

Appendix H.6

HERITAGE IMPACT ASSESSMENT



HERITAGE IMPACT ASSESSMENT: PROPOSED IGOLIDE WIND ENERGY FACILITY, NEAR FOCCHVILLE, GAUTENG PROVINCE

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

SAHRA Case ID: 21549

Report for:

WSP Group Africa (Pty) Ltd

Building C, Knightsbridge, 33 Sloane Street, Bryanston, 2191

Email: Ashlea.Strong@wsp.com

On behalf of:

Igolide Wind (Pty) Ltd



Dr Jayson Orton
ASHA Consulting (Pty) Ltd
40 Brassie Street, Lakeside, 7945
Tel: (021) 788 1025 | 083 272 3225
Email: jayson@asha-consulting.co.za



Jaco van der Walt
Beyond Heritage
37 Oliehout Street, Modimolle, 0510
Tel: 082 373 8491
Email: jaco@heritageconsultants.co.za

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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 development of the Igolide Wind Energy Facility (WEF), just northeast of Fochville, Gauteng Province. An approximate centre point for the project is at S26° 27' 02.44" E27° 30' 58.82".

The study area is an undulating landscape with the lowlands largely ploughed and the hills often covered in bush and rocks.

Aerial photography revealed the presence of Late Iron Age settlements amongst the bushy areas and the field survey confirmed these findings as well as locating, some historical stone-walled sites, a historical cemetery and a burial site marked by two stone packed graves. Artefacts were not seen associated with any of these sites but an isolated Early Stone Age handaxe was noted. Historical structures and ruins were also seen but all are located well away from the project footprint.

The proposed layout crosses through one archaeological site and runs very close to several more and a cemetery. With one exception, these can all be easily avoided with suitable buffers. The exception is where there is limited space between the project site boundary and an Iron Age site. In this case the minimum buffer from the project boundary will avoid the archaeology but with a smaller buffer which is acceptable in this instance. Although there will be impacts to the cultural landscape, the presence of large industrial facilities (gold mines, with nighttime lighting) scattered through the landscape means that the impacts will not be unacceptable.

The proponent must make the following adjustments to the layout prior to final submission of the application for environmental authorisation:

- The project road past the graveyard at Site 23 should be shifted north to allow a 30 m no-go buffer around the graveyard;
- The project road passing through the Late Iron Age Site 05 should be rerouted towards the south. It is recognised that the project site boundary provides a constraint in terms of buffer width (30 m would be ideal) and the road should thus be placed as far south as possible;
- Turbines 1, 3 and 5 and their associated roads should be shifted to the north to allow a 30 m no-go buffer between them and the Late Iron Age and historical Sites 01, 02 and 16;
- The project infrastructure at Turbine 7 must be placed far enough east to allow a 30 m no-go buffer around the Late Iron Age Site 07; and
- The project road passing the north-eastern part of Late Iron Age Site 08 should be shifted towards the northeast to allow a 30 m no-go buffer between it and the site.

If the above layout changes are implemented then it is recommended that the proposed Igolide WEF be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- Given the high density of archaeological sites, a heritage management plan should be compiled to ensure adequate protection of the sites both during and after construction;
- No roads are permitted to cross Late Iron Ages sites;
- A 30m no-go buffer must be applied around all archaeological sites and graves;
- The portion of the graveyard falling within the site must be fenced (farm-style fence with pedestrian gate);

- No-go signage should be placed along the margins of Sites 01, 02, 05, 07, 08, 16, 17, 18, 20, 23 and 25, adjacent to the project infrastructure and the ECO should monitor compliance;
- Should the layout be revised as part of an amendment process post Environmental Authorisation, an archaeologist must check the revised layout before grubbing commences to ensure that no-go areas are avoided and that No-Go signage is in place;
- No stones may be removed from any archaeological sites;
- An early warning system to allow the red aircraft warning lights to remain off until required should be considered for use;
- Buildings to be painted in earthy colours where feasible;
- Ensure effective rehabilitation of all disturbed areas not required during operation;
- Ensure effective rehabilitation of all disturbed areas after decommissioning; and
- 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

Acheulean: An archaeological name for the period comprising the later part of the Early Stone Age. This period started about 1.7-1.5 million years ago and ended about 250-200 thousand years ago.

