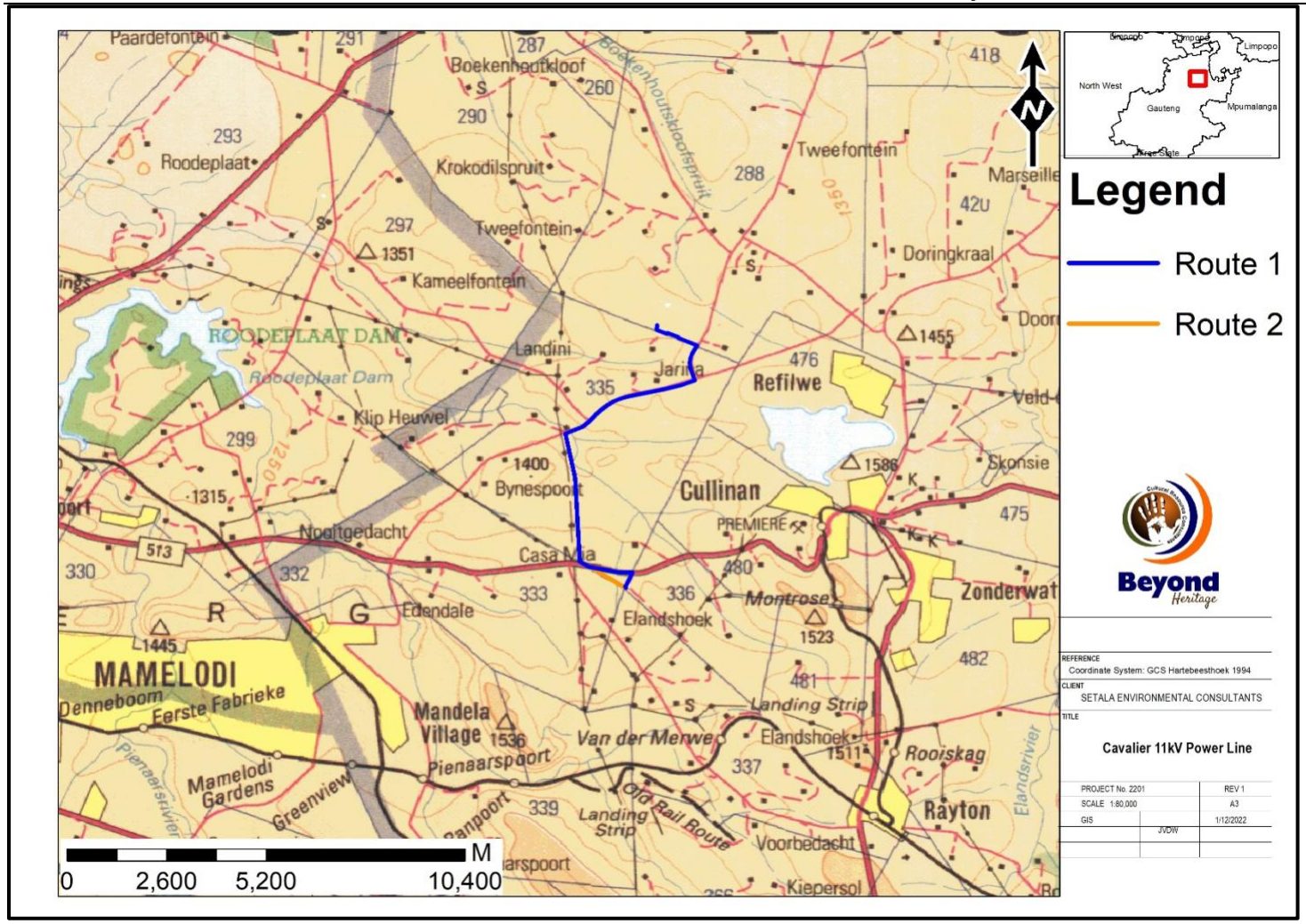

Figure 1.1. Regional setting (1: 250 000 topographical map).

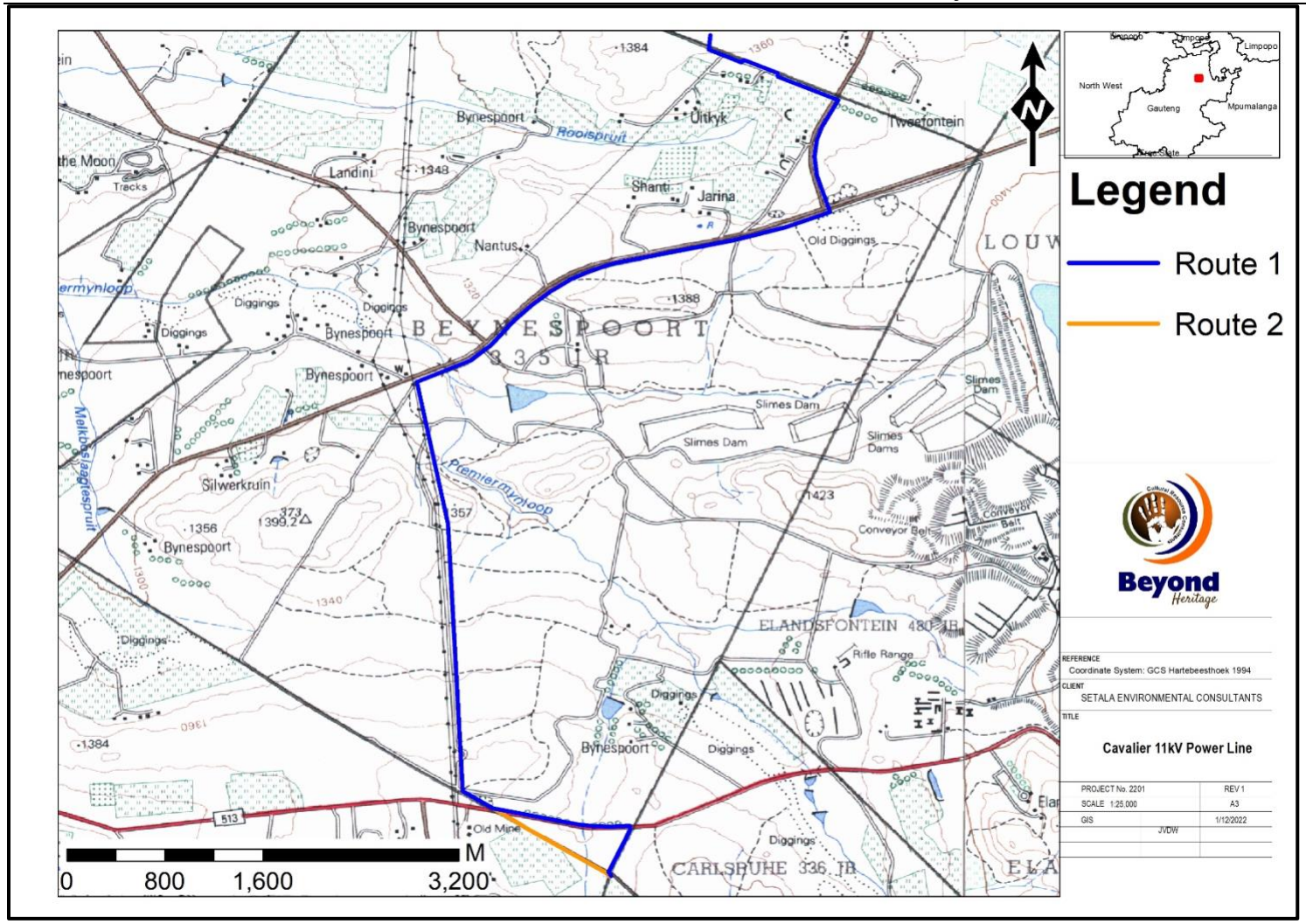

Figure 1.2. Local setting of the project (1: 50 000 topographical map).

