Appendix G.8 Heritage Assessment

HERITAGE IMPACT ASSESSMENT:
PROPOSED IGOLIDE WEF 132KV GRID CONNECTION, POTSHEFSTROOM MAGISTERIAL DISTRICT, GAUTENG PROVINCE

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)

SAHRA Case ID: 22864

Report for:

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On behalf of:

ENERTRAG South Africa (Pty) Ltd

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1st draft: 06 May 2024
Final report: 01 June 2024

SUMMARY

ASHA Consulting (Pty) Ltd was appointed by WSP Group Africa (Pty) Ltd to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction of a powerline to link the proposed Igolide Wind Energy Facilty (WEF) to the East Drie Five Substation located approximately 3 km north of the WEF. The project is some 4 km to 6 km north of Fochville and has southern and northern end points at:

- S26° 26’ 32.5” E27° 30’ 51.6” (at the facility substation); and
- S26° 26’ 06.6” E27° 30’ 15.5” (at the East Drie Five Substation).

It is noted that the applicant is seeking authorisation for a corridor such that the final alignment can be designed during the planning phase to avoid all known sensitive areas at the time. This approach is supported from a heritage point of view.

The area is characterised by grassy hills with rocky outcrops occurring in the north. The proposed corridor slopes uphill from the facility substation site in the south towards the mine located at its northern end. Vegetation cover is fairly dense throughout with grass over most of the land but some small areas of forest/bush in places.

The survey revealed a number of stone-walled sites. Most are likely to be from the Late Iron Age and include settlements with circular enclosures and three elongated stone walls. Some small historical stone ruins were also found but are severely degraded and not likely to be very old. The cultural landscape is also a heritage resource but the presence of gold mines and powerlines in the landscape means that an industrial layer already occurs, and the new proposed powerline is not incompatible with the existing landscape.

It is recommended that the proposed powerline be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- The final alignment of the powerline and service track must be evaluated by an archaeologist relative to the known heritage sites in the area. The results of this evaluation must be reported to SAHRA with any required mitigation actions noted;
- The powerline should preferably avoid the steep slope in the northeast with the ridge immediately to its west being favoured for use;
- No stones may be removed from any archaeological sites;
- The Fossil Chance Finds Procedure must be included in the project EMPr;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Glossary

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Holocene: The geological period spanning the last approximately 10-12 000 years.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Iron Age: Period post-dating about AD 200 and occurring in Eastern South Africa and featuring farming communities who practised iron smelting. It is split into the Early Iron Age (AD 200 to AD 900), the Middle Iron Age (AD 900 to AD 1300) and the Late Iron Age (AD 1300 to AD 1840.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Pleistocene: The geological period beginning approximately 2.5 million years ago and preceding the Holocene.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

EAP: Environmental Assessment Practitioner

ECO: Environmental Control Officer

EGI: Electricity Grid Infrastructure

EMPr: Environmental Management Program

ESA: Early Stone Age

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

HV: High Voltage

LSA: Later Stone Age

MSA: Middle Stone Age

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25 of 1999)

PHRA: Provincial Heritage Resources Authority

PPP: Public Participation Process

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

Contents

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by WSP Group Africa (Pty) Ltd to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction of a powerline to link the proposed Igolide Wind Energy Facility (WEF) to the East Drie Five Substation located approximately 3 km north of the WEF. The entire extent of the Project is located within the Central Corridor of the Strategic Transmission Corridors. The project is some 4 km to 6 km north of Fochville and has southern and northern end points at:

- S26° 26' 32.5" E27° 30' 51.6" (at the facility substation); and
- S26° 26' 06.6" E27° 30' 15.5" (at the East Drie Five Substation).

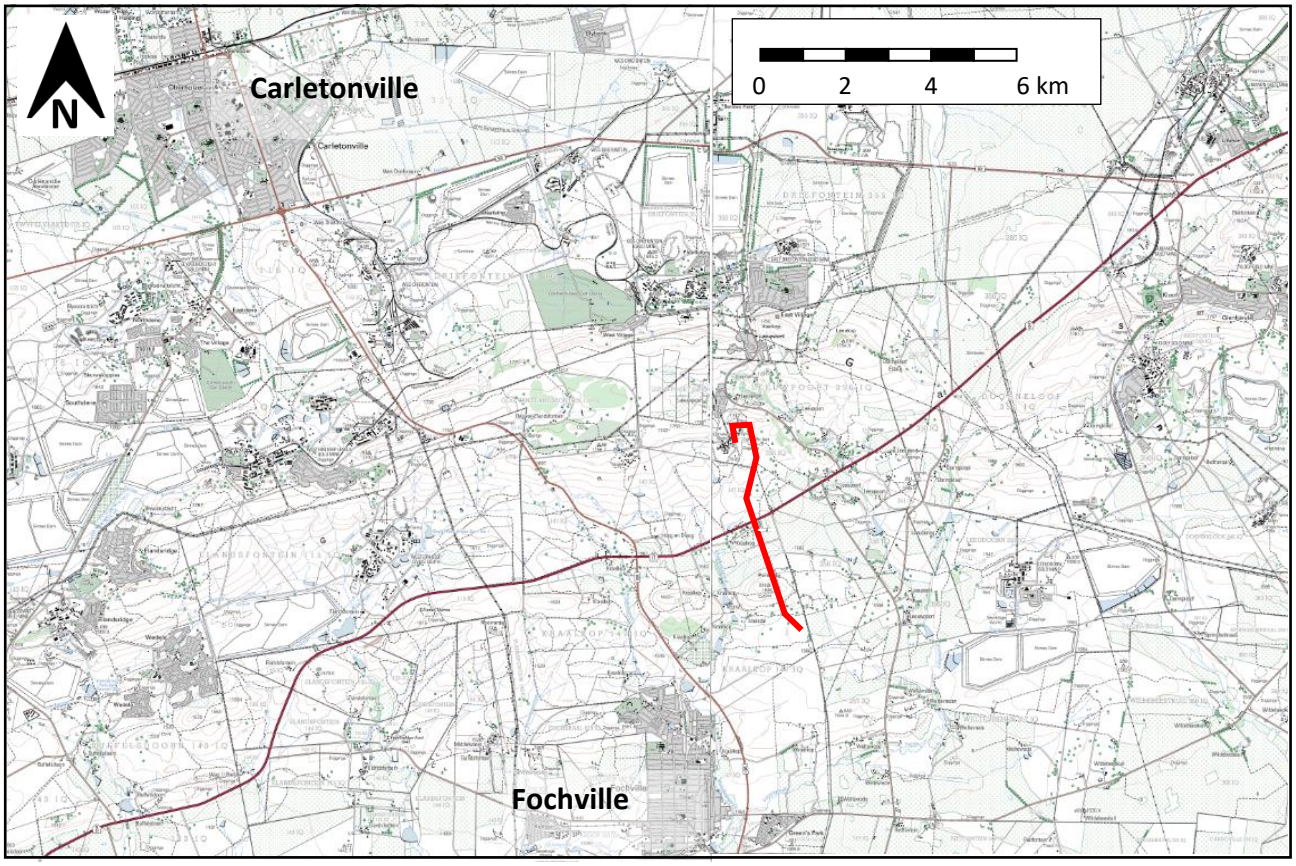


Figure 1: *Extract from 1:50 000 topographic mapsheets 2627AD & 2627BC (dated 2010) showing the location of the powerline (red line). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

The project would be located on the following farm portions:

- Portion 20 of Kraalkop 147 IQ
- Portion 31 of Kraalkop 147 IQ
- Portion 45 of Kraalkop 147 IQ
- Porton 46 of Kraalkop 147 IQ
- Portion 53 of Kraalkop 147 IQ
- Portion 68 of Kraalkop 147 IQ
- Portion 11 of Leeuwpoort 356 IQ
- Portion 77 of Leeuwpoort 356 IQ

1.1. The proposed project

1.1.1. Project description

ENERTRAG South Africa (Pty) Ltd is proposing to develop a 132kV switching station, a 132kV single or double circuit powerline, and termination point upgrades (as may be necessary), including possible expansion, to allow for the proposed new 132kV powerline connection (hereafter the "Project"). The Project is intended to feed the electricity generated by the approved 100MW Igolide WEF (DFFE reference number: 14/12/16/3/3/2/2385), EA dated 31 January 2024) to the national energy grid, with the point of connection being the existing East Drie Five Substation. The project includes the following components (see also Table 1 & Figure 2):

- Construction of 1 x 132kV powerline (either single or double circuit). A corridor of up to 250m in width (125m on either side of the centre line) has been identified for the placement of the up to 132kV single or double circuit power line to allow flexibility in the design of the final powerline route, and for the avoidance of sensitive environmental features (where possible).
- Construction of 1 x 132kV switching station. The switching station assessment site is ~2.5ha as the switching station will be located adjacent to the approved 33/132kV on-site IPP substation (DFFE reference number: 14/12/16/3/3/2/2385), EA dated 31 January 2024) which was assessed as part of the Igolide WEF Environmental Authorisation process. A 500m buffer around the switching station has been identified to ensure flexibility in routing the powerline. The switching station will include, but is not limited to:
    - A high voltage substation yard to allow for multiple 132kV feeder bays.
    - Standard substation electrical equipment, including but not limited to, busbars, office area, operation and control room, workshop and storage area, feeder bays, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be required.
    - Control building, telecommunication infrastructure, oil dam(s), etc.
    - Workshop and office area within the switching station footprint.
    - Fencing around the switching station.
    - All the access road infrastructure to and within the switching station.
    - Associated infrastructure, including but not limited to, lighting, fencing, and buildings required for operation (ablutions, office, workshop and control room, security fencing and gating, parking area, concrete batching plant (if required), waste storage/disposal and storerooms).
- Upgrading of the East Drie Five Substation to accommodate the powerline from the Igolide WEF (feeder bay and transformer upgrade), including expansion within the yard, where required, with a footprint of up to 4ha. Standard substation infrastructure will include: operation and control room, transformer oil dam, and standard substation electrical equipment (feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave/line trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be required).