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

Handaxe: A bifacially flaked, pointed stone tool type typical of the Early Stone Age Acheulian Industry. It is also referred to as a large cutting tool.

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.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

CRM: Cultural Resources Management

DFFE: Department of Forestry, Fisheries and the Environment

EGI: Electricity Grid Infrastructure

EIA: Environmental Impact Assessment

EMPr: Environmental Management Program

EO: Environmental Officer

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

NBKB: Ngwao-Boswa Ya Kapa Bokoni

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

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

PPP: Public Participation Process

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

Contents

Glossary	iv
Abbreviations	iv
1. INTRODUCTION	1
1.1. The proposed project	2
1.1.1. Project description	2
1.1.2. Identification of alternatives.....	5
1.1.3. Aspects of the project relevant to the heritage study.....	5
1.2. Terms of reference	5
1.3. Scope and purpose of the report	5
1.4. The authors.....	6
1.5. Declaration of independence	6
2. LEGISLATIVE CONTEXT	6
2.1. National Heritage Resources Act (NHRA) No. 25 of 1999	6
2.2. Approvals and permits.....	8
2.2.1. Assessment Phase	8
2.2.2. Construction Phase	8
2.3. Guidelines	8
3. METHODS	8
3.1. Literature survey and information sources	8
3.2. Field survey.....	9
3.3. Specialist studies.....	10
3.4. Impact assessment	10
3.5. Grading	10
3.6. Consultation.....	11
3.7. Assumptions and limitations	11
4. PHYSICAL ENVIRONMENTAL CONTEXT	11
4.1. Site context	11
4.2. Site description	12
5. FINDINGS OF THE HERITAGE STUDY	18
5.1. Palaeontology	18
5.2. Archaeology	18
5.2.1. Desktop study.....	18
5.2.2. Site visit	20
5.3. Graves.....	41
5.4. Historical aspects and the Built environment	41
5.4.1. Desktop study.....	41
5.4.2. Site visit	41
5.5. Cultural landscapes and scenic routes	42
5.6. Statement of significance and provisional grading	46
6. ASSESSMENT OF IMPACTS	48
6.1. Construction Phase.....	48

6.1.1. Impacts to archaeological resources	48
6.1.2. Impacts to graves	48
6.1.3. Impacts to the cultural landscape.....	49
6.2. Operation Phase	49
6.2.1. Impacts to the cultural landscape.....	49
6.3. Decommissioning Phase	50
6.4. Cumulative impacts	1
6.5. Evaluation of impacts relative to sustainable social and economic benefits.....	1
6.6. Existing impacts to heritage resources.....	2
6.7. The No-Go alternative	3
6.8. Levels of acceptable change	3
7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME	3
8. CONCLUSIONS	6
8.1. Reasoned opinion of the specialist.....	9
9. RECOMMENDATIONS	9
10. REFERENCES	10
APPENDIX 1 – Curriculum Vitae	12
APPENDIX 2 – Mapping	14
APPENDIX 4 – Site Sensitivity Verification.....	16

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 development of the Igolide Wind Energy Facility (WEF), just northeast of Fochville, Gauteng Province (Figures 1 & 2). The site lies east of the N12/R500 intersection and an approximate centre point for the project is at S26° 27' 02.44" E27° 30' 58.82".