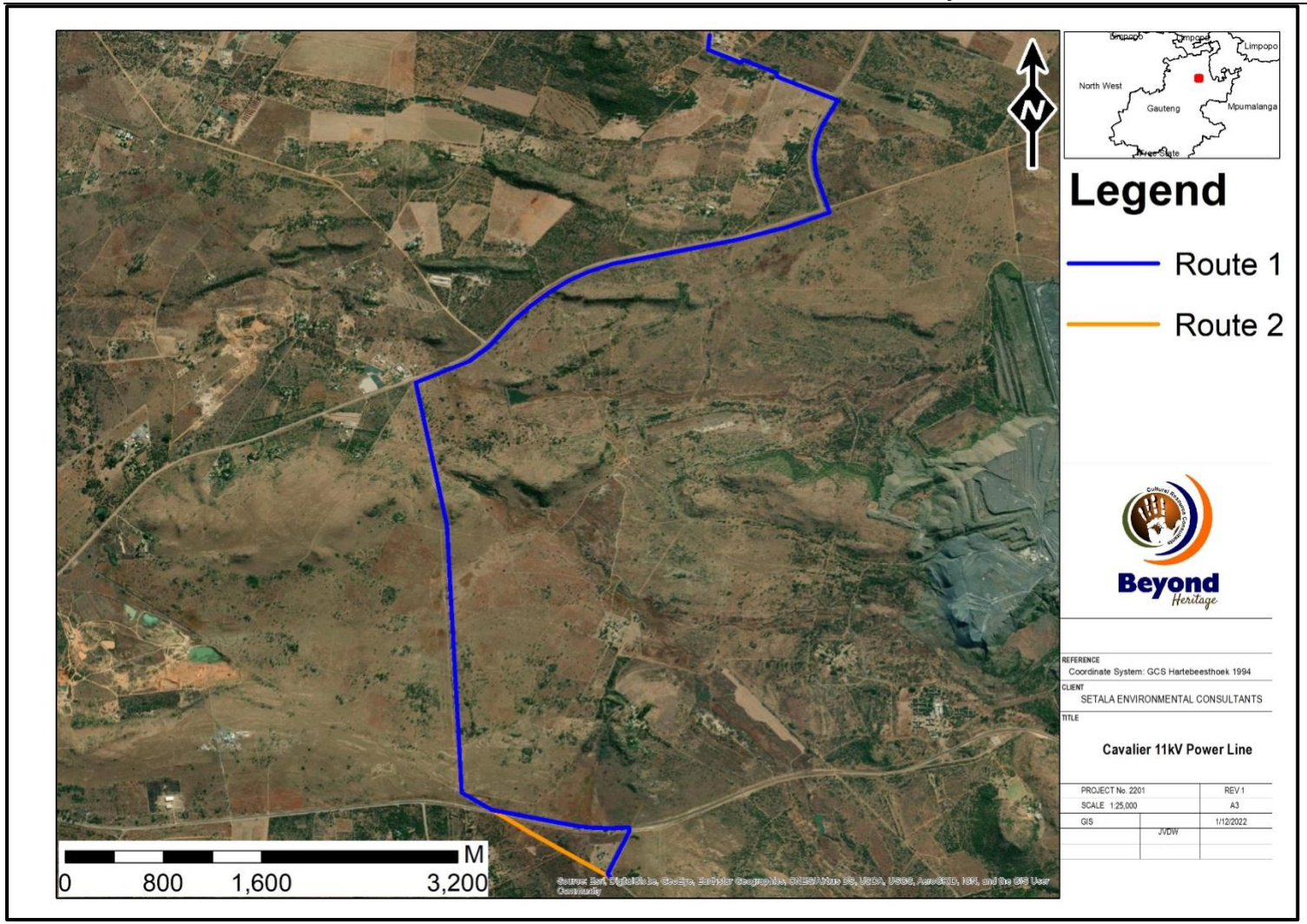

Figure 1.3. Aerial image of the development footprint.

2 Legislative Requirements

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 HIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 HIA's are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

3 METHODOLOGY

3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The following aspects are included in this process:

- To identify interested and affected parties (I&APs) and relevant authorities,
- The opening and maintaining of a register of all I&APs and key stakeholders on a database (on-going).
- To identify potential environmental impacts through investigation and PPP.
- Advertising the BA process and availability of the BID.

- Consultation with and dissemination of information to I&APs through the BID.
- To describe and investigate the alternatives that may be considered.

Basic Assessment (BA) phase

- This phase inter alia includes:
- Inviting I&AP comment and input on the draft BAR (30-day comment period).
- One-on-one consultation, virtual meetings.
- Recording all comments, issues and concerns raised by I&APs in a Comments and Response Report for inclusion in the final BAR.

3.1 Site Investigation

The aim of the site visit was to:

a) survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest;

b) record GPS points of sites/areas identified as significant areas;

c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Table 4: Site Investigation Details

	Site Investigation
Date	5 – 7 January 2022
Season	Summer – Due to the overall heavy rainfall within the project area in recent weeks, the local vegetation is extremely overgrown across the entire landscape making archaeological visibility low. A small section of Option 2 was not physically surveyed due to access restrictions. The study area was however sufficiently covered to understand the heritage character of the area (Figure 3-1).

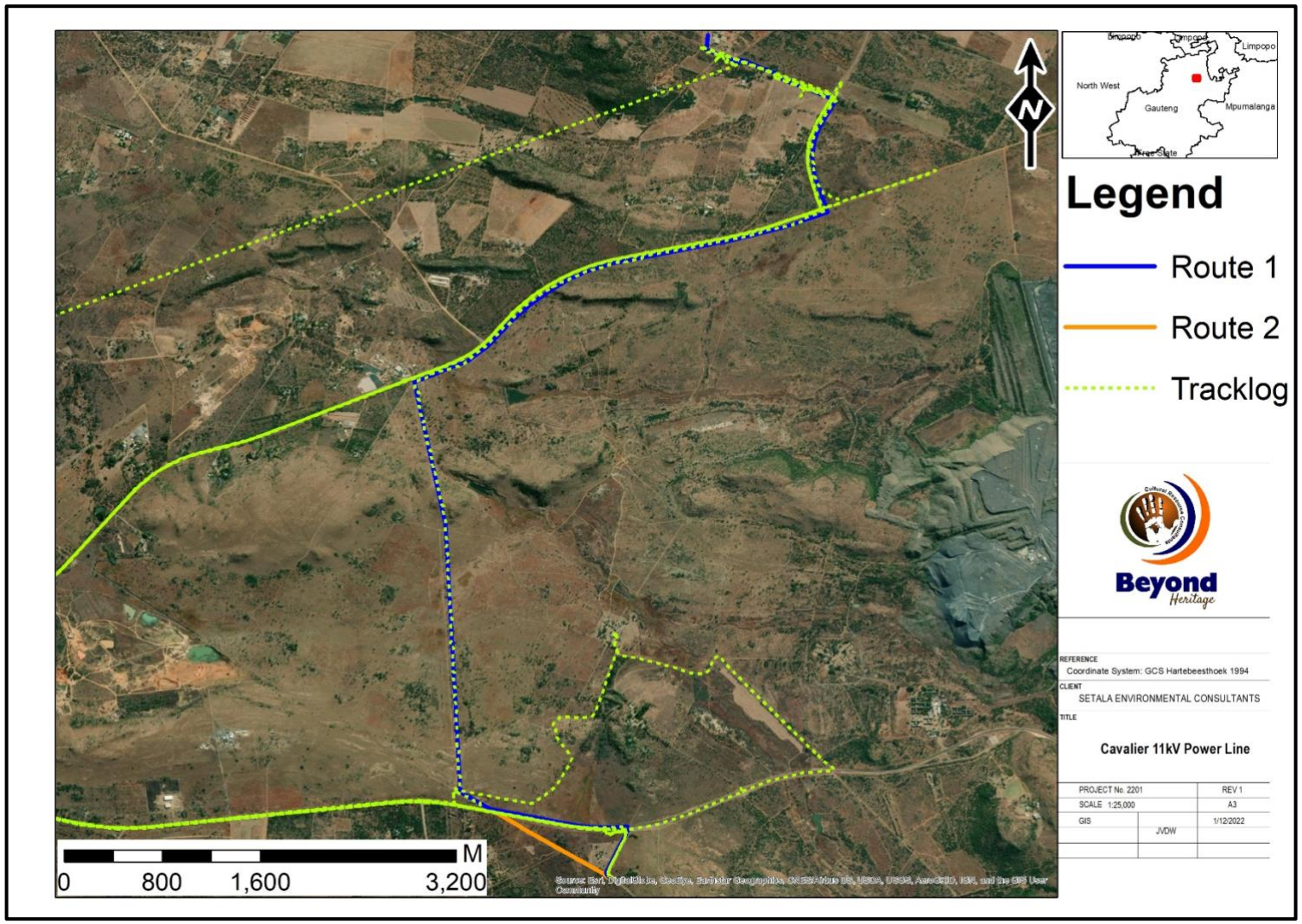

Figure 3.1: Tracklog of the survey in green.

3.2 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to the community, or pattern of South Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa.

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

Table 5. Heritage significance and field ratings

FIELD RATING	***GRADE***	***SIGNIFICANCE***	***RECOMMENDED MITIGATION***
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP. A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

3.3 Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
  - medium-term (5-15 years), assigned a score of 3;
  - long term (> 15 years), assigned a score of 4; or
  - permanent, assigned a score of 5;
  - The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
  - The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
  - The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
  - the **status**, which will be described as either positive, negative or neutral.
  - the degree to which the impact can be reversed.
  - the degree to which the impact may cause irreplaceable loss of resources.
  - the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:
S=(E+D+M) P
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

3.4 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 Description of Socio-Economic Environment

The Tshwane IDP (2006 – 2011) indicated that: "*From a socio-economic demographic perspective Tshwane has seen some improvements, despite the fact that it continues to face serious challenges. The City's population has grown slower than the national average, and in 2004 was estimated to be around 2,2 million people, of which 40,6% of the population fell within the 15-34-year age bracket. Compared to the national average, the City's residents are better skilled, reflect high levels of literacy, the City provides employment for a larger percentage of its residents, its human development ranking is high and it has a per capita income above the national average. These figures have resulted in employment, and wage per capita value-added improvements, although, poverty and unemployment remain problematic. In 2003 Tshwane's Economically Active Population (EAP) amounted to 48% of the total population which was higher than the national but lower than the provincial average. While this is positive, employment opportunities were lagging behind, which led to a high level of unemployment. Many people were absorbed into the informal market, but the latter is believed to have levelled off since 2001. Statistics have further shown that 15,3% of households had no income in 2001 (a doubling from 1996), the number of people living in poverty has increased and the group hardest hit in respect of unemployment are the youth (20-24 years).*" Priorities of the IDP included economic development and job creation.