Table 1: *Technical details of the proposed project.*

Facility Name:	Igolide WEF Electrical Grid Infrastructure
Applicant:	ENERTRAG South Africa (Pty) Ltd
Municipalities:	Merafong City Local Municipality in the Gauteng Province of South Africa
132kV powerline (single or double circuit):	- Single or double circuit 132kV between the proposed switching station and the existing East Drie Five Substation. The powerline design may include: o Intermediate self-supporting monopole; o Inline or angle-strain self-supporting monopole; o Suspension self-supporting monopole; o Triple pole structure; o Steel lattice structure; or o Similar powerline design at 132kV specification. - The above designs may require anchors with guy-wires or be anchorless. For up to 132kV structures, concrete foundation sizes may vary depending on design type up to 80m^2, with depths reaching up to 3.5m typically in a rectangular 'pad' shape. - A working area of approximately 100m x 100m is needed for each of the proposed structures to be constructed. - Gridline length: approximately 4km - Height of powerline: up to 40m - Width of gridline servitude: 32m A 250m wide corridor (125m on either side of the centre line) has been identified for the assessment and micro-siting of the powerline to avoid sensitivities and ensure technical feasibility.
Switching Station:	- Development footprint (permanent infrastructure area): approximately 2.5ha as the switching station will be located adjacent to the approved 33/132kV on-site IPP substation (DFFE reference number: 14/12/16/3/3/2/2385), EA dated 31 January 2024) which is being assessed as part of the Igolide WEF Environmental Authorisation process. - Capacity: 132kV - Standard substation electrical equipment, including, but not limited to, busbars, control building, telecommunication infrastructure, office area, operation and control room, workshop and storage area, feeder bays, stringer strain breams, insulators, arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be required. - Associated infrastructure, including, but not limited to, lighting, fencing (~2m high), gating, parking area, and buildings required for operation (ablutions, office, workshop and control room, concrete batching plant (if required), waste storage/disposal and storerooms).
Termination point upgrades:	Upgrades to the existing East Drie Five Substation will also be required, including possible expansion within the yard, where required, with a footprint of up to 4ha. This includes the installation of additional feeders bays to accommodate the power being evacuated from the proposed Igolide WEF and transformer upgrades.
Access roads:	- During construction, a permanent access road along the length of the powerline corridor, between 4 – 6m wide will be established to allow for large crane movement. This track will then be utilised for maintenance during operation.

	- Permanent access roads to and within the substation, up to 8m wide, will be established.

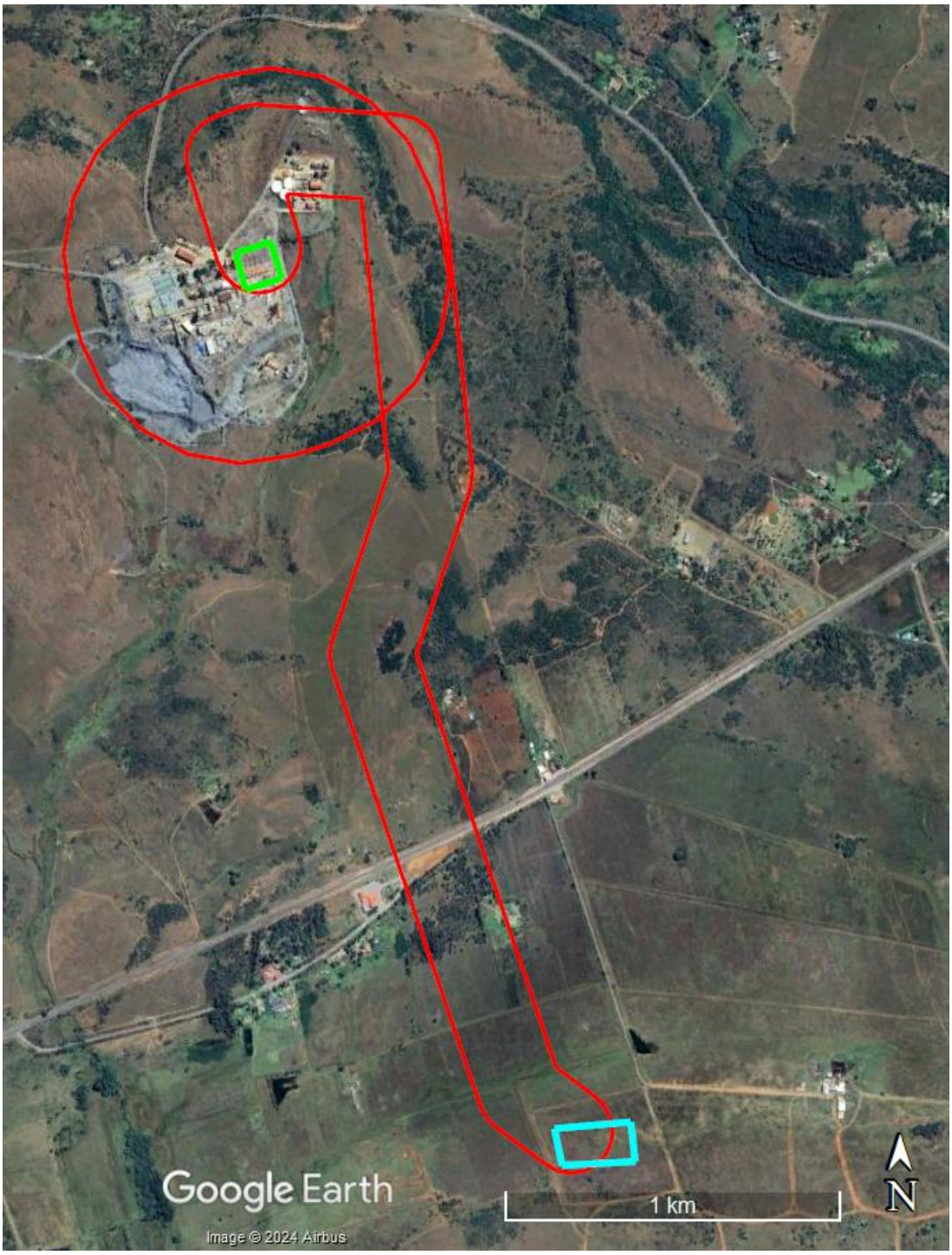


Figure 2: *Aerial view of the study area (red polygons) showing the proposed on-site substation (turquoise polygon) and the existing east Drie Five Substation (green poygon).*

1.1.2. Identification of alternatives

No alternatives are currently being considered. A different and longer alignment running towards the northeast of the WEF site was previously considered but is no longer feasible due to land access concerns.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was asked to:

- Describe regional and local features of the receiving environment;
- Conduct desktop research;
- Conduct a field survey to search for sensitive areas and sites of heritage significance;
- Map sensitive features and provide spatial data to inform the final project layout;
- Assess the potential impacts on identified heritage resources within a Heritage Impact Assessment (HIA) report that complied with the requirements of both the NHRA and Appendix 6 of the NEMA EIA regulations;
- Identify relevant legislation and legal requirements; and
- Provide recommendations on possible mitigation measures and management guidelines.

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue negative impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the National Department of Forestry, Fisheries and the Environment (DFFE) who will review the Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

2.1. National Heritage Resources Act (NHRA) No. 25 of 1999

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: "any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith";
- Palaeontological material: "any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace";
- Archaeological material: a) "material remains resulting from human activity which 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"; b) "rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation"; c) "wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation"; and d) "features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found";
- Grave: "means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place"; and
- Public monuments and memorials: "all monuments and memorials a) "erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government"; or b) "which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual."

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

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

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

2.2. Approvals and permits

2.2.1. Assessment Phase

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BA. The present report provides the heritage component. The Development Applications Unit of the South African Heritage Resources Agency (SAHRA) is required to provide comment on the proposed project in order to facilitate final decision-making by the DFFE.

2.2.2. Construction Phase

If archaeological or palaeontological mitigation is required prior to construction, then the appointed archaeologist or palaeontologist would need to obtain a permit from SAHRA. This would be issued in their name. This is so that the heritage authority can ensure that the appointed practitioner has proposed an appropriate methodology that will result in the mitigation being undertaken properly. A built environment permit, if required, would need to be obtained from the Provincial Heritage Resources Authority (PHRA).

2.3. Guidelines

SAHRA have issued minimum standards documents for archaeological and palaeontological specialist studies. There is also a Western Cape Provincial guideline for heritage specialists working in an EIA context and which is generally useful. The reporting has been prepared in accordance with these guidelines. The relevant documents are as follows:

- SAHRA. 2007. Minimum Standards: archaeological and palaeontological components of impact assessment reports. Document produced by the South African Heritage Resources Agency, May 2007.
- Winter, S. & Baumann, N. 2005. Guideline for involving heritage specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 E. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 1 with relevant dates of each source referenced in the text as needed. Data were also collected via a field survey. The data quality is suitable for the purpose of informing this report.

Table 1: *Information sources used in this assessment.*

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.

Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.
Screening Tool maps	DFFE	Current	Spatial	Potential sensitivity of the study area

3.2. Field survey

The site was subjected to a detailed foot survey on 15 April 2024 by Dr Jayson Orton and Joseph Matembo. Note that, with the exception of visiting a historical structure, the southern part of the study area (south of the N12) was not surveyed as historical aerial photography showed that it has all be cultivated at some time in the past. This was during autumn and the grass cover was fairly dense, which negatively affected the archaeological survey. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Garmin Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 3). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that the amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

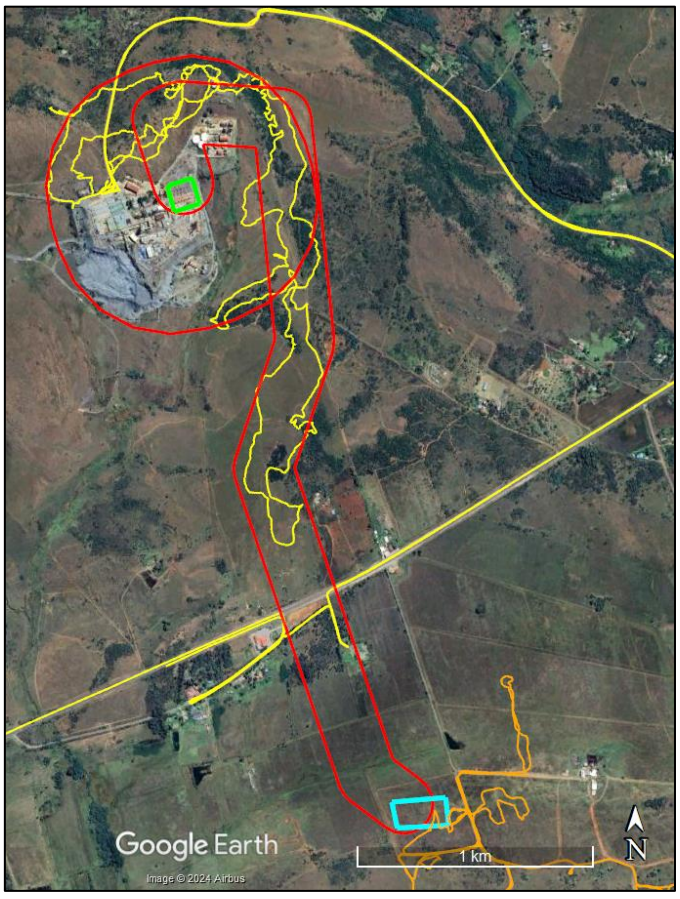


Figure 3: *Aerial view of the study area (key as per Figure 2) showing the survey tracks (orange lines = 2023, yellow lines = 2024).*

3.3. Specialist studies

A palaeontological specialist study is being compiled by Prof. Marion Bamford.