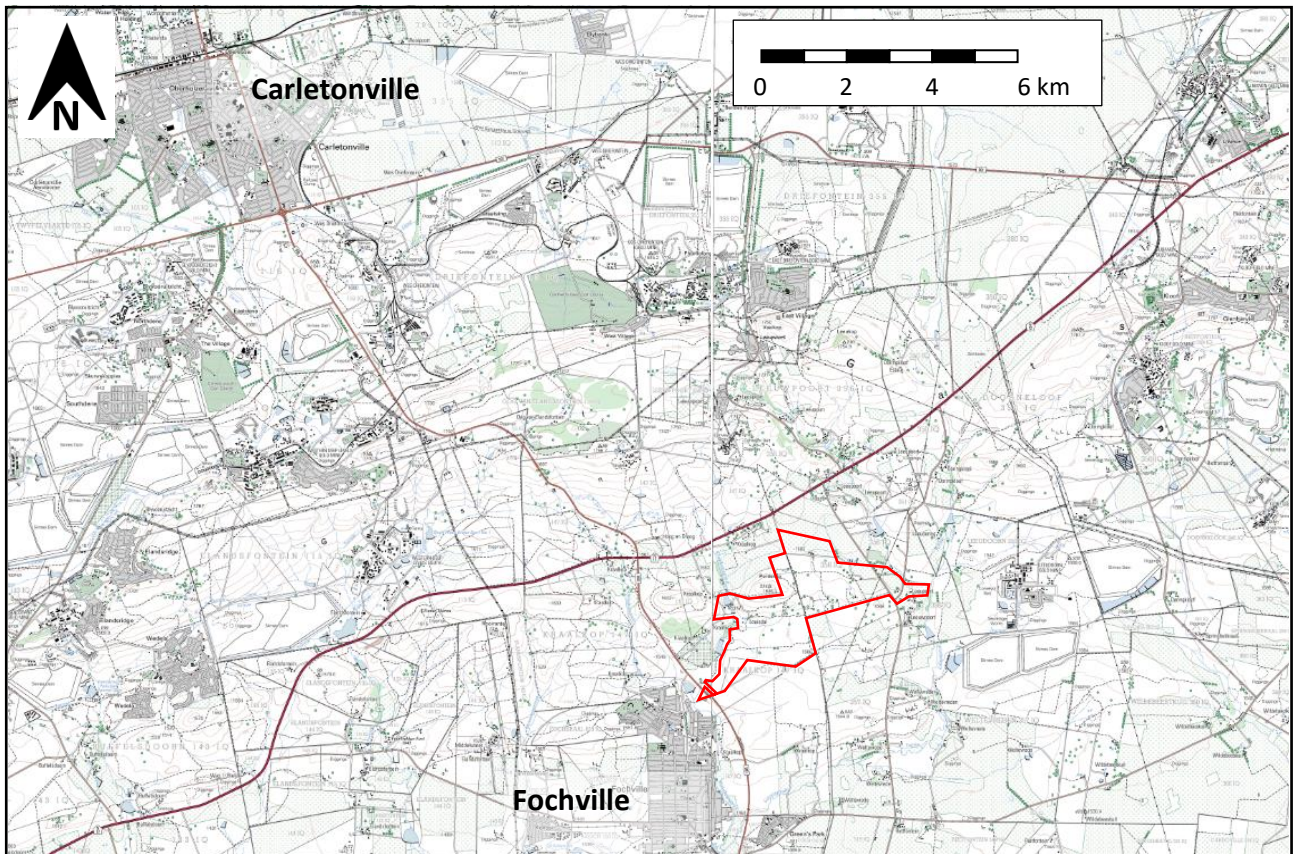


Figure 1: Extract from 1:50 000 topographic mapsheets 2627AD & 2627BC (dated 2010) showing the location of the site. Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

The proposed WEF will be developed within an overall project area measuring approximately 680 hectares (ha). Within this area, the extent of the project footprint will be approximately 50 ha. The following farm portions are included in the project area:

- Portion 14 of Farm 147 Kraalkop;
- Portion 20 of Farm 147 Kraalkop;
- Portion RE/22 of Farm 147 Kraalkop;
- Portion 8 of Farm 356 Leeuwpoort;
- Portion 57 of Farm 356 Leeuwpoort;
- Portion 65 of Farm 356 Leeuwpoort; and
- Portion 66 of Farm 356 Leeuwpoort.