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process by the EAP. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

6 Literature / Background Study:

6.1 Literature Review (SAHRIS)

Little research has been conducted in the study area and studies consulted for this project are listed in Table 6.

Table 6. Studies consulted for the project

Author	Year	Project	Findings
Birkholtz, P.	2007	Phase 1 Heritage Impact Assessment Proposed Mining Activities On Portion 47 (A Portion Of Portion 45) Of The Farm Nooitgedacht 333 JR Cullinan Magisterial District, Gauteng.	Five sites were located which can be classified into three different types, namely two cemeteries, two historic military sites and one Late Iron Age site.
Van Schalkwyk, J. A.	2012	Heritage Impact Assessment For The Proposed Upgrade Of A Section Of The R513 (P2-5), Cullinan Region, Gauteng Province.	No sites, features or objects of cultural heritage significance were found in the study area
Muhomba, C. J.	2015	Heritage Impact Assessment For The Proposed Poultry Breeder In Portion 6 Of The Farm Kafferskraal 475 JR In Cullinan, Gauteng Province (GDARD REF: 002/14-15/0239)	Graves

6.1.1 Genealogical Society and Google Earth Monuments

A cemetery of 67 graves is indicated on the Genealogical Society of South Africa on the farm Beynespoort 335. It is located approximately 390 m from the proposed project and will not be impacted on by the powerline and not further discussed here.

6.2 Background to the general area

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

6.2.1 Stone Age

The Stone Age can be divided in three main phases as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago.
- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

A single Later Stone Age site is on record in the greater study area (called Ford Troye) (Bergh 1999). According to Bergh (1999) there are also 125 Late Iron sites on record in the greater study area. Several Stone Walled Settlements is found in the general study area associated with the Manala Ndebele. These Southern Ndebele speaking people occupied the area between the 1600’s up to the 1800’s.

6.2.2 The Iron Age

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD

- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living.

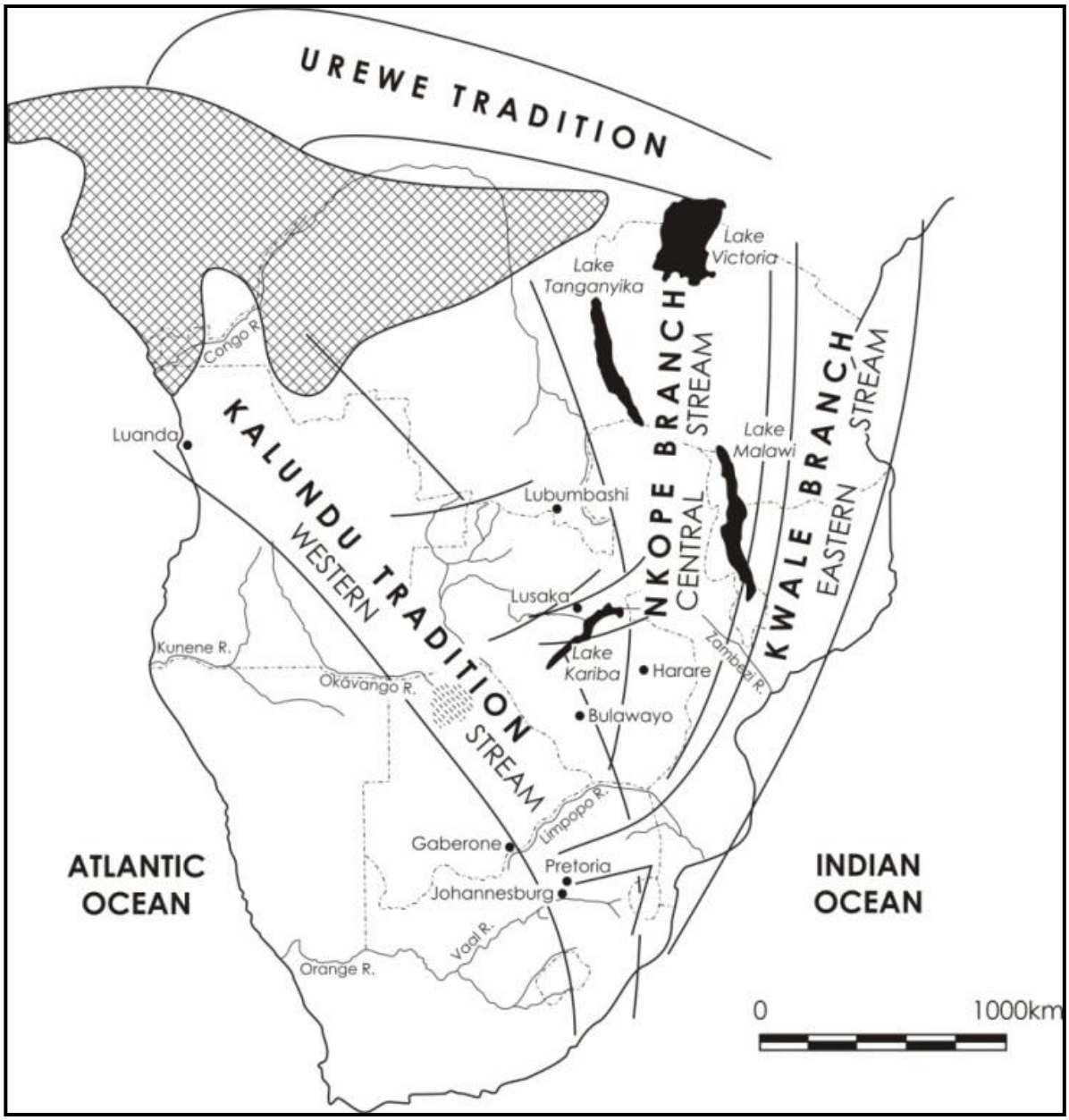

Figure 6.1:Movement of Bantu speaking farmers (adapted from Huffman 2007)

Towards Pretoria is the well-known Early Iron Age Site of Derdepoort where a small collection of ceramics was uncovered dating back to the 4th to 7th century AD (Nienaber *et al* 1997). In the greater Tshwane area, many Late Iron Age settlements are on record (Bergh 1999: 4, 7) and stone walled settlements occur around the study area. These sites are mostly associated with the Southern Ndebele and are found in the area between Wallmannsthal and Roodeplaat Dam and also along the Pienaars River to the south of the N4 Highway (Birkholtz 2009). According to Birkholtz (2009) the Manala Ndebele moved from Ezotshaneni to a place known as Embilaneni in 1717. The new settlement spread over the Bronberg mountains east of Pretoria. The Embilaneni settlement was occupied over a period of 30 years between 1717 and 1747.

The Difaqane (Sotho), or Mfekane ("the crushing" in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820's until the late 1830's. It came about in response to

heightened competition for land and trade and caused population groups like gun carrying Griquas and Shaka's Zulus to attack other tribes. At the beginning of the nineteenth century, the predominant black tribe in the area north of Pretoria was the Manala-Ndebele. The Kgatla were also present to the north of where Pretoria is located today. It seems that, in 1832, Shaka's Zulu tribe passed by the south of Pretoria from the southeast in a westerly direction. This was in order to attack Mzilikazi's Ndebele.

6.2.3 Historical information on the greater study area

The village of Cullinan was named after Sir Thomas Cullinan. The village is known as of being the site of discovery of the world's largest diamond.

Premier Mine was originally part of the farm owned by Cornelis Minnaar, namely Elandsfontein no. 85. It was registered on the 7th of November 1859. A portion of the farm was sold to his brother Roelof Minnaar in 1861, who in turn sold the northern part of the farm to Willem Prinsloo for £570 on the 7th December 1896 (http://www.cullinan-conservancy.org/cultural-heritage.php).

Thomas Major Cullinan, a building contractor wanted to obtain an option on the Prinsloo farm but could not. When Willem Prinsloo died in 1898, Maria Prinsloo became the new owner just before the Anglo Boer War (1898-1902) broke out. After the war Maria Prinsloo's brothers returned to the farm. The Prinsloo family were in need of money. When Thomas Cullinan started new negotiations with the family, they agreed to the sale of the farm for the sum £52,000 .

'Rayton Junction', as it was first known, started out as a tin shack mining town on the farm Elandshoek. During its boom days the town served the needs of thousands of diggers and prospectors working for the Schiller, Montrose and Dunmore mining companies. The original Rayton Junction was laid out along a spur of the main NZASM railway line, which was completed in 1895 to connect the Republic of Transvaal's capital, Pretoria to the port in Delagoabay, Mozambique. Officials in the Montrose Diamond Mining Company did the town planning and named the hamlet after Lady Rachel Ray Williston, wife of the company's first manager, Colonel Balliston.

The town's first—and then only—brick building was the original magistrate's office, which dates from this early time. Between 1900 and 1910 a railroad was constructed between Rayton and Cullinan. Thomas Cullinan's company was initially registered as the Premier Syndicate on November 6, 1902. They reregistered on 1 December 1902 as The Premier (Transvaal) Diamond Mining Company LTD (http://www.cullinan-conservancy.org/cultural-heritage.php).