3.4. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a methodology supplied by WSP.

3.5. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system[1] for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

3.6. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

3.7. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Due to the extensive grass cover which inhibited study of the substrate, the survey attempted to (1) identify all obvious heritage resources, (2) focus on areas where heritage was most likely to occur, and (3) determine the relationship between heritage resources and landscape features. It is assumed that the findings would be indicative of the overall pattern on the landscape. It is assumed that the information provided for the assessment is an accurate reflection of the development proposal.

[1] The system is intended for use on archaeological and palaeontological sites only.

Cumulative impacts are difficult to assess due to the variable site conditions that would have been experienced in different areas and in different seasons. Survey quality is thus likely to be variable. As such, some assumptions need to be made in terms of what and how much heritage might be impacted by other developments in the broader area.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The study area corridor runs through a landscape with various uses. Dominant among these are agriculture which occupies the largest area and mining which, although occupying a smaller area, tends to be highly visible. A mine occurs at the northern end of the corridor. It has a substation and linking powerlines. The N12 freeway crosses the southern part of the corridor.

4.2. Site description

The corridor is lowest in the south where the land is flatter and has been ploughed in the past. Vegetation consists of grass and exotic trees. North of the N12 the land slopes uphill towards the north. Groves of trees occur within an otherwise grassland context. In the far north, where the mine lies, the land is steeper and rock outcrops occur. A fairly steep ridge occurs in the north-eastern part of the study area and is well coated with bush.

Figure 4: *Looking south through the southern part of the corridor, south of the N12.*

Figure 5: *Looking south through the southern part of the corridor, south of the N12.*

Figure 6: *Looking south from just north of the N12 which lies just in front of the trees (note white car in mid-picture).*

Figure 7: *Looking north from just north of the N12. The mine is visible at the top of the hill.*

Figure 8: *Looking northeast in the central part of the corridor.*

Figure 9: *Looking south in the central part of the corridor.*

Figure 10: *Looking west across the corridor towards the southern end of the mine.*

Figure 11: *Looking west from the north-eastern corner of the study area sowing the steep bushy slope leading towards the mine at the top of the hill.*

Figure 12: *Looking south and showing the nature of the steep slope in the north of the corridor.*

Figure 13: *Looking west across the northern part of the study area to the north of the mine.*

Figure 14: *Looking south in the northern part of the study area towards the East Drie Five Substation to which the proposed powerline would connect.*

5. FINDINGS OF THE HERITAGE STUDY

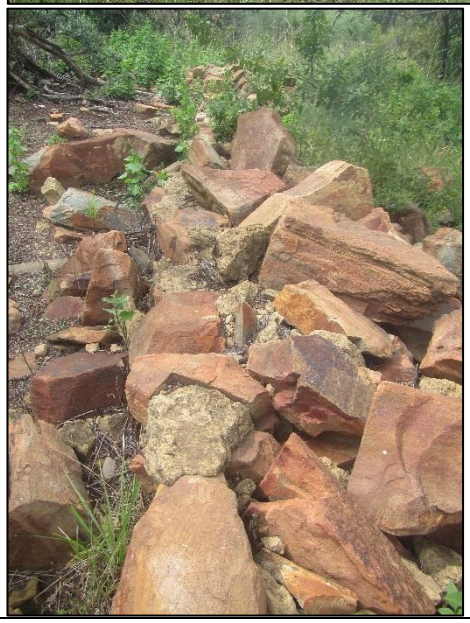
This section describes the heritage resources recorded in the study area during the course of the project. A full list is found in Table 2, they are mapped in Figures 15 to 20, and a brief discussion of the different types of heritage follows.

Table 2: *List of finds from the heritage survey.*

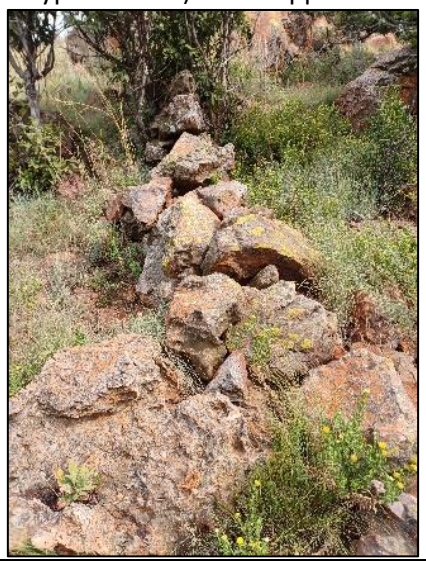
Waypoint	Location	Description	Significance Grade
4304	S26 26 09.4 E27 30 43.4	House that predates 1938. It is likely not much older than that and has no special heritage qualities. 	Low ---
4305	S26 24 53.7 E27 30 26.8	This is a Late Iron Age stone-walled settlement measuring about 30 m by 90 m and located in a heavily overgrown area at the foot of a steep slope which rises to its west. Due to the very dense bush, it was not possible to determine the extent of the site towards the base of the slope to the west and towards the south. Walling was seen over an area of about 30 m by 90 m though. 	Medium GPA
4306	S26 24 53.4 E27 30 26.5		
4307	S26 24 53.1 E27 30 27.1		
4308	S26 24 52.2 E27 30 26.8		
4309	S26 24 52.2 E27 30 26.0		
4313	S26 24 54.1 E27 30 27.1		

4315	S26 24 54.6 E27 30 27.4		
4310	S26 24 52.8 E27 30 27.3	These points all lie along a stone wall. An adjacent footpath cuts through the wall at one point. The wall is clearly packed (though still quite informally) rather than being rocks pushed to the side to make space for the path. It is approximately 140 m long and extends along the eastern side of the Iron Age settlement. It is unknown whether it is related to the settlement since the wall does not reach as far north as the settlement and also extends further south than the visible enclosures.	Low GPB
4311	S26 24 53.0 E27 30 27.7		
4312	S26 24 53.4 E27 30 27.9		
4314	S26 24 54.4 E27 30 28.0		
4316	S26 24 55.1 E27 30 28.0		
4317	S26 24 55.7 E27 30 28.4		
4318	S26 24 56.3 E27 30 28.7		
4319	S26 24 56.9 E27 30 29.1		
4321	S26 24 59.2 E27 30 30.4	This is a stone-walled enclosure measuring about 3 m by 8 m. It is built on the side of a rocky area 150 m south of the Late Iron Age settlement described above and 75 m south of the long stone wall. Whether it is related to those features is unknown. The walling is about 0.5 m high and no associated artefacts were seen. It is assumed to date to the Late Iron Age. 	Low GPB

4322	S26 25 15.8 E27 30 30.9	A stone wall similar to that described above. It is about 100 m long and runs across a grassy area towards, and then along, the base of a rock outcrop.  	Low GPB
4323	S26 25 15.5 E27 30 30.0		
4324	S26 25 15.5 E27 30 29.4		
4325	S26 25 16.3 E27 30 31.3		
4326	S26 25 17.0 E27 30 31.8		
4327	S26 25 17.4 E27 30 31.9		
4328	S26 25 38.1 E27 30 32.7	This is a Late Iron Age settlement measuring about 120 m by 150 m and located against the south-eastern side of a rock outcrop. There are many enclosures but only a small area was examined. Much of it was heavily overgrown with bush. The full extent of the site was mapped from modern and historical aerial photography. 	Medium GPA
4329	S26 25 37.7 E27 30 33.2		
4330	S26 25 38.1 E27 30 33.1		
4331	S26 25 38.6 E27 30 33.2		
4332	S26 25 38.5 E27 30 33.7		
4333	S26 25 38.5 E27 30 34.1		
4334	S26 25 38.1 E27 30 34.3		
4335	S26 25 38.1 E27 30 35.0		
4336	S26 25 38.1 E27 30 35.7		
4337	S26 25 39.0 E27 30 35.9		
4338	S26 25 39.2 E27 30 35.6		

4339 4340 4341	S26 25 39.2 E27 30 34.8 S26 25 39.4 E27 30 34.5 S26 25 39.8 E27 30 34.9		
4342	S26 25 28.0 E27 30 32.6	This site is the collapsed remains of a small stone and cement house measuring about 4 m by 7 m. The cement is a weak mix and must be of 20th century age. No details besides floor size could be determined. The feature is not visible on the 1938 aerial photography but was likely too small to show up.  	Very low GPC

4343	S26 25 26.4 E27 30 32.2	This is the collapsed remains of a small stone and cement structure measuring about 2 m by 2 m. It is 20th century in age. Some modern glass and plastic debris was present in the area. The feature is not visible on the 1938 aerial photography but was likely too small to show up. 	Very low GPC
4344	S26 25 26.5 E27 30 31.9	This is a pile of stones located about 6 m west of waypoint 4343. There is no cement so it is not a collapsed structure. 	Very low GPC
4345	S26°25'14.5" E27°30'30.2”	This site was not seen in the field despite having walked along the adjacent rocky ridge within about 12 m of it. It was seen on aerial photography and identified based on the appearance of other sites. It is a single enclosure about 10 m in diameter. 	Low GPB

4346	S26°25'27.7" E27°30'11.7"	This site was not seen in the field and is located a short distance outside the study area. It was recorded from aerial photography and added here for precautionary reasons. It is a single stone-walled enclosure measuring about 21 m by 24 m. It is located 50 m northeast of waypoint 4347. 	Low GPB
4347	S26°25'29.7" E27°30'10.4"	This site was not seen in the field and is located a short distance outside the study area. It was recorded from aerial photography and added here for precautionary reasons. It is a single stone-walled enclosure measuring about 16 m by 20 m. It is located 50 m southwest of waypoint 4346. 	Low GPB
1811 1812 1813 1814 1815	S26 24 55.9 E27 29 51.6 S26 24 56.9 E27 29 59.0 S26 24 56.8 E27 29 58.2 S26 24 56.7 E27 29 56.9 S26 24 56.4 E27 29 55.9	This is a packed stone wall less than 0.5 m high. It was not recorded over its full length since the western end extended far out of the study area. However, the western extent (at waypoint 1811) was mapped from aerial photography. 	Low GPB