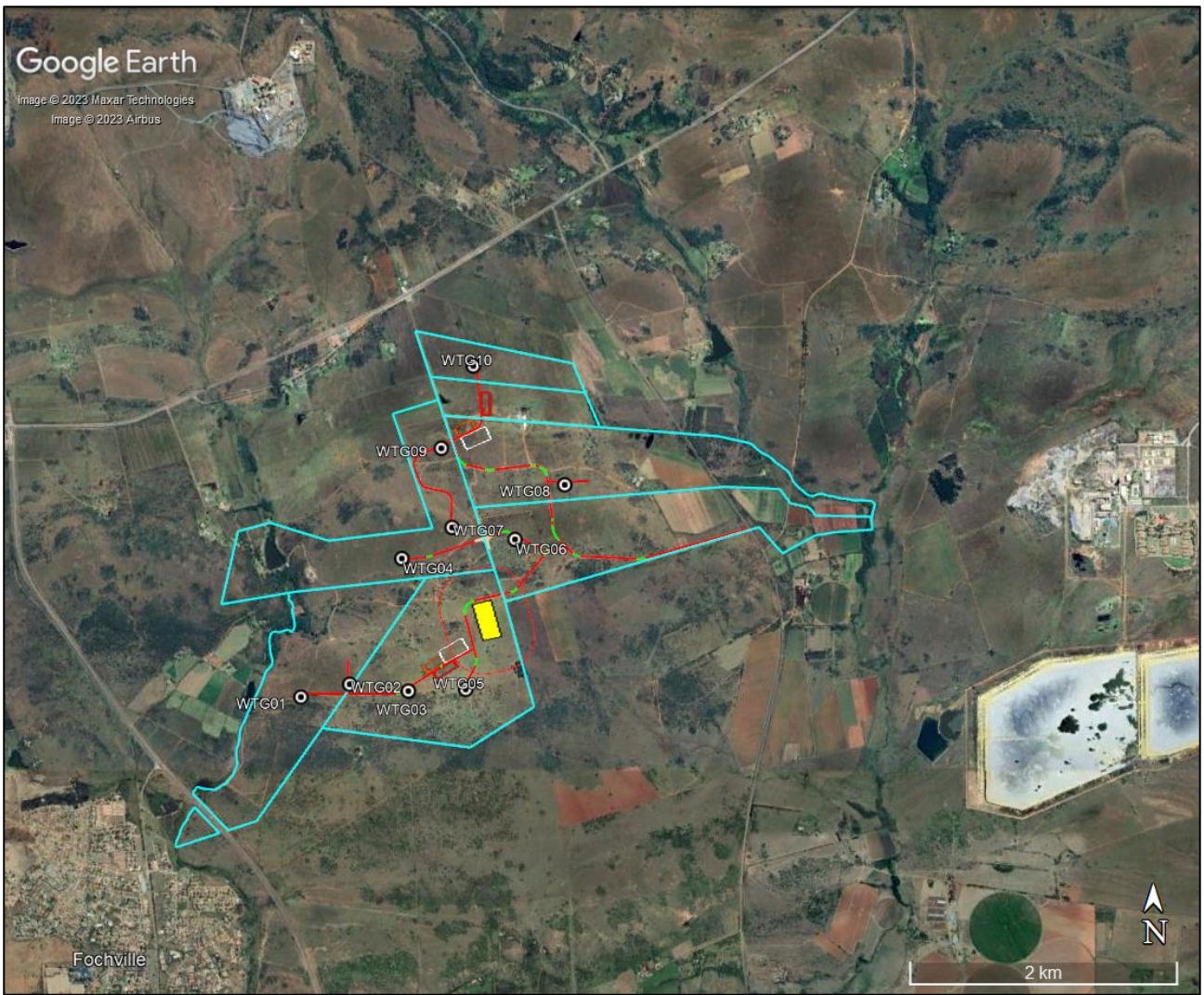


Figure 2: Aerial view of the study area (turquoise polygons are the farm portions) showing the surrounding context which includes Fochville to the southwest and various gold mines. Red/green lines are project roads, labelled dots are turbines, red/white rectangles are laydown areas, site camps and batching plants, yellow rectangle is the substation.

1.1. The proposed project

1.1.1. Project description

The project comprises of a small WEF of approximately ten turbines. Associated infrastructure would include – among other things – access roads, powerlines, a substation, battery energy storage system (BESS) and offices. Full details of the project are provided in Table 1.

Table 1: Summary of technical details for the Igolide WEF.

Facility Name:	Igolide Wind Energy Facility (WEF)
Applicant:	Igolide Wind (Pty) Ltd
Municipalities:	Merafong City Local Municipality in the Gauteng Province of South Africa
Extent:	680ha