Prospecting started immediately. In April 1903 William McHardy became the first general manager. Production began on 24th April 1903. By 1904 the mine already employed more than 2000 people. On the 25th January 1905 a diamond with the mass of 3,106 carats in its uncut state was found in the side-wall of the open pit. The Cullinan Diamond is still the largest gemstone ever found. Two of the stones cut from the Cullinan Diamond are now found in the British Crown Jewels; the 530-carat "Star of Africa", which is set in the septre and the 317-carat "Lesser Star of Africa" which is set in the Imperial State Crown (http://www.cullinan-conservancy.org/cultural-heritage.php).

1914 proved to be the start of difficult times. Three hundred and eighty one European employees were discharged for provoking industrial disturbances at the mine. During the outbreak of World War 1 in Europe in August 1914, diamond prices tumbled and subsequently all operations at the Premier mine were suspended.

Premier Mine resumed production on the 16th January 1916. The De Beers Consolidated Mines acquired a controlling interest in the mine in 1917. In 1918 almost every family in the Cullinan community lost a member to the flu epidemic (http://www.cullinan-conservancy.org/cultural-heritage.php).

The great depression in 1929 affected the rest of the world and in 1932 operations at the Premier mine were suspended again. By 1933 deprivation and hunger were experienced not only in Cullinan in the entire country. The retrenched employees were permitted to remain in occupation of the company's houses rent free. They were also provided with water, lights, sanitary and medical services free of charge. The nearby Zonderwater farm came to the rescue by providing soup kitchens for the hungry children. By the time World War 2 started in 1939, the village was nearly deserted.

From 1941 to 1945 the biggest concentration of Italian Prisoners of War (over 90 000), who were captured in North Africa, were housed in South Africa at Zonderwater Prison. During this period the army took over the village, even the golf course was used to pitch tents on.

Among these prisoners of war were musicians, craftsman and artists who painted eight murals in 1942 in the old Recreation Club Hall. The 3 m x 4 m mural paintings depicted historical scenes from South Africa and Britain. The paintings were probably copied from photographs or post cards, as most are copies of well-known artists like Erich Mayer and W.H. Coetzer (http://www.cullinan-conservancy.org/cultural-heritage.php).

During 1948 the Recreational Hall was converted into a cinema. Unfortunately most of the murals were damaged when boards were placed over them to improve the acoustics. The pressed steel ceiling, which dated back from 1912 - when the Recreational Hall was rebuilt after a fire - was also covered by a false acoustic ceiling. Nearly fifty years later in 1993 the hidden murals were again uncovered. Great effort was made to restore the murals and this was completed in 1998.

After the end of the war in 1945, numerous prisoners chose to remain in South Africa. Only 30,000 were permitted to remain. Around 264 prisoners were buried in the Italian military cemetery just outside Cullinan. Many descendants of the Italian POW's have been making an annual pilgrimage to the Italian War Cemetery ever since.

In 1945 all the rain water that accumulated during the twelve years the mine had been closed, was pumped out of the big hole and the mine resumed production. The mine is still producing some of the world's finest diamonds today (http://www.cullinan-conservancy.org/cultural-heritage.php).

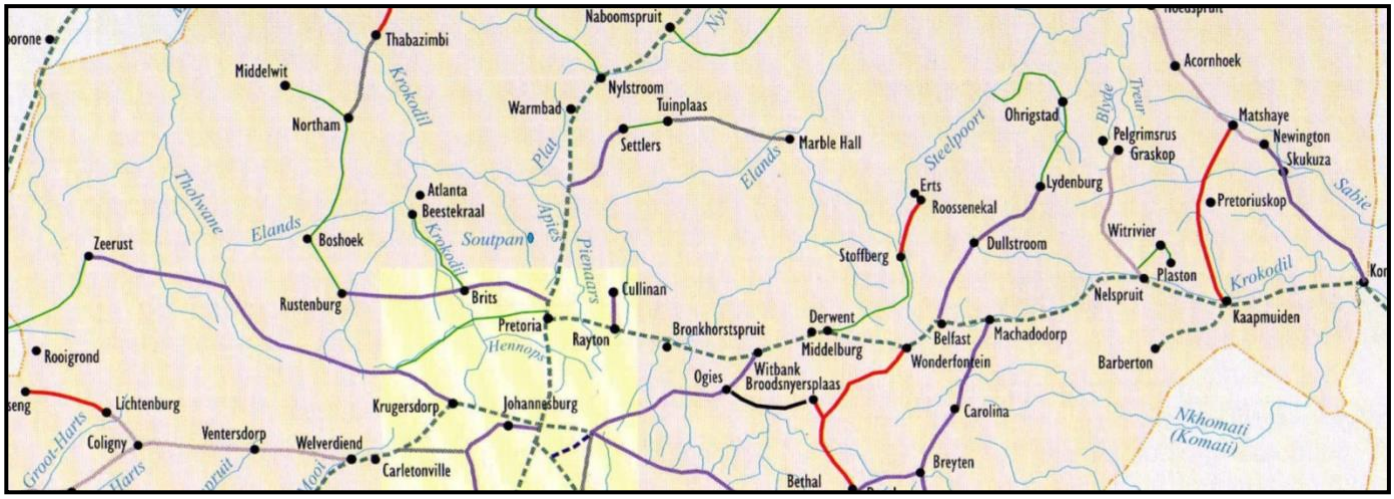

Figure 6.2:Enlarged section of the railroad development map from Bergh 1999.

6.2.4 Battles close to the study area

The Battle of Diamond Hill (or the Battle of Donkerhoek) was fought in the greater study area on 11 June 1900. The Boers under leadership of General Louis Botha suffered a loss of around 30 men, of whom 11 were killed in this battle. The battle took place after Lord Roberts occupied Pretoria and the Boers moved their capital to Machadodorp. General Botha established a line of defence about 30 kilometres east of Pretoria on both sides of the railway line to prevent the British army moving east towards Machadodorp. The frontline stretched over 40 km (Bergh 1999). The British advanced against the Boers to clear the Boers from the areas close to Pretoria. The British suffered 180 casualties in the battle and on the 12th of June Botha led his men into the cover of darkness with a sense of victory. This battle boosted the Boers morale and the war continued for two more years (Von der Heyde 2013).

7 Description of the Physical Environment

The proposed project is situated about 6km west of Cullinan. The proposed power line traverses the area from the R513 through the Cullinan Game Reserve towards the R573 where it follows the road towards the Cavalier abattoir grounds. Impact areas outside of the Cullinan Reserve are generally disturbed areas along the large roads. The landscape is generally flat with one large hill towards the centre of the game farm area. A large existing powerline is located within the corridor of the new proposed line.

Figure 7.1. Southern end of proposed line on Portion 82/335

Figure 7.2. Existing power lines near the southern end of the proposed line on Portion 82/335

Figure 7.3. General site - near the northern end of the project area close to the Cavalier grounds on Portion 48/335.

Figure 7.4. General site - near the northern end of the project area close to the Cavalier grounds on Portion 48/335.

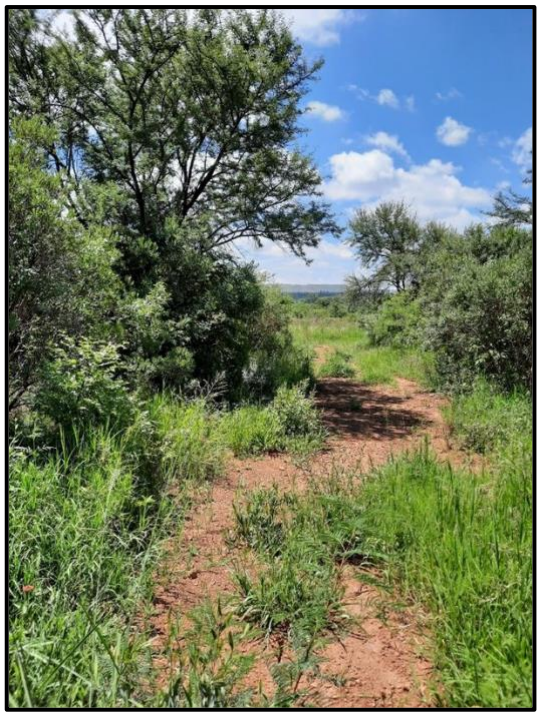

Figure 7.5. General site conditions - Overgrown vegetation directly across the road from the Cavalier abattoir on Portion 46/335.

Figure 7.6. General site conditions - Overgrown vegetation directly across the road from the Cavalier abattoir on Portion 46/335.

Figure 7.7. General site - overgrown vegetation directly across the road from the Cavalier abattoir on Portion 46/335.

Figure 7.8. General site - inaccessible portion on the property towards the southern end of the proposed line on Portion 82/335.

Figure 7.9. General view of the landscape on Portion 2/335.