			
1816	S26 24 53.2 E27 30 14.0	This is a Late Iron Age settlement measuring about 30 m by 60 m near the summit of a hill. Most walling is about 0.5 m high but some extends to about 1 m. The enclosures are in various shapes and include some that are fairly square or rectangular. Some have preserved entrances.  	Medium GPA
1817	S26 24 52.8 E27 30 14.1		
1818	S26 24 52.9 E27 30 14.6		
1819	S26 24 53.2 E27 30 14.7		
1820	S26 24 53.3 E27 30 14.6		
1821	S26 24 53.7 E27 30 14.4		
1822	S26 24 53.7 E27 30 14.1		
1823	S26 24 53.5 E27 30 13.9		
1824	S26 24 53.7 E27 30 13.3		
1825	S26 24 53.7 E27 30 12.9		
1826	S26 24 53.9 E27 30 13.0		
1827	S26 24 54.1 E27 30 13.1		

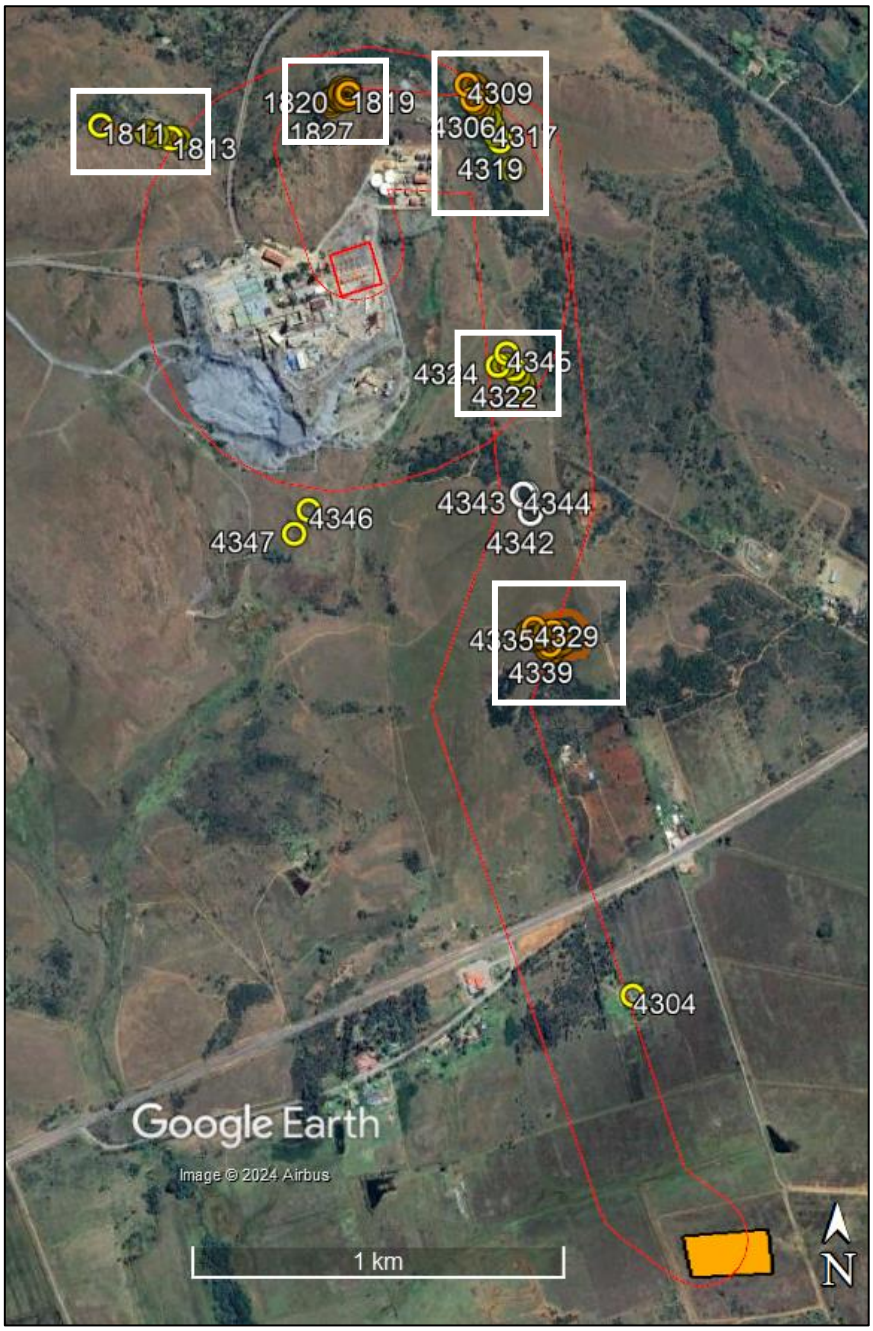


Figure 15: *Distribution of heritage resources in and around the study area. The white boxes show the locations of the enlargements in Figures 16 to 20 progressing from southeast to northwest.*

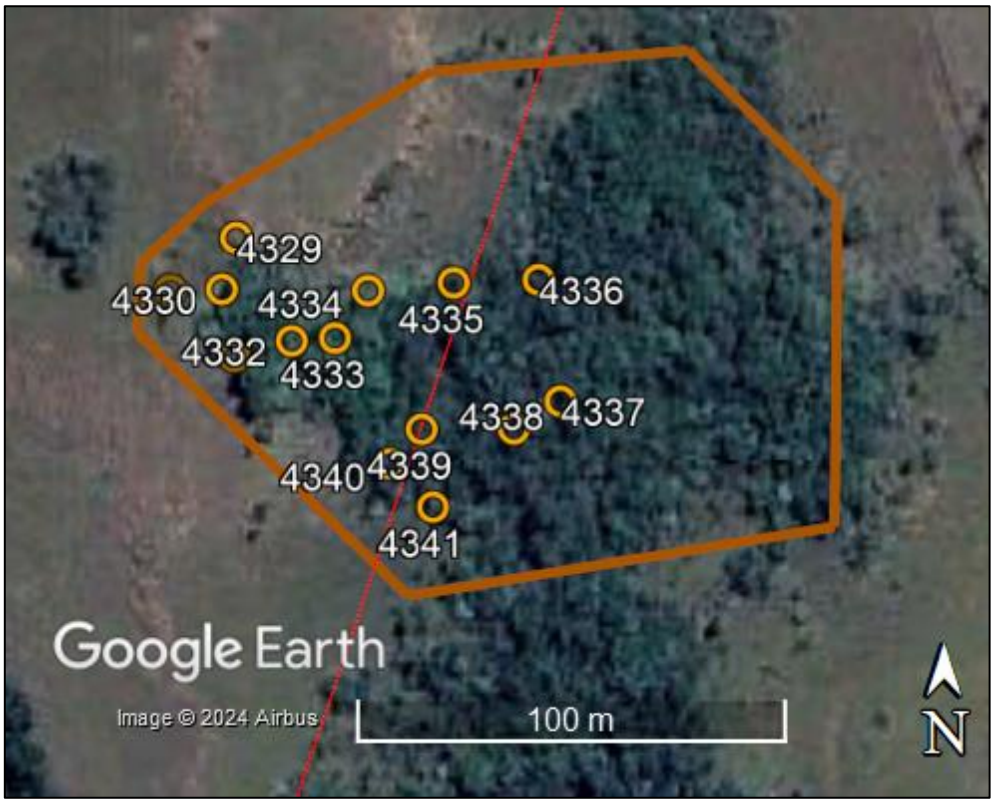


Figure 16: *Enlargement showing the LIA site at waypoints 4329 to 4341.*

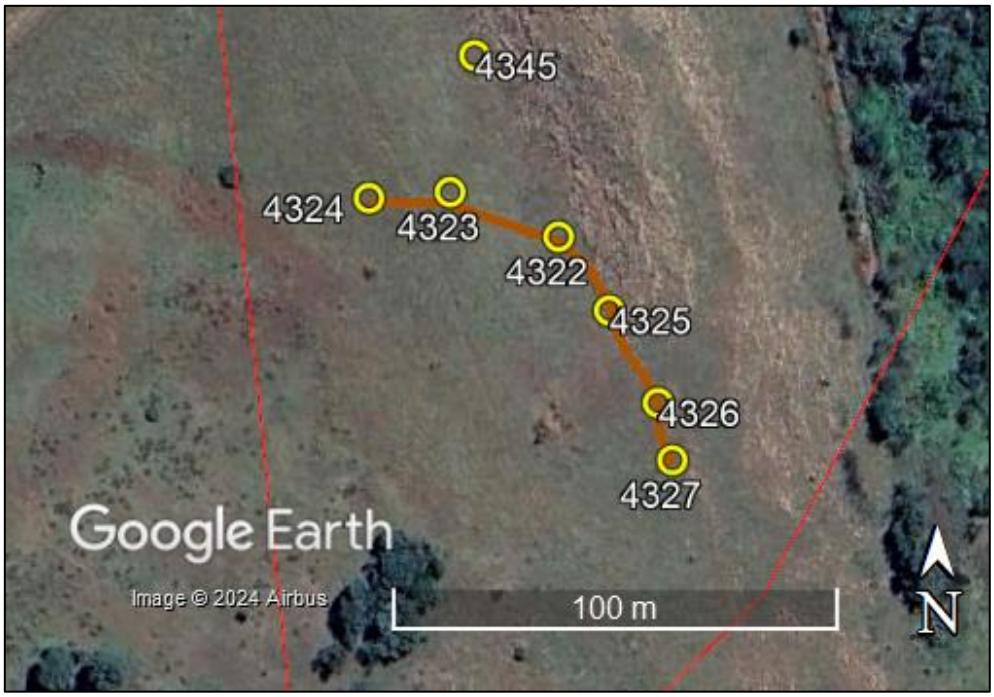


Figure 17: *Enlargement showing the stone wall at waypoints 4322 to 4327 and an isolated small site to the north at waypoint 4345.*