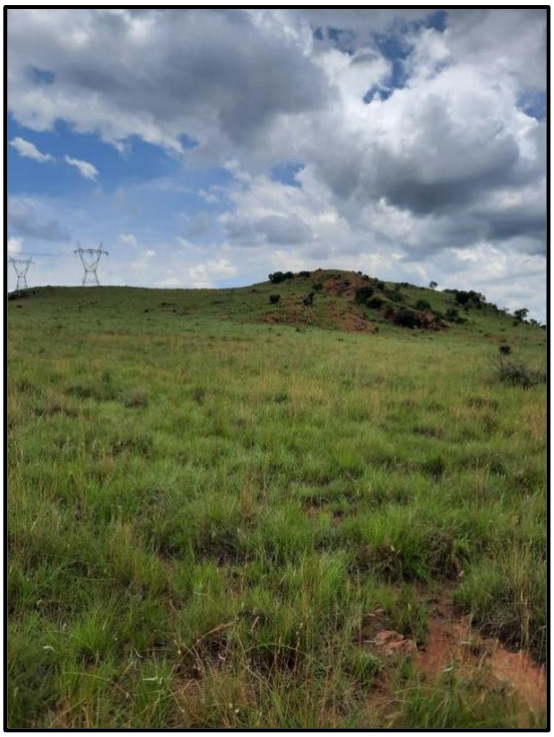

Figure 7.10. General site - large hill towards the central area of the game farm on Portion 2/335.

8 Findings of the Survey

8.1 Heritage Resources

Previous disturbances relating to clearing for roads are evident as well as earthworks in the larger area, however several heritage resources are known (Figure 8.1 and Table 7). The only resource in proximity to the power line is a small cemetery (approximately 14 graves) situated next to the road at -25.6827746, 28.4625081 (Figure 8.1) recorded as waypoint 236. The cemetery is marked by graves with stone dressings with no headstones apart from two graves with granite headstones. The cemetery is situated just outside of the Game Reserve fence on the southern edge of portion 1/335. Graves are of high social significance and the site is given a field rating of GP A. The vegetation around the cemetery is overgrown due to recent heavy rain and could potentially obscure more graves. General site conditions are shown on Figure 8.2 – 8.6.

Table 7. Heritage resources in the greater area.

LONGITUDE	LATITUDE	LABEL
28° 29' 29.2000" E	25° 40' 05.1300" S	20 Graves Cemetery
28° 27' 45.1500" E	25° 40' 58.1000" S	14 Graves Cemetery (Outside the Game Farm)
28° 27' 58.0845" E	25° 39' 25.8145" S	Walled Minnaar Cemetery (Â±26 Graves)
28° 27' 26.0500" E	25° 39' 14.9100" S	The Diggers Cemetery (Outside our Mining Area)
28° 27' 40.1500" E	25° 39' 04.6600" S	The Diggers Town (1932-1950)
28° 30' 03.3200" E	25° 40' 43.2000" S	Windy Brow Cemetery (Â±41 Graves)
28° 28' 22.1483" E	25° 40' 29.1432" S	211 Graves Cemetery
28° 28' 22.8000" E	25° 40' 28.9200" S	Site 1 Cemetry (211 Graves)
28° 28' 17.6880" E	25° 40' 37.0920" S	Site 2 Structure
28° 28' 13.6920" E	25° 40' 38.3520" S	Site 3 Structure
28° 28' 14.3040" E	25° 40' 42.8700" S	Site 4 Settlement
28° 28' 05.9520" E	25° 40' 44.8680" S	Site 5 Structure
28° 28' 02.4600" E	25° 40' 46.8840" S	Site 6 Structure
28° 28' 02.6760" E	25° 40' 46.8480" S	Site 7 Structure
28° 27' 57.1320" E	25° 40' 47.1000" S	Site 8 Kraal
28° 27' 59.6160" E	25° 40' 44.0040" S	Site 9 Structure
28° 28' 00.7680" E	25° 40' 42.7080" S	Site 10 Settlement
28° 28' 05.2320" E	25° 40' 40.6920" S	Site 11 Structure
28° 27' 52.9560" E	25° 40' 41.7000" S	Site 12 Kraal
28° 27' 30.0600" E	25° 40' 44.7240" S	Site 13 Structure
28° 27' 37.4400" E	25° 40' 43.6800" S	Site 14 Structure
28° 27' 40.1760" E	25° 40' 45.6600" S	Site 15 Settlement
28° 27' 59.6160" E	25° 40' 44.0040" S	Site 16 Kraal
28° 27' 04.1400" E	25° 40' 32.5920" S	Site 17 Structure

28° 27' 01.8720" E	25° 40' 28.3080" S	Site 18 Structure
28° 27' 29.9880" E	25° 40' 29.6400" S	Site 19 Structure
28° 26' 58.6680" E	25° 40' 22.9080" S	Site 20 Kraal
28° 27' 23.7960" E	25° 40' 15.0960" S	Site 21 Homestead
28° 27' 05.9040" E	25° 39' 59.9760" S	Site 22 Homestead
28° 27' 10.8360" E	25° 39' 59.2200" S	Site 23 Structure
28° 27' 15.9480" E	25° 39' 54.5760" S	Site 24 Homestead
28° 27' 18.4320" E	25° 39' 51.1560" S	Site 25 Homestead
28° 27' 19.7640" E	25° 39' 49.7160" S	Site 26 Homestead
28° 27' 22.8600" E	25° 39' 47.3760" S	Site 27 Homestead
28° 27' 28.7280" E	25° 39' 44.4240" S	Site 28 Homestead
28° 27' 35.7480" E	25° 39' 43.6320" S	Site 29 Structure
28° 27' 32.0400" E	25° 39' 28.5120" S	Site 30 Homestead
28° 27' 28.9080" E	25° 39' 29.7720" S	Site 31 Homestead
28° 27' 25.3800" E	25° 39' 28.5120" S	Site 32 Structure
28° 27' 29.3040" E	25° 39' 23.6160" S	Site 33 Structure
28° 27' 43.4520" E	25° 39' 41.9400" S	Site 34 Concrete Beacon
28° 27' 36.4320" E	25° 39' 24.9480" S	Site 35 Structure
28° 27' 38.9160" E	25° 39' 26.3160" S	Site 36 Structure
28° 27' 51.1200" E	25° 39' 30.1320" S	Site 37 Structure
28° 27' 45.3600" E	25° 39' 29.2320" S	Site 38 Settlement
28° 27' 35.3160" E	25° 39' 15.3360" S	Site 39 Metal Water Pump
28° 27' 29.3040" E	25° 39' 23.6160" S	Site 40 Structure
28° 27' 59.1480" E	25° 39' 32.7240" S	Site 41 Structure
28° 28' 18.1920" E	25° 39' 37.1160" S	Site 42 Kraal
28° 27' 57.9600" E	25° 39' 25.7400" S	Site 43 20-30 Graves
28° 28' 22.5122" E	25° 39' 45.4317" S	Site 44 Building
28° 28' 01.3080" E	25° 39' 08.0280" S	Site 45 Settlement
28° 28' 08.0400" E	25° 39' 50.8680" S	Site 46 Trenches
28° 28' 15.9960" E	25° 39' 00.9720" S	Site 47 Mampa School
28° 28' 14.6640" E	25° 39' 01.2600" S	Site 48 Mud Structures
28° 28' 20.6760" E	25° 38' 54.7800" S	Site 49 Structures
28° 28' 44.0040" E	25° 38' 53.7000" S	Site 50 Structures
28° 28' 44.0040" E	25° 38' 51.5760" S	Site 51 Structure
28° 28' 17.5299" E	25° 39' 37.2923" S	Site 52 Structure
28° 28' 34.3920" E	25° 38' 49.1280" S	Site 53 Structure
28° 28' 17.5299" E	25° 39' 37.2923" S	Site 54 Trench
28° 28' 22.6560" E	25° 39' 02.8080" S	Site 55 Structure
28° 28' 29.4038" E	25° 39' 56.0044" S	Site 56 Structure
28° 28' 45.8400" E	25° 38' 45.1320" S	Site 57 Structure
28° 28' 45.4800" E	25° 38' 46.7880" S	Site 58 Structure
28° 28' 42.9240" E	25° 38' 41.3160" S	Site 59 Structure
28° 28' 33.2760" E	25° 38' 32.6760" S	Site 60 Structure
28° 28' 34.1040" E	25° 38' 38.1120" S	Site 61 Structure
28° 28' 45.6960" E	25° 38' 36.3120" S	Site 62 Structure

28° 29' 10.1760" E	25° 38' 31.4520" S	Site 63 Structure
28° 29' 15.7920" E	25° 38' 45.8160" S	Site 64 Structure
28° 29' 06.8280" E	25° 38' 44.8440" S	Site 65 Structure
28° 29' 03.3360" E	25° 38' 44.5560" S	Site 66 Structure
28° 29' 56.7240" E	25° 36' 53.1720" S	Site 67 Structure
28° 30' 01.9800" E	25° 38' 14.4600" S	Site 68 Structure
28° 29' 53.4480" E	25° 38' 14.6040" S	Site 69 Structure
28° 29' 49.4520" E	25° 38' 21.6240" S	Site 70 Structure
28° 29' 59.4600" E	25° 38' 53.0520" S	Site 71 Structure
28° 29' 57.5520" E	25° 38' 55.7520" S	Site 72 Structure
28° 29' 44.3400" E	25° 38' 55.7520" S	Site73 Structure
28° 29' 53.5200" E	25° 38' 56.7600" S	Site 74 Structure
28° 29' 41.4600" E	25° 38' 52.9800" S	Site 75 Structure
28° 29' 24.8640" E	25° 38' 48.0120" S	Site 76 Structure
28° 29' 21.3000" E	25° 39' 43.2000" S	Site 77 Structure
28° 29' 15.1080" E	25° 39' 38.5920" S	Site 78 Structure
28° 28' 40.8720" E	25° 39' 36.5400" S	Site 79 Structure
28° 28' 49.6200" E	25° 39' 41.9040" S	Site 80 Wooden Cross
28° 29' 04.6320" E	25° 39' 37.8360" S	Site 81 Structure
28° 28' 50.7720" E	25° 39' 38.8800" S	Site 82 Sitting Benches
28° 29' 15.9720" E	25° 39' 44.3520" S	Site 83 Structure
28° 29' 11.9040" E	25° 39' 48.1680" S	Site 84 Structure
28° 29' 22.6320" E	25° 39' 50.1840" S	Site 85 Structure
28° 29' 27.7440" E	25° 39' 56.2680" S	Site 8 Structure
28° 28' 59.9160" E	25° 40' 00.3720" S	Site 87 Structure
28° 29' 08.5200" E	25° 40' 02.4600" S	Site 88 Structure (Farm House)
28° 29' 01.4280" E	25° 40' 18.1200" S	Site 89 Grave
28° 29' 21.7320" E	25° 40' 37.0200" S	Site 90 Structure
28° 27' 45.0720" E	25° 40' 57.9000" S	Site 91 Graves
28° 27' 45.1512" E	25° 40' 57.8244" S	Waypoint 236 Cemetery recorded during this survey.

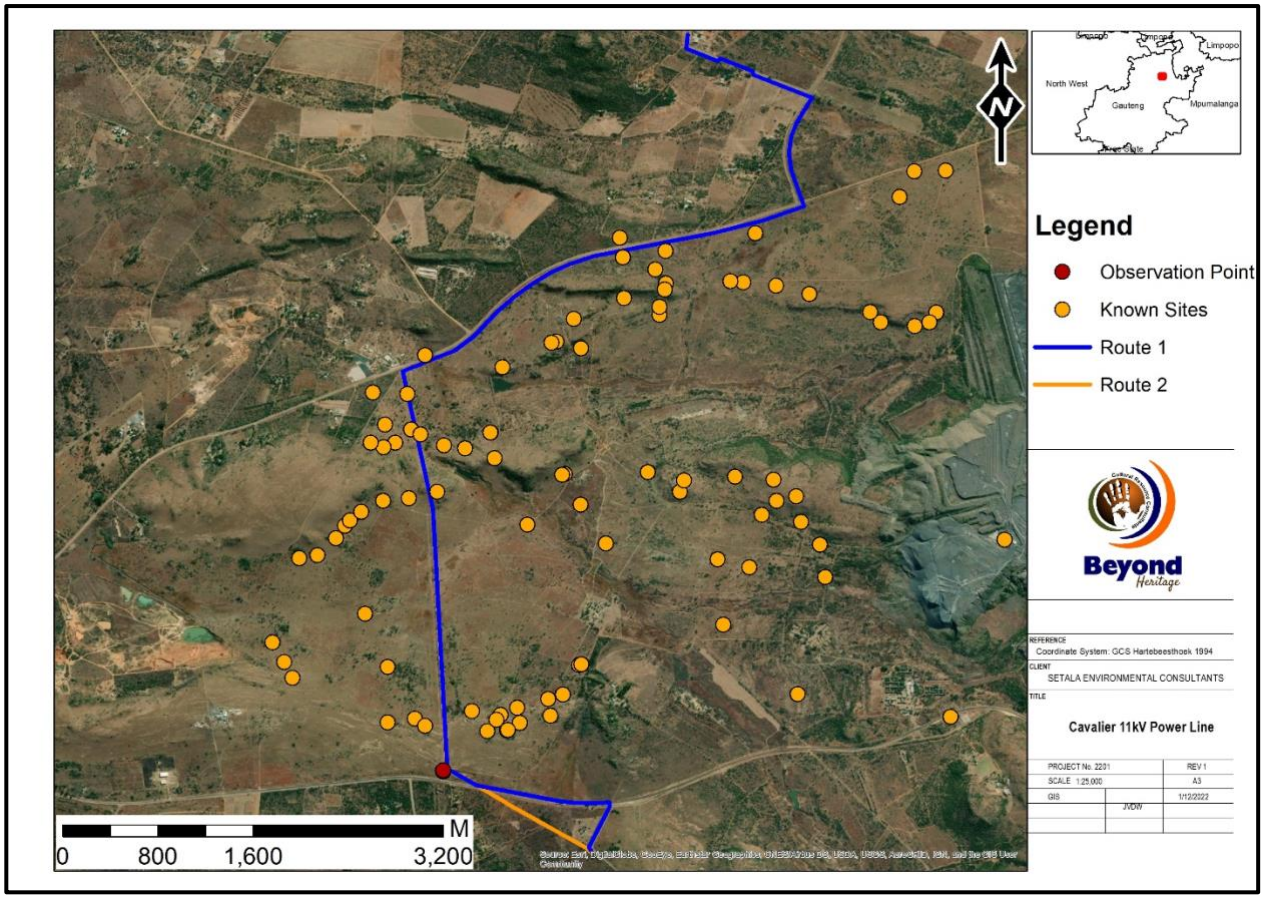

Figure 8.1. Known and recorded features in relation to the line.

Figure 8.2. Stone packed grave at waypoint 236

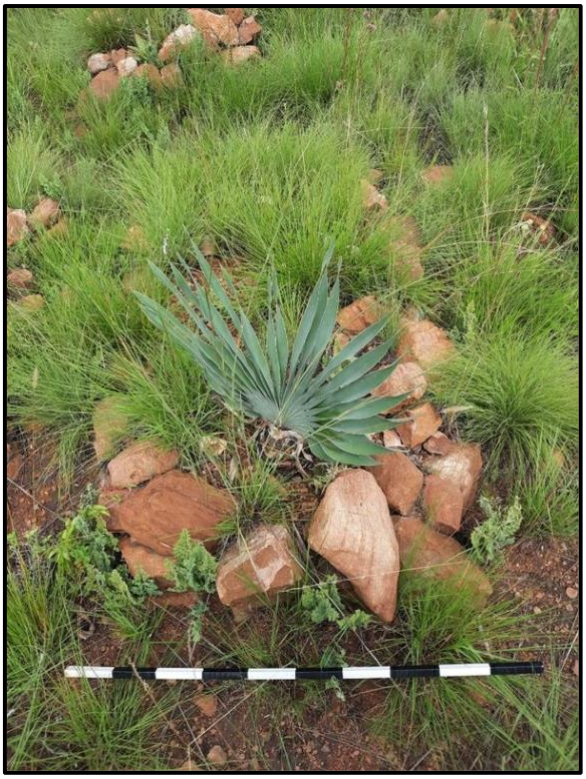

Figure 8.3. Stone packed grave at Waypoint 236

Figure 8.4. Grave with granite headstone at Waypoint 236.

Figure 8.5. Stone packed grave with granite headstone at Waypoint 236.

Figure 8.6. Graves under existing power line.

8.2. Cultural Landscape

The landscape is generally flat with one large hill towards the centre of the game farm area. The areas outside of the boundaries of the game reserve has been impacted on by road and powerline infrastructure developments. Based on historical topographic maps the study area was part of a large historical landscape and based on the Heritage inventory of the Cullinan Diamond Mine Game Farm known sites are indicated in Figure 8.7 and 8.8. These sites include the remains of structures some of which are indicated on maps dating to 1943 (Figure 8.7).