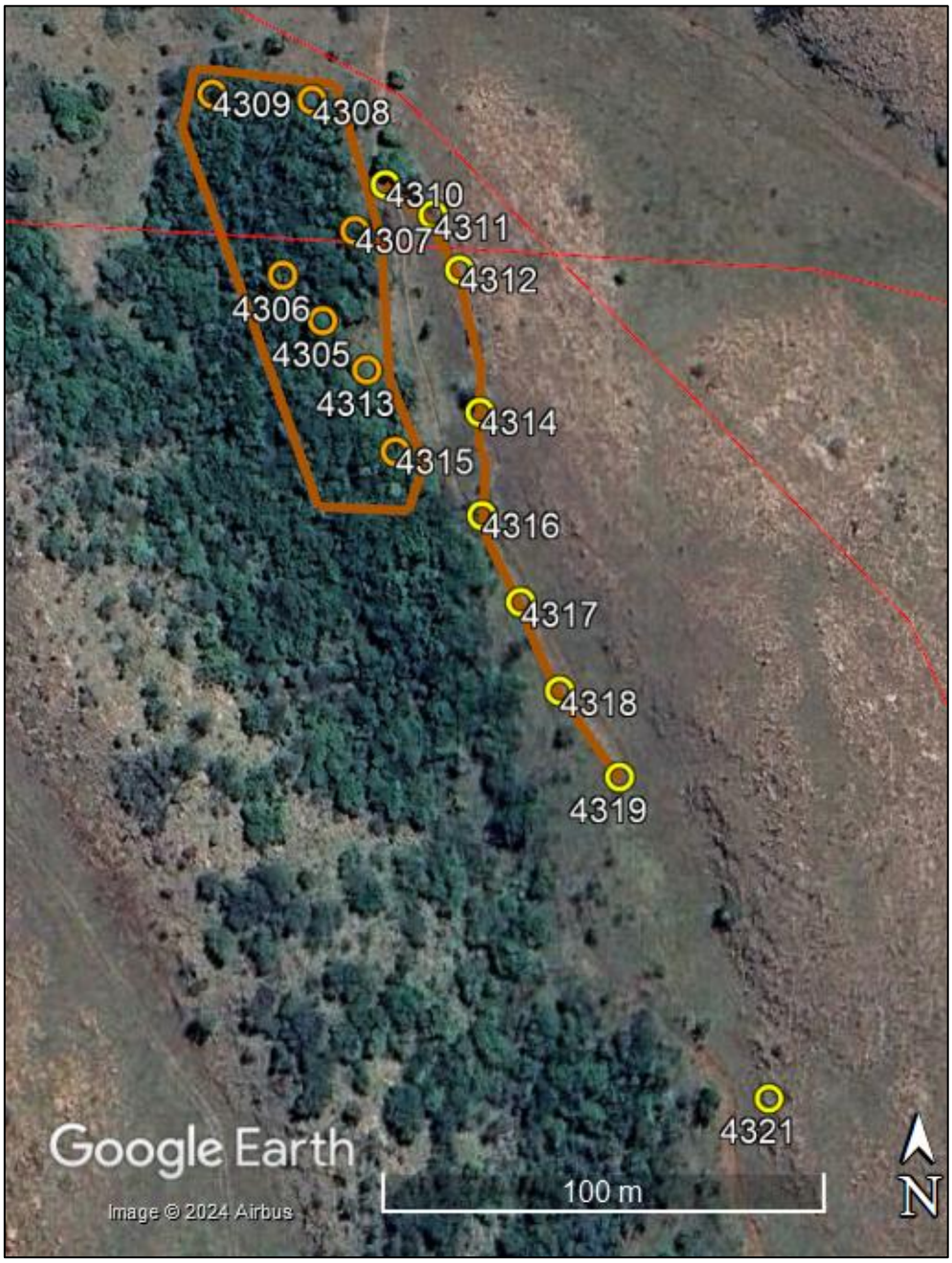


Figure 18: *Enlarhement showing the LIA site at waypoints 4305, 4306, 4308, 4309, 4613 and 4315, the stone wall at waypoints 4310-4312, 4314 and 4316-4319 and an isolated site at waypoint 4321.*

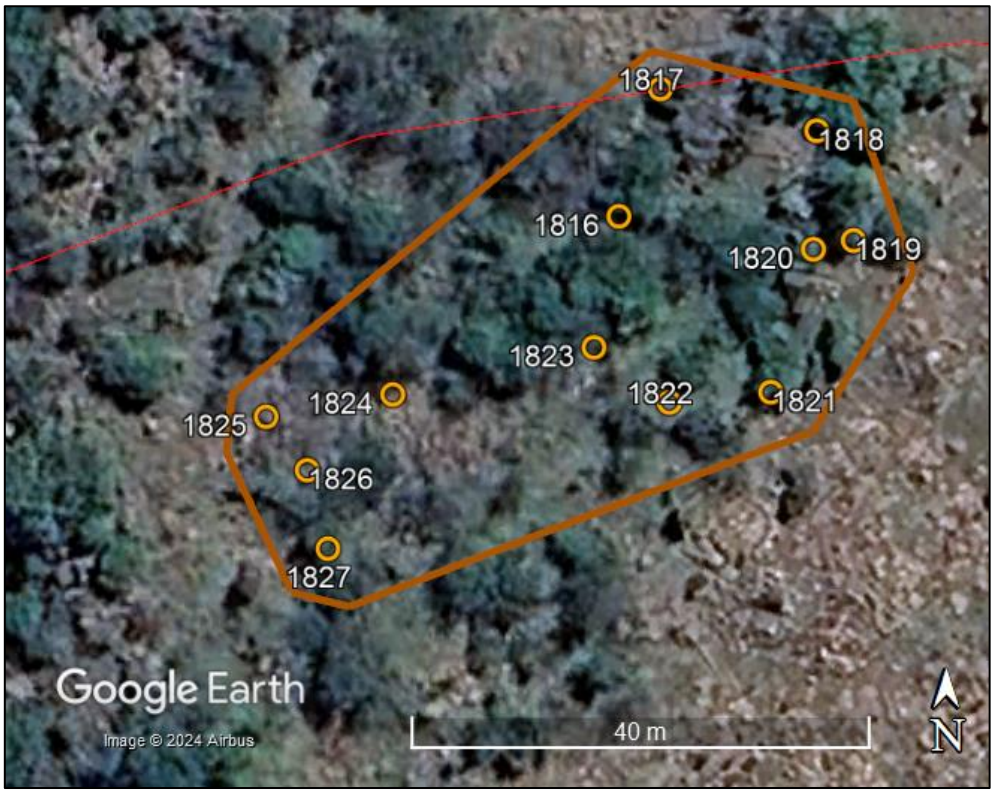


Figure 19: *Enlargement showing the LIA site at waypoints 1817 to 1827.*

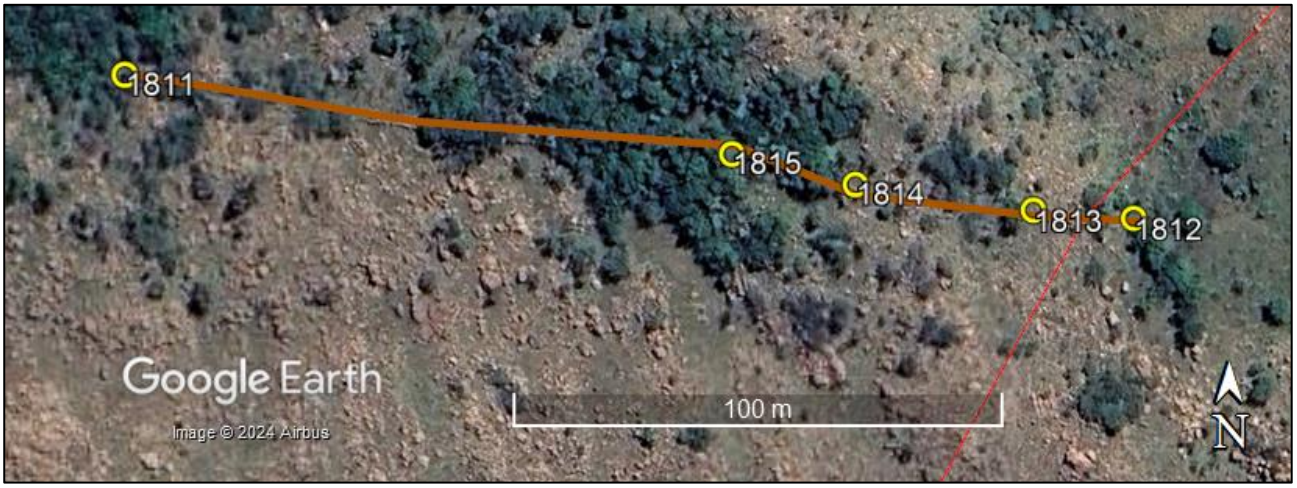


Figure 20: *Enlargement showing the stone wall at waypoints 1811 to 1815.*

5.1. Palaeontology

The SAHRIS Palaeosensitivity Map shows the site to be of high palaeontological sensitivity (Figure 21). Because of this high sensitivity, a separate palaeontological specialist study was commissioned and is submitted along with this HIA.

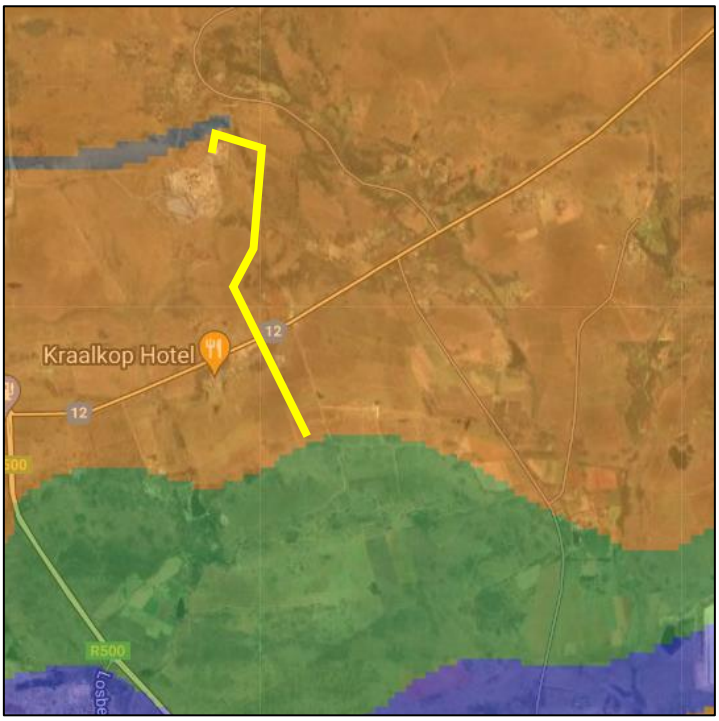


Figure 21: *Extract from the SAHRIS Palaeosensitivity Map showing the site to be of high palaeontological sensitivity (yellow shading).*

5.2. Archaeology

5.2.1. Desktop study

Sections of the wider area have been previously surveyed (Table 4) with Middle (MSA) and Later (LSA) Stone Age scatters, Iron Age sites, historic ruins, farmsteads, burial grounds, and potential British windbreaks all having been found. Other surveys in the surrounding areas found Stone Age scatters, Late Iron Age stone walled settlements, and historical ruins. The Cultural Resource Management (CRM) assessments conducted in the area and consulted for this report are listed in Table 3. A general discussion of local archaeology follows.

Table 3: *List of other CRM projects conducted in and around the present study area.*

Author	Year	Project	Findings
Huffman, T.N., van der Merwe, H.D., Steel, R.	1994	Archaeological Survey of the East and West Driefontein Mines.	MSA and LSA scatters, Iron Age stone walled complexes, historic ruins, and potential British windbreaks.
Du Piesanie, J.	2016	Environmental Impact Assessment for Sibanye Gold Limited's West Rand Tailings Retreatment Project: Heritage Impact Assessment.	LIA site, nine structures, thirteen werfs, four burial grounds.
Orton, J. & Van der Walt, J.	2023	Heritage Impact Assessment: Proposed Igolide Wind Energy Facility, near Fochville, Gauteng Province.	LIA sites, historical farmstead, cemetery, graves

Van Schalkwyk, J.A.	2014	Cultural Heritage Assessment for the Libanon 132KV Loop-In Line, Carletonville Region, Westonaria Magisterial District, Gauteng Province	No sites
Van Schalkwyk, J.A.	2017	Phase 1 Cultural Heritage Impact Assessment: the Proposed Construction of the Fochville 132Kv Power Line, Gauteng Province.	LIA stone walled settlements, homestead ruins, a large formal cemetery.
Van Schalkwyk, J.A.	2022	Phase 1 Cultural Heritage Impact Assessment: The Proposed Expansion of the Existing Kokosi Cemetery, Located West of the Town of Fochville, Gauteng Province.	No sites
Van der Walt, J.	2017	Heritage Impact Assessment for the Proposed South Deep Solar PV Project, Westeronia, Gauteng Province.	MSA scatters, ruins, demolished farm house, cattle kraal, and a grave.
Küsel, U.	2008	Cultural Heritage Resources Impact Assessment of Portion 11 of the Farm Leeuspruit 184 IQ, Fochville, North West Province	No sites
Schoeman, M.H., Barry, L., Huffman, T.N.	2004	Archaeological Reconnaissance for the Proposed New South Deep Tailings Dam. A phase- report for Metago Environmental Engineers.	ESA scatter, MSA scatter, LSA scatters, Historic stone wall, Historic homestead.

Stone Age

The region surrounding the study area lacks any significant Stone Age sites, and finds in the area are limited to low significance surface scatters of artefacts. These scatters represent the movement of early humans within the landscape but, due to their poor context, do not represent definitive occupation sites. A survey conducted to the northwest of the current project area (Huffman *et al.* 1994) found multiple MSA and LSA scatters on sandy terraces. The MSA tools were made from red ironstone and the LSA lithics were made from fine grained cherts and chalcedonies. As such, Stone Age scatters may also occur within the current project area. MSA and LSA sites are likely to be dominant since ESA finds within this region are rare. An ESA scatter was, however, identified during a survey around 15km east of the project area (Schoeman *et al.* 2004). One rock painting site was identified on a 1968 topographic map of the area. The site has not been visited and it is not known what archaeology is present.

Iron Age

Bantu-speaking people moved into Eastern and Southern Africa about 2000 years ago (Mitchell 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. 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 (EIA): Most of the first millennium AD.
» The Middle Iron Age (MIA): 10th to 13th centuries AD.
» The Late Iron Age (LSA): 14th century to colonial period.

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

Iron Age occupation in the vicinity of the study area only started during the LIA after climatic conditions became favourable in the region for LIA settlement and agricultural activities. Iron Age communities in the region are associated with Sotho and Tswana speaking people who entered and settled in the region. LIA stone-walled complexes can be found spread across the broader landscape with associated artefacts. These LIA settlements can be widely found on flat-topped ridges and hills throughout the landscape (Dreyer 2006). The hills surrounding Fochville are well known for the Tlokwe Ruins which are scattered throughout. The region surrounding the project area is known to have been inhabited by the Bakwena baMare-a-Phogole who are known to have settled south of Fochville during the LIA (Vorster 1969). Under the leadership of their chief, Kokosi, the baMare-a-Phogole are believed to have inhabited the region until the 1820s when Mzilikazi and his Matabele raided the interior of South Africa and killed and drove out many Iron Age communities (Sadr 2020). A township just west of Fochville was named Kokosi after the LIA chief. The stone walled settlements within the larger region were later classified as belonging to the Molokwane settlement type which is prevalent across this part of Gauteng (Huffman 2007).

During the mid-17th century Europeans started to settle in modern-day Cape Town. During and after the conflict caused by the Mfecane (1820-1840), during the reign of king kaSenzangakhona Zulu, known as Shaka, Dutch-speaking farmers started to migrate to the interior regions of South Africa. This period is marked by various skirmishes and battles between the local inhabitants, Dutch settlers and the British (Giliomee & Mbenga 2007).

5.2.2. Site visit

The site visit showed that LIA settlements were present in the study area. Three of them were found, one on a hill in the far north, one at the foot of the steep slope in the northeast, and another just overlapping into the eastern edge of the corridor midway along its length. These sites consisted only of stone-walled enclosures. Further details regarding potential deposit and the presence of artefacts such as pottery could not be determined due to the dense grass and generally overgrown nature of the areas in which these sites occurred. Also found were three elongated stone walls, one running west to east in the far northwest of the study area and another running north to south in the northeast of the corridor and immediately adjacent to a LIA settlement and a third which had a gentle curve was located in a grassy area in the central part of the corridor. The purpose and age of these walls is unknown, but they are probably LIA. Two isolated circular enclosures were seen on aerial photography to the west of the corridor. They were not visited.

Also found were some small historical stone ruins in the central part of the corridor. They were very poorly preserved and, due to the presence of cement on some stones and only modern rubbish, they are assumed to not be very old.

It should be noted that many more archaeological sites were located in the area at the southern end of the corridor. These have been reported on in Orton and Van der Walt (2023) and, because none are affected by the present project, these are not discussed further here. The nearest is about 120 m south of the on site substation.

5.3. Graves

No graves were seen. None are expected, although it is possible that still born children may have been buried within the Iron Age settlements. These remains would likely never be found due to their obvious fragility which would prevent preservation.

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

The Anglo-Boer War – or Second South African War – was an important aspect of local history in many parts of South Africa. In the vicinity of the present study area there were a few skirmishes. Most notably, in 1900, Boer military leader Daniel Theron was killed in action near present day Fochville. In present day Hillshaven, east of Fochville, a small battle was waged on the farm Modderfontien at the end of January 1901. Boer General Smuts defeated a small British force posted at Modderfontein. A few days later General Cunninghame arrived with his force and was unable to dislodge the Boers from their defensive position. On the 4th of February, however, he was successful, and the Boers retreated southwards (Conan Doyle 1901 in AngloBoerWar.com 2023).

Fochville was initially laid out on farms Kraalkop and Leeuspruit during World War I but was only formally proclaimed as a town on 15 November 1920. The town is named after the commander-in-Chief of the Allied Forces in France during World War I, Ferdinand Foch (Raper 2004). East Village is a mining town developed after 1968. Aerial photography shows it to have been fully developed prior to 1991.

5.4.2. Site visit

A single historical house was seen just outside the eastern edge of the corridor in the south at waypoint 4304. Although the original dwelling pre-dates 1938 (as is evident from aerial photography; Figure 22), it has been added to many times over the years (Figure 23) and has lost almost all of its heritage value. The western wall is of modern facebrick, as is the veranda, and a modern stone wall has been built at the western end of the veranda.

Figure 22: *Aerial view showing the existence of the house at waypoint 4304 in 1938.*

Figure 23: *Aerial view showing the many additions to the house at waypoint 4304.*

Other historical structures were noted from aerial photography to occur in the area but they are 280 m east (house) and 440 m west (Kraalkop Hotel) of the edge of the proposed grid corridor and will not be affected.

5.5. Cultural landscapes and scenic routes

Cultural landscapes are the product of the interactions between humans and nature in a particular area. Sauer (1925) defined them thus: "The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural area is the medium, the cultural landscape the result". Cultural landscapes are thus areas containing multiple 'sites' and which have been shaped by the interaction of natural processes and anthropogenic activities such as construction and agriculture. Scenic routes are well-travelled roads that pass through natural or cultural landscapes with aesthetic value and that often have iconic or visually attractive views.

The landscape has several different land uses. The land use at the southern end of the corridor is agriculture and livestock/game grazing, while the remaining land further north may be used for occasional grazing but this was not obviously the case at the time of the site inspection. This land is, nonetheless, rural in character. The other main land use is the mine in the north which provides an industrial layer to the landscape. Other gold mines as well as the towns of Fochville (to the south) and East Village (to the north) also occur within a few kilometers of the corridor. Existing high voltage (HV) powerlines occur in the area as does the substation to which the project would connect. These other land uses alter the overall sense of place of the rural environment.

Historical aerial photography from 1938 shows that the amount of ploughed land has remained fairly consistent with the land north of the N12 generally having never been ploughed aside from a small area just east of the corridor. Several farmsteads and/or buildings were present in 1938, as was the N12 (although following a different alignment past the Kraalkop Hotel to the west of the corridor). The various gold mines and associated slimes dams scattered around the wider area have appeared in more recent decades, adding an industrial layer to the landscape. These observations

show a continually evolving cultural landscape with modern industrial uses (i.e. mining) becoming visually prominent on the landscape.

Another aspect of the cultural landscape is the older Iron Age landscape. This is an archaeological feature and relates to the very large number of Iron Age sites that occur in the wider area.

5.6. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources are deemed to have up to medium cultural significance at the local level for their scientific value and can be graded up to GPA.

The historical house is heavily altered and is of very low cultural significance for its historical, social and architectural values.

The cultural landscape is largely a rural landscape but with pockets of industrialisation (mines) and development (Fochville and East Village). It does still retain aesthetic value but is not an uncommon landscape type and has been compromised by industrialisation. It is thus of low cultural significance.

The heritage resources are mapped relative to the proposed corridor in Figures 15 to 20. The final alignment of the proposed powerline is not yet known so this cannot be shown relative to the identified heritage resources.

6. ASSESSMENT OF IMPACTS

The impacts identified for this project are:

- *Construction phase:*
  - Impacts to palaeontology
  - Impacts to archaeology
  - Impacts to the cultural landscape
- *Operation phase:*
  - Impacts to the cultural landscape
- *Decommissioning phase:*
  - Impacts to the cultural landscape

While palaeontological heritage is assessed in the separate specialist study and, all the other impacts are considered here. Impacts to graves and built heritage resources are not expected to occur.