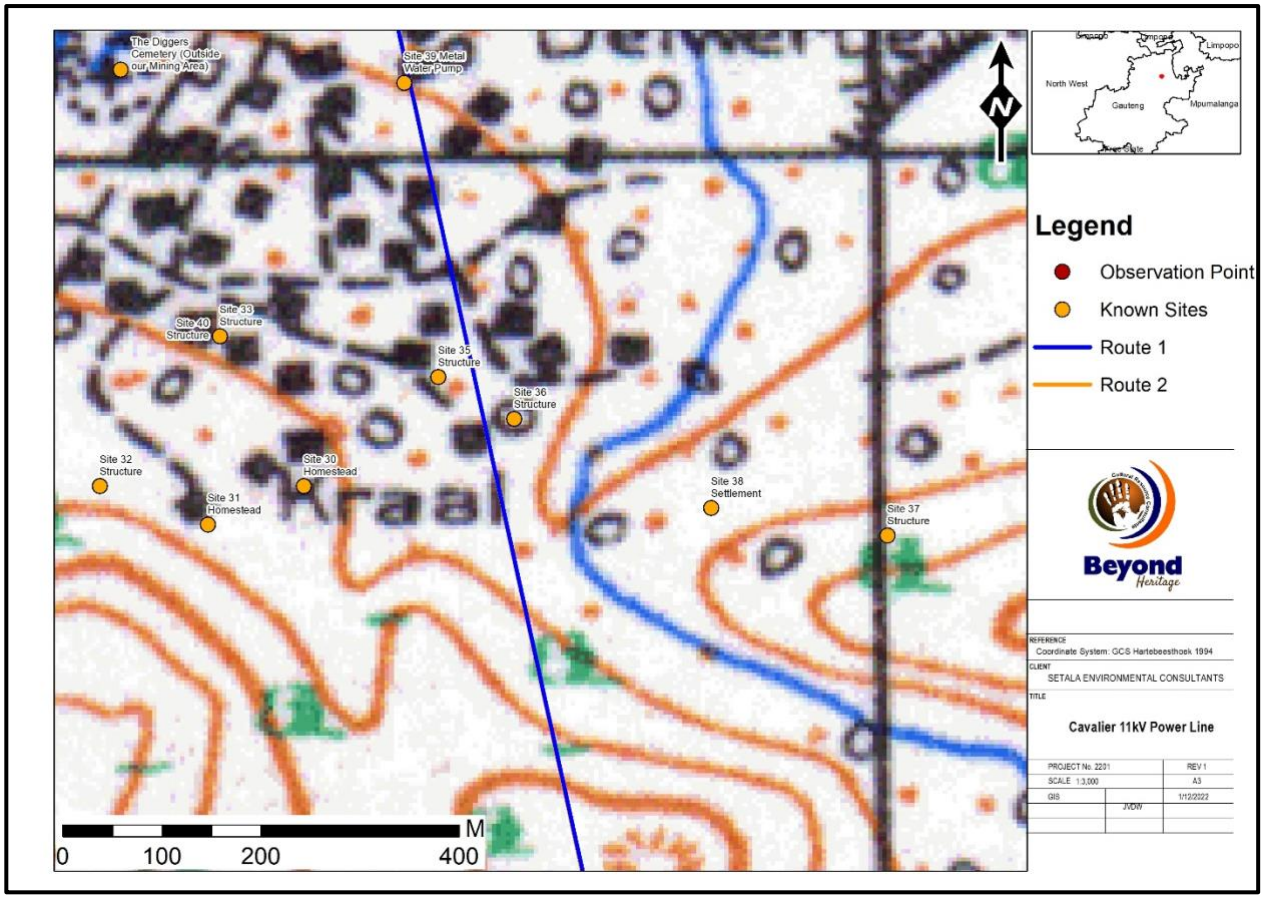

Figure 8.7. 1943 Topographic map of the study area indicating structures in the surrounding area.

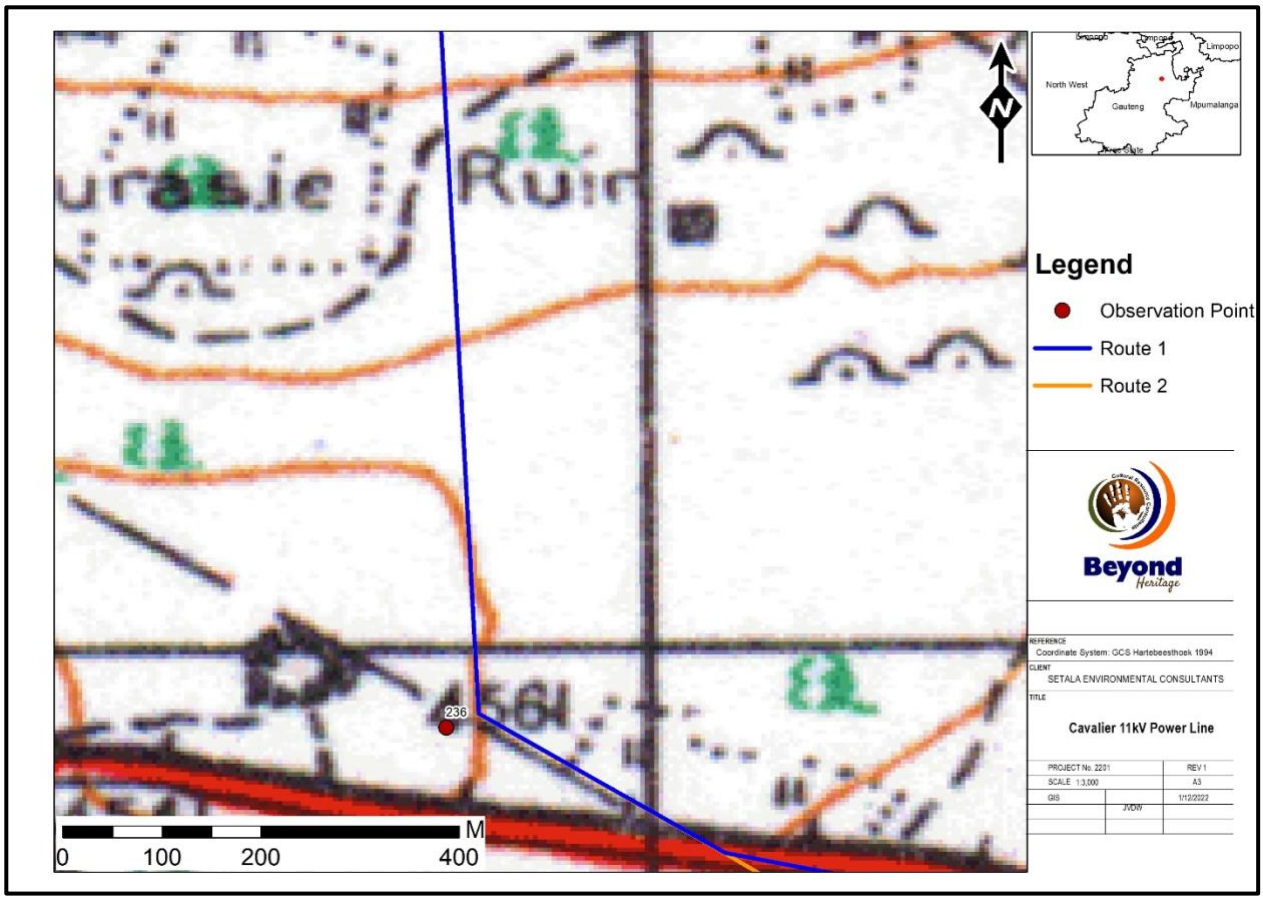

Figure 8.8. 1943 Topographic map of the study area the recorded cemetery is indicated at waypoint 236.

8.3. Paleontological Heritage

According to the SAHRA Paleontological map the study area is of no to moderate paleontological significance and an independent study was conducted by Prof Marion Bamford and concluded that it is extremely unlikely that any fossils would be preserved in the overlying soils and sands. of the Quaternary. There is a very small chance that trace fossils (microbially induced sedimentary structures) may occur in the Rayton Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer or other responsible person once excavations for foundations have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be very low so as far as the palaeontology is concerned the project should be authorised (Figure 8.9).

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 8.9. Paleontological sensitivity of the study area as indicated on the SAHRA Palaeontological sensitivity map.

9 Potential Impact

The closest resource to the power line is a cemetery located more than 30 m from the proposed power line and no known sites are within the impact area of the power line therefore no adverse impact to heritage resources is expected (Figure 9.1 and 9.2). Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures as recommended in this report should be implemented during all phases of the project. Impacts of the project on heritage resources is expected to be low during all phases of the development (Table 8).

9.1.1 Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.3 Operation Phase

No impacts are expected during the operation phase.