6.1. Construction Phase

6.1.1. Impacts to archaeological resources

Direct negative impacts to archaeological resources could occur during the construction phase when construction equipment is brought onto the site and grubbing and excavations begin. It is probable that some impacts could occur, but without knowing the final alignment this cannot be confirmed. Impact significance would likely be **moderate negative** because powerlines tend to not have a large footprint on the ground (Table 5). Mitigation in this instance would entail paying careful attention to the locations of archaeological sites and ensuring, when siting the final alignment within the proposed corridor, that all archaeological sites are avoided by both the pylons and the service track. In this way, it is anticipated that the impact significance could be reduced to **low negative** after mitigation.

There are no fatal flaws in terms of construction phase impacts to archaeology.

6.1.2. Impacts to the cultural landscape

Note that the archaeological Iron Age landscape is considered under archaeology and this section relates to other aspects of the landscape and land use. Direct negative impacts to the cultural landscape would occur during the construction phase when construction equipment arrives on site and the work gets underway. The impact is largely a visual one and relates to the presence of incompatible equipment and activity in the landscape. However, because of the existing industrial layer (mining and existing electrical infrastructure), the impact significance is only expected to be **moderate negative** (Table 5). It is impossible to hide the activity and powerline, so the only mitigation measures are to ensure that the construction duration is kept as short as possible and that no service track is built up the steep slope to the northeast of the mine. This will slightly decrease the magnitude and the resulting significance after mitigation will be **low negative**.

There are no fatal flaws in terms of construction phase impacts to the cultural landscape.

6.2. Operation Phase

6.2.1. Impacts to the cultural landscape

Direct negative impacts to the cultural landscape would occur during the operation phase due to the presence of the powerline in the landscape. The significance calculates to **moderate negative** (Table 5), but this is due to the certainty with which the impact will occur. In reality, this is probably an inflated assessment. There are no mitigation measures that can be applied to hide a powerline, so the post-mitigation impact significance remains **moderate negative**.

There are no fatal flaws in terms of operation phase impacts to the cultural landscape.

6.3. Decommissioning Phase

Decommissioning phase impacts are essentially the same as those for the construction phase but the activities on site would occur in the reverse order. Again, before mitigation the significance is expected to be **moderate negative** (Table 5). Mitigation would entail keeping the decommissioning duration as short as possible and ensuring effective rehabilitation of all areas afterwards. This reduces the significance to **low negative**.

Table 5: *Assessment of impacts.*

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D) x	P=	S	Rating
Impact 1:	Archaeology	Damage to or destruction of archaeological resources	Construction	Negative	moderate	3	2	5	5	3	**45**	**N3**	1	1	5	5	1	**12**	**N1**
					Significance	**N3 - Moderate**							**N1 - Very Low**						
Impact 2:	Cultural landscape	Visual intrusion into the cultural landscape	Construction	Negative	Low	2	2	1	2	5	**35**	**N3**	1	2	1	2	5	**30**	**N2**
					Significance	**N3 - Moderate**							**N2 - Low**						
Impact 3:	Cultural landscape	Visual intrusion into the cultural landscape	Operation	Negative	Low	1	2	1	4	5	**40**	**N3**	1	2	1	4	5	**40**	**N3**
					Significance	**N3 - Moderate**							**N3 - Moderate**						
Impact 4:	Cultural landscape	Visual intrusion into the cultural landscape	Decommis-sioning	Negative	Low	2	2	1	2	5	**35**	**N3**	1	2	1	2	5	**30**	**N2**
					Significance	**N3 - Moderate**							**N2 - Low**						

6.4. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible negative** significance. The cultural landscape is difficult to assess for existing impacts because it is constantly evolving and changing through the addition of new layers. In this instance the rural landscape is dominant spatially and has been degraded by the presence of mining infrastructure in the area. The significance of these impacts on the site is considered to be **low negative**.

6.5. Cumulative impacts

In relation to an activity, cumulative impact "means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities" (NEMA EIA Reg GN R982 of 2014).

The main driver of impacts in the wider area is undoubtedly mining. However, many mines have been present for a number of decades and their impacts are not known. It is likely that Iron Age settlement and historical sites (largely farm buildings) would have been lost. Some of these are evident from aerial photography. Neither of these are uncommon types of heritage in the area but, nonetheless, the NHRA regards every heritage site as unique. Therefore, the significance of cumulative impacts on archaeology and historical sites is likely to be up to **moderate negative**.

The cultural landscape has been compromised by mining and powerlines. Due to the history of mining on the Witwatersrand, this impact will have moderated to some degree as mining is an accepted component of the landscape. Nonetheless, it is unsightly and the impact significance on the wider landscape can be regarded as **moderate negative**.

6.6. Evaluation of impacts relative to sustainable social and economic benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

The proposed powerline is intended to support the WEF and connect it to the national electricity grid. South Africa has been experiencing ongoing electricity supply shortages which impacts on people's personal lives and on economic development. As such, any contribution of new electricity generation is a clear economic and social benefit and, if mitigation is applied as suggested above, then the socio-economic benefits outweigh the residual impacts. Furthermore, a small number of construction phase jobs may be created by the project.

6.7. The No-Go alternative

If the project were not implemented then the site would stay as it currently is (impact significance of **neutral**). Although the heritage impacts with implementation could potentially be greater than the existing impacts, the loss of socio-economic benefits (i.e. new electricity generation) is more significant and suggests that the No-Go option is less desirable in heritage terms.

6.8. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many publicly accessible vantage points is undesirable. Because of the general permeability of powerlines, such an impact to the landscape is not envisaged.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The actions recorded in Table 6 should be included in the Environmental Management Programme (EMPr) for the project.

Table 6: *Heritage considerations for inclusion in the EMPr.*

Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts to archaeology and graves					
Damage or destruction of archaeological sites or graves	Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance	Planning & Construction Phase: Final alignment to be evaluated by an archaeologist relative to known sites, make recommendations for mitigation or further survey as may be needed.	Appoint archaeologist to evaluate alignment well before construction (noting that further survey may be required if there are doubts)	Once-off	Project developer
Damage or destruction of archaeological sites	Locate sensitive areas before damage occurs and avoid impacts	Construction Phase: No-Go signage will need to be placed at sites close to the final alignment. To be determined during planning phase.	Monitoring of No-Go areas (construction period only)	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Construction Phase: Reporting chance finds as early as possible to SAHRA (https://www.sahra.org.za/contact/) or an archaeologist, protect in situ and stop work in immediate area	Inform staff to be vigilant and carry out inspections of new excavations	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly during construction period only)	ECO
Damage or destruction of any known sites	Avoid impacts	Construction Phase: Place No-Go signage at identified sensitive locations.	Monitoring of No-Go areas (construction period only)	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Impacts to the cultural landscape					
Visible landscape scarring	Minimise landscape scarring	Construction Phase: Ensure disturbance is kept to a minimum and does not exceed project requirements. Avoid construction on very steep slopes. Rehabilitate areas not needed during operation.	Monitoring of surface clearance relative to approved layout	Ongoing basis	Construction Manager or Contractor
				As required	ECO
Intrusion into cultural landscape	Minimise visual intrusion	Operation Phase: Ensure that all maintenance vehicles and operational activities stay within designated areas.	Undertake visual inspections and report non-compliance	As required	Environmental Manager

Intrusion into cultural landscape	Minimise contrast and light pollution	Operation Phase: Paint buildings in earthy colours to reduce contrast. Make use of motion detectors and downlighting to reduce night-time light pollution.	Monitor that this has been considered in the design and operation of the facility	Once off	Project Developer
Visible landscape scarring	Minimise landscape scarring	Decommissioning Phase: Ensure all areas are rehabilitated following specialist rehabilitation plan.	Monitor compliance and success of rehabilitation	As required	ECO

8. CONCLUSIONS

The survey for this project resulted in the finding of a number of stone-walled archaeological sites. Because a final alignment has not been provided and the applicant is aiming for approval of a corridor, the actual impacts cannot be accurately assessed. However, the corridor approach means that flexibility can be maintained and impacts can possibly be better avoided through careful consideration during the planning stage. The corridor approach is thus supported here from an archaeological perspective.

The other main impact is on the cultural landscape. Given the existence of various mines and powerlines in the area this is not a significant consideration in terms of heritage impacts.

8.1. Reasoned opinion of the specialist

Given that impacts on archaeology should be easily avoided and that the cultural landscape already has an industrial layer to it, it is the opinion of the heritage specialist that this project may be authorised.

9. RECOMMENDATIONS

It is recommended that the proposed powerline be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- The final alignment of the powerline and service track must be evaluated by an archaeologist relative to the known heritage sites in the area. The results of this evaluation must be reported to SAHRA with any required mitigation actions noted;
- The powerline should preferably avoid the steep slope in the northeast with the ridge immediately to its west being favoured for use;
- No stones may be removed from any archaeological sites;
- The Fossil Chance Finds Procedure must be included in the project EMPr;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 40 Brassie Street, Lakeside, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code EB
Marital Status: Married to Carol Orton
Languages spoken: English, Afrikaans, basic French

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology) [First Class]	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

- Association of Southern African Professional Archaeologists (ASAPA) membership number: 233
- ASAPA CRM Section member with the following accreditation:
  - Principal Investigator: Coastal shell middens (awarded 2007)
    Stone Age archaeology (awarded 2007)
    Grave relocation (awarded 2014)
  - Field Director: Rock art (awarded 2007)
    Colonial period archaeology (awarded 2007)
- Association of Professional Heritage Practitioners (APHP) membership number: 43
  - Accredited Professional Heritage Practitioner

Memberships and affiliations:

➢ South African Archaeological Society Council member	2004 – 2016
➢ Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
➢ UCT Department of Archaeology Research Associate	2013 – 2017
➢ Heritage Western Cape APM Committee member	2013 – 2023
➢ UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
➢ Fish Hoek Valley Historical Association	2014 –
➢ Kalk Bay Historical Association	2016 –
➢ Association of Professional Heritage Practitioners member (CRM Section)	2016 –
➢ Southern African Field Archaeology section editor	2021 –

Fieldwork and project experience:

I have extensive experience as Field Director and Principal Investigator throughout Western and Northern Cape, and the western Free State and Eastern Cape. I also work in the eastern part of South Africa through partnership with an Iron Age accredited colleague.

Feasibility studies:
Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- ➢ Project types
  - o Notification of Intent to Develop applications
  - o Heritage Impact Assessments
    - o Self-standing assessments under Section 38(1) of the NHRA
    - o Assessments under NEMA and Section 38(8) of the NHRA
  - o Archaeological specialist studies
  - o Strategic assessments
  - o Phase 1 archaeological test excavations in historical and prehistoric sites
    - o Archaeological research projects
- ➢ Development types
  - o Mining and borrow pits
  - o Roads (new and upgrades)
  - o Residential, commercial and industrial development
  - o Agricultural developments
  - o Dams and pipe lines
  - o Power lines and substations
  - o Renewable energy facilities (wind, solar and hydro-electric)

Phase 2 mitigation and research excavations:

➢ ESA open sites	o Duinefontein, Gouda, Namaqualand
➢ MSA rock shelters	o Fish Hoek, Yzerfontein, Cederberg, Namaqualand
➢ MSA open sites	o Swartland, Bushmanland, Namaqualand
➢ LSA rock shelters	o Cederberg, Namaqualand, Knersvlakte, Bushmanland
➢ LSA open sites (inland)	o Swartland, Franschhoek, Namaqualand, Bushmanland, De Aar
➢ LSA coastal shell middens	o Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand coast, Knersvlakte
➢ LSA burials	o Melkbosstrand, Saldanha Bay, Namaqualand coast, Knysna
➢ Historical sites	o Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
➢ Historic burial grounds	o Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl, Beaufort West, Franschhoek (farmstead and well), Paarl, De Aar

➢ *Awards:*

1998: Frank Schweitzer memorial book prize for an outstanding student.
2015/2016: Western Cape Government Cultural Affairs Awards: Best Heritage Project.

APPENDIX 2 – Site Sensitivity Verification

As required in Part A of the Government Gazette 43110, GN 320, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool. The details of the site sensitivity verification are noted below:

Date of Site Visit	15 April 2024
Specialist Name	Dr Jayson Orton
Professional Registration Number	ASAPA: 233; APHP: 043
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd

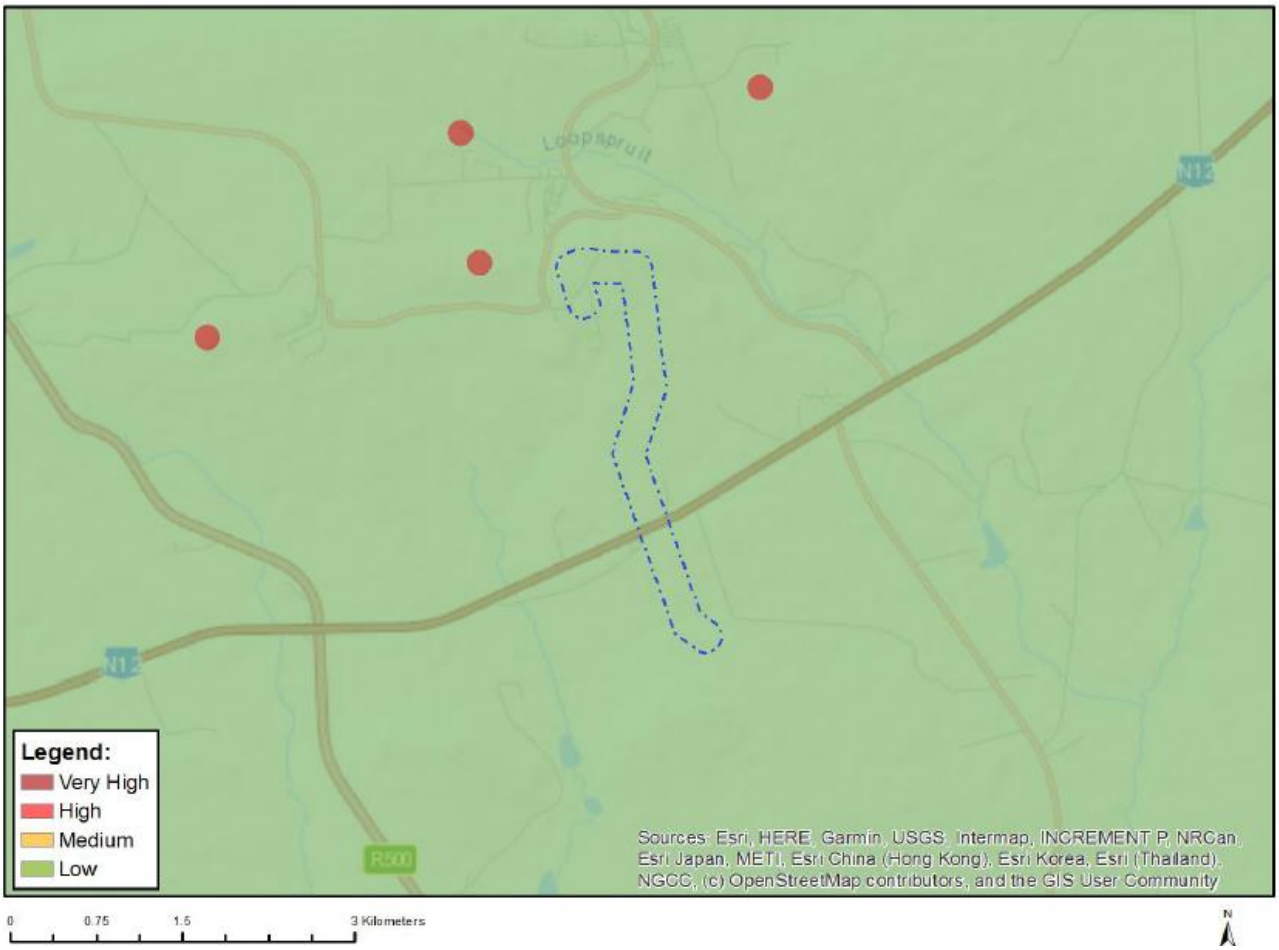
Method of the Site Sensitivity Verification

Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. This was used to determine whether any areas were likely to be particularly sensitive. Subsequent fieldwork served to ground truth the site, including areas identified as potentially sensitive. Desktop research using maps, historical aerial photography, published literature and commercial reports was also conducted to inform on the heritage context of the area. This information is presented in the report (Sections 5.2.1 and 5.4.1).

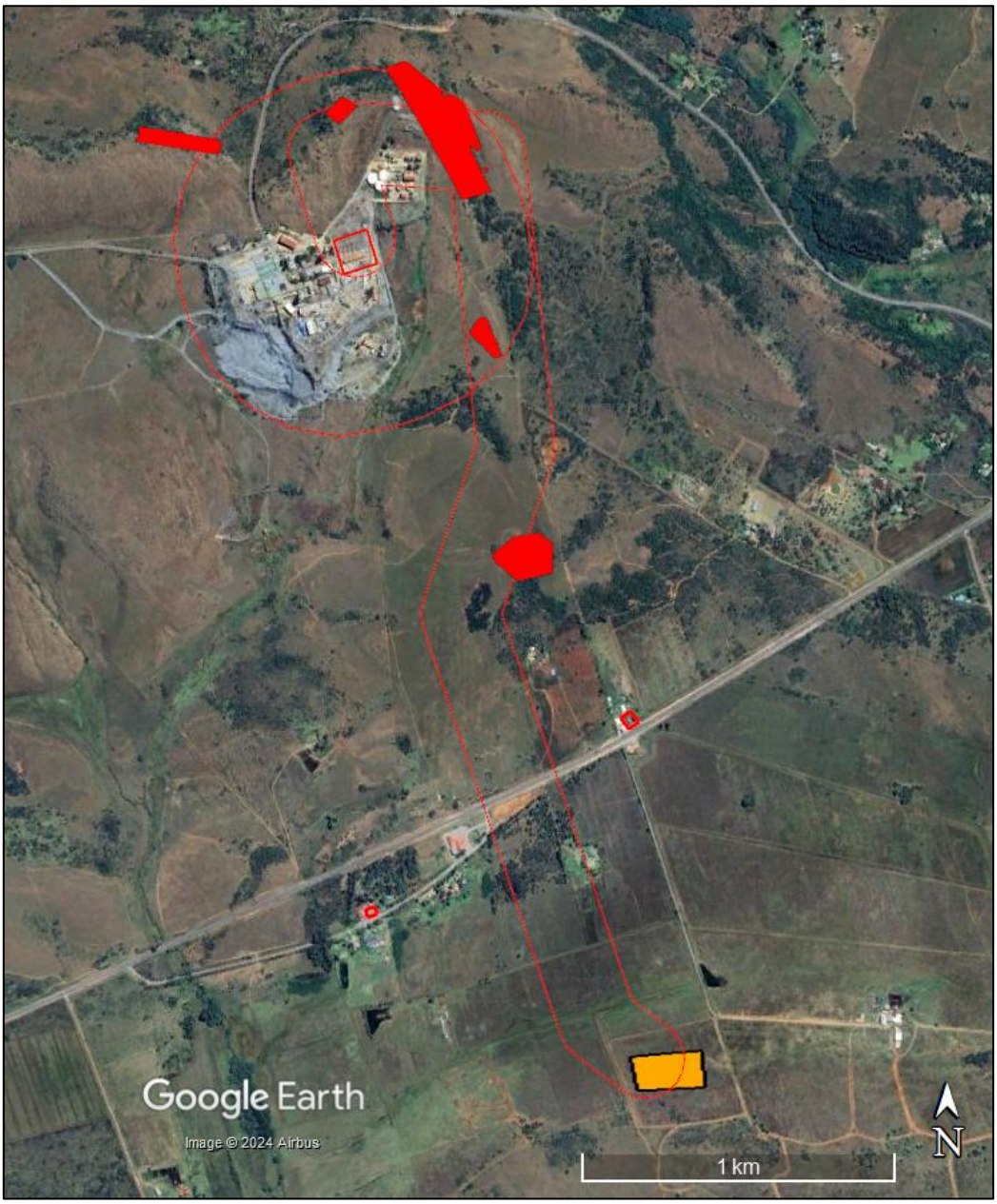
Outcome

The first map below is extracted from the screening tool report and shows the archaeological and heritage sensitivity to be low throughout the proposed powerline corridor. The sensitive location shown to the west of the north end of the corridor is likely the stone wall documented during the present survey, but this cannot be confirmed. The site visit showed that in fact the majority of the site is of low sensitivity but that a number of small areas (where heritage resources were found) are considered to be of high sensitivity. The second map below shows the areas considered to be sensitive from a heritage point of view. These are mostly archaeological sites, but the steep slope northeast of the mine is also included. Photographs of these sites are included in the impact assessment report.

The heritage specialist therefore **disputes** the Screening Tool map.



Screening tool map showing the entire corridor as being of low sensitivity.



Map showing the heritage sensitivity.