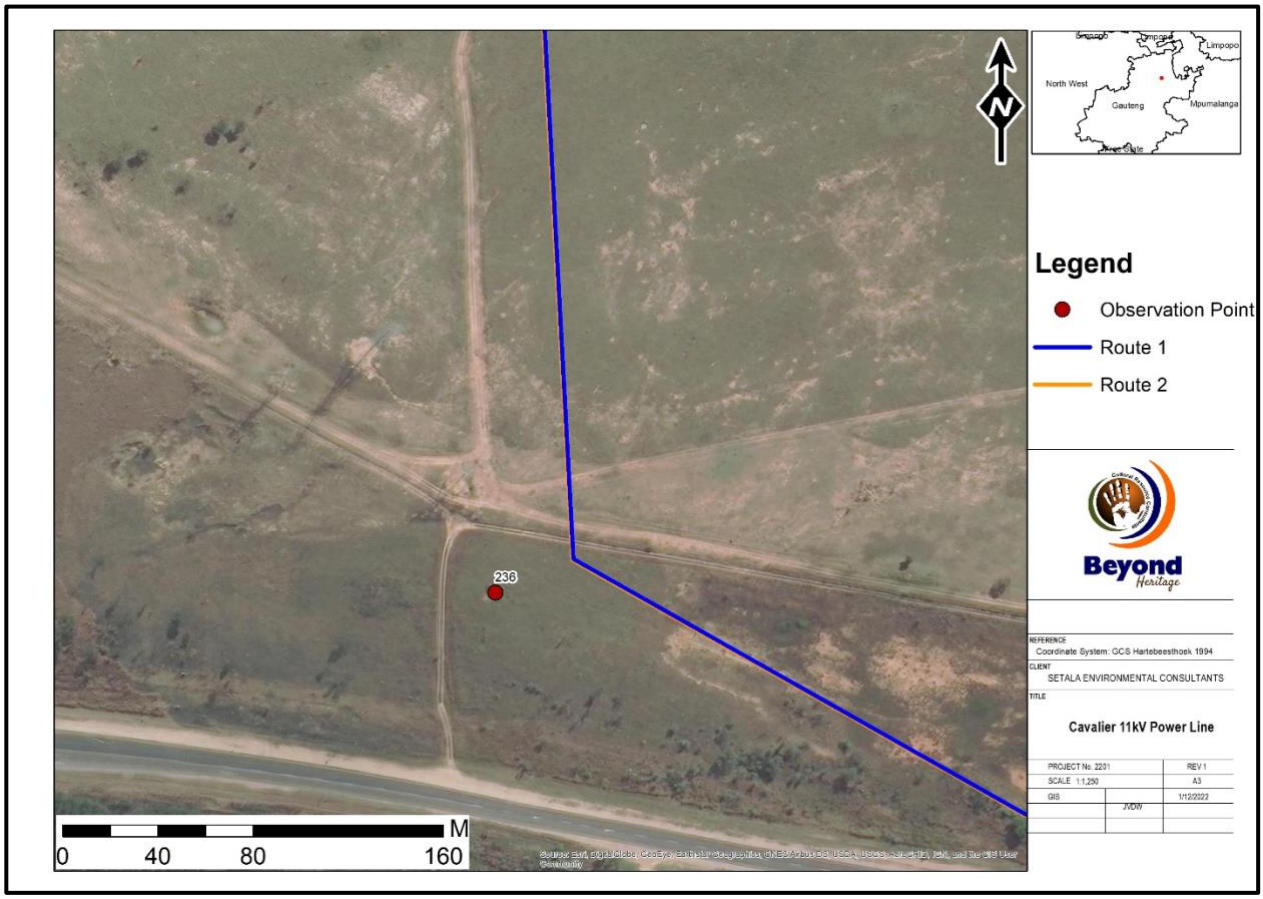

Figure 9.1. Recorded cemetery 32 meters from the power line.

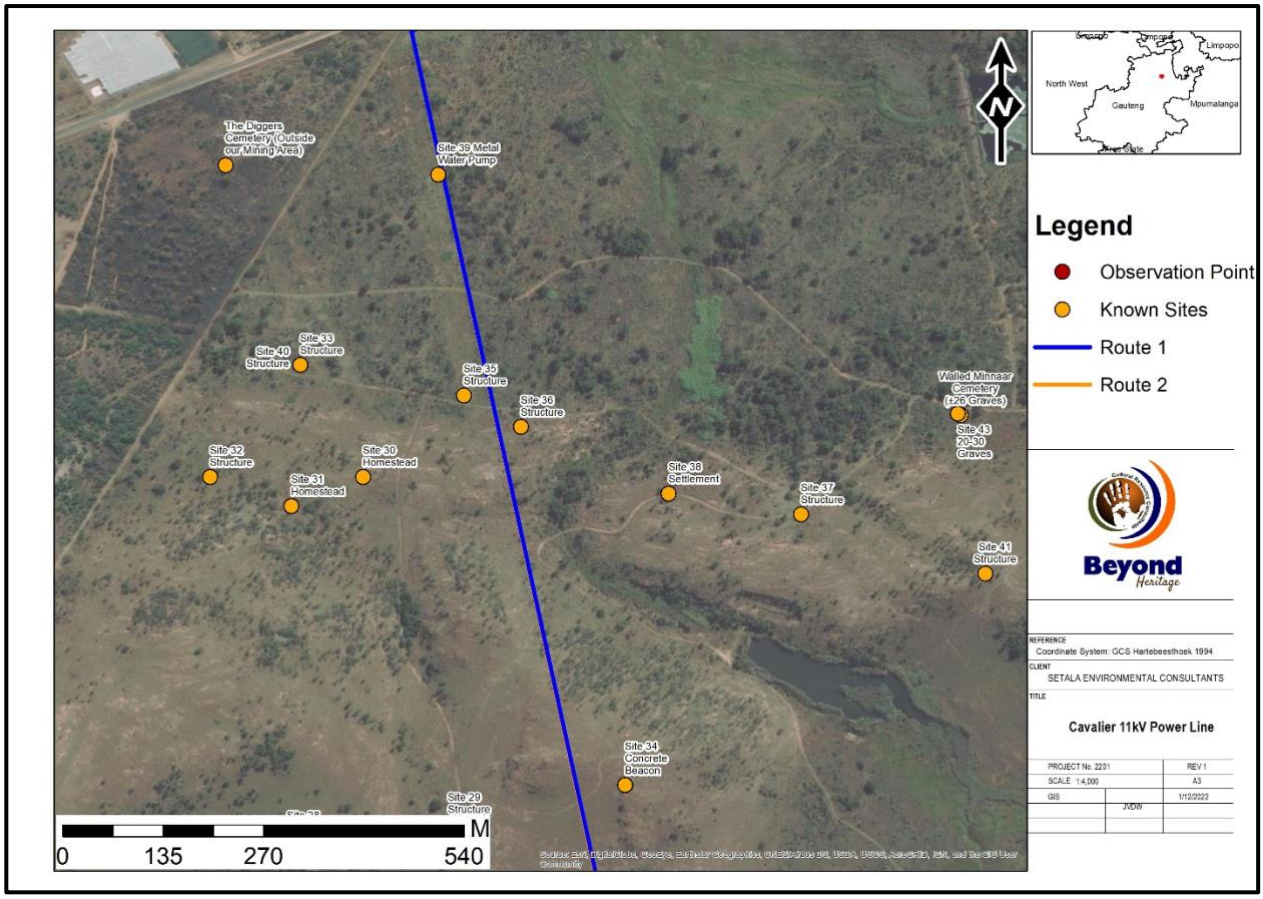

Figure 9.2. Known sites in relation to the power line. Site 35 & 36 are more than 30 meters from the centre line.

9.1.4 Impact Assessment for the Project

Table 8. Impact assessment of the proposed project.

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**18 (Low)**	**18 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA
Mitigation: • Known sites and the recorded cemetery should be indicated on development plans, demarcated where necessary during construction, and avoided; • Any changes to the proposed route must be assessed by a archaeologist; • Implementation of a chance find procedure for the project; and • Weekly monitoring of pylon excavation areas during the pre construction and construction phase by the ECO as described in section 10.6.		
Cumulative impacts: The proposed project will have a low cumulative impact as no known heritage resources will be adversely affected.		
Residual Impacts: Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

10 Conclusion and recommendations

Parts of the study area are altered by the development of roads and an existing power line while sections of the study area located in the Cullinan Game Reserve is undisturbed but characterised by dense vegetation that could result in some cultural resources not detected during the survey. This limitation can be successfully mitigated with the implementation of a chance find procedure outlined under Section 10.2.

Historical topographic maps show that the study area was part of a large historical landscape and based on the Heritage inventory of the Cullinan Diamond Mine Game Farm known sites are indicated in Figure 8.1 and 8.2. These sites include the remains of structures some of which are indicated on maps dating to 1943 (Figure 8.1). None of these sites will be impacted on and the only site of relevance to the power line development is a cemetery located more than 30 meters away from the proposed power line and no direct impacts are expected to and of the features.

The impact of the proposed project on heritage resources is low and either option is acceptable from a heritage perspective. It is therefore recommended that the project can commence on the condition that the following recommendations (Section 10) are implemented as part of the EMPr and based on approval from SAHRA:

10.1 Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the project may only proceed based on approval from SAHRA:

Recommendations:

- Known sites and the recorded cemetery should be indicated on development plans and avoided;
- Any changes to the proposed route must be assessed by an archaeologist;
- Implementation of a chance find procedure for the project (as outlined in Section 10.2); and
- Weekly monitoring of pylon excavation areas during the pre-construction and construction phase by the ECO as described in section 10.6. .

10.2 Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.

- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

10.3 Reasoned Opinion

The overall impact of the project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.4 Potential risk

Potential risks to the proposed project are the occurrence of intangible features and unrecorded cultural resources (of which graves are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation, as well as additional layout changes.

10.5 Monitoring Requirements

Ideally, site monitoring should be conducted by an experienced archaeologist or heritage specialist. Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief*: As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are the initial soil removal and subsequent earthworks during construction. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 9. Monitoring requirements for the project

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Clearing activities and construction	When pylon positions are determined and during excavations for the pylons.	ECO	Weekly (Pre construction and construction phase)	Proactively	• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist/ palaeontologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities.

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
					• Only recommence operations once impacts have been mitigated.

10.6 Management Measures for inclusion in the EMPr

Table 10. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (monitoring tool)
General project area	Implement chance find procedures in case possible heritage finds are uncovered	Pre Construction and construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
General project area	Any changes to the proposed route must be assessed by a archaeologist;	Pre Construction and construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	EAP & ECO Checklist/Report
General project area	Known sites and the recorded cemetery should be indicated on development plans, demarcated during construction, and avoided.	Pre Construction and construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
General project area	Weekly monitoring during the pre construction and construction phase by the ECO.	Pre Construction and construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under	ECO Checklist/Report

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (monitoring tool)
					Section 35, 36 and 38 of NHRA	

10.7 Knowledge Gaps

Due to the subsurface nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. Also thick grass cover hampered ground visibility and although unlikely informal graves could have been undetected during the field survey. This limitation is successfully mitigated with the implementation of a chance find procedure.

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