Footprint:	50ha
Capacity:	Up to 100MW
No. of turbines:	10
Turbine hub height:	Up to 200m
Rotor Diameter:	Up to 200m
Tip Height :	Up to 300m
Foundation:	Approximately 25m diameter x 3m deep. Volume to be excavated will be approximately 2 200m ³ , in sandy soils due to access requirements and safe slope stability requirements.
Turbine Hardstand:	Hardstand does not require concrete. Area required will be approximately 1 ha per turbine.
Tower Type	Steel or concrete towers can be utilised at the site. Alternatively, the towers can be of a hybrid nature, comprising concrete towers and top steel sections.
On-site IPP substation and battery energy storage system (BESS):	<p>The total footprint for the on-site substation, including the BESS, will be up to 2.5ha in extent.</p> <p>The on-site IPP portion substation will consist of a high voltage substation yard to allow for multiple up to 132kV feeder bays and transformers, control building, telecommunication infrastructure, and other substation components, as required. A 500m buffer around the on-site IPP substation has been identified to ensure flexibility in routing the powerline.</p> <p>The BESS storage capacity will be up to 100MW/400 megawatt-hour (MWh) with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology; however, the specific technology will only be determined following Engineering, Procurement, and Construction (“EPC”) procurement. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers. The BESS components will arrive on site pre-assembled.</p>
Grid (to form part of a separate application for EA)	<p>A single or double circuit 132kV overhead powerline and 132kV switching station (with a footprint of 1.5ha, to be located adjacent to the on-site IPP substation) to feed the electricity generated by the proposed WEF into Eskom’s Midas Main Transmission Substation via a 11km overhead line.</p> <p>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</p>

	powerline route, and for the avoidance of sensitive environmental features (where possible).
Cables:	The medium voltage collector system will comprise cables up to and including 33kV that run underground, except where a technical assessment suggests that overhead lines are required, connecting the turbines to the on-site IPP substation.
Operations and Maintenance (O&M) building and storerooms:	<p>The Operations and Maintenance (“O&M”) building footprint will be located near the on-site substation. Typical areas include:</p> <ul style="list-style-type: none"> - Operations building – 20m x 10m = 200m² - Workshop and stores area – of ~300m² - Refuse area for temporary waste storage and conservancy tanks to service ablution facility. <p>The total combined area of the buildings will not exceed 5 000m².</p>
Construction camps:	The construction camp will house the contractor offices, ablution facilities, mess area, etc., and will have a footprint of 1ha. The construction camp will be demolished after commercial operations date and the area rehabilitated.
Temporary laydown or staging areas:	<p>The laydown area will be used for the storage of equipment or components that will be incorporated into the facility (such as electrical cables) as well as non-facility related equipment and components such as shipping frames, concrete shuttering, etc. The laydown area will also be used for the storage (and filling of vehicles) of diesel fuel.</p> <p>The laydown area will have a footprint of up to 2ha, which could increase to 3ha for concrete towers, should they be required. The laydown area will be demolished after commercial operations date and the area rehabilitated.</p>
Cement Batching Plant (temporary):	The cement batching plant will be used to mix and blend cement, water, sand and aggregates to form quality concrete to be used for foundations. The cement batching plant will have a footprint of 1ha.
Access and Internal Roads:	<p>Access and internal roads will have a width of 8 - 10m, increasing up to 20m for turning circle/bypass areas to allow for larger component transport. The access and internal roads will be placed within a corridor of up to 20m width to accommodate cable trenches, stormwater channels and turning circle/bypass areas of up to 20m.</p> <p>Existing access roads will be used where possible to minimise impact. Where required, the width of the existing roads will be widened to ensure the passage of vehicles.</p>
Supporting Infrastructure:	<ul style="list-style-type: none"> - Fencing; - Lighting; - Lightning protection; - Telecommunication infrastructure;

	<ul style="list-style-type: none"> - Stormwater channels; - Water pipelines; - Offices; - Operational and control centre; - Operations and maintenance area / warehouse / workshop; - Ablution facilities; - Gatehouse; - Security building; - Visitor's centre; and - Substation building.
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1.1.2. Identification of alternatives

No location alternatives are assessed, but the project was designed iteratively so as to account for and avoid sensitive areas identified in the various specialist studies.

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 to identify potentially sensitive areas;
- 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

A 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 Environment (DFFE) who will review the Environmental Impact Assessment (EIA) 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 authors

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.

Jaco van der Walt has been practising as a CRM archaeologist for 20 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012. Jaco is an accredited member of ASAPA (#159) and APHP (#114) and has conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as the Northern and Eastern Cape Provinces in South Africa.

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

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 an EIA. 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 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 project layout was subjected to a detailed foot survey by Jaco van der Walt and an assistant on 23rd and 24th August 2023 with survey outside of the actual layout largely limited to what was needed to record visible heritage sites. This was during late winter and, being the end of the dry season, ground visibility for the archaeological survey was fairly good. 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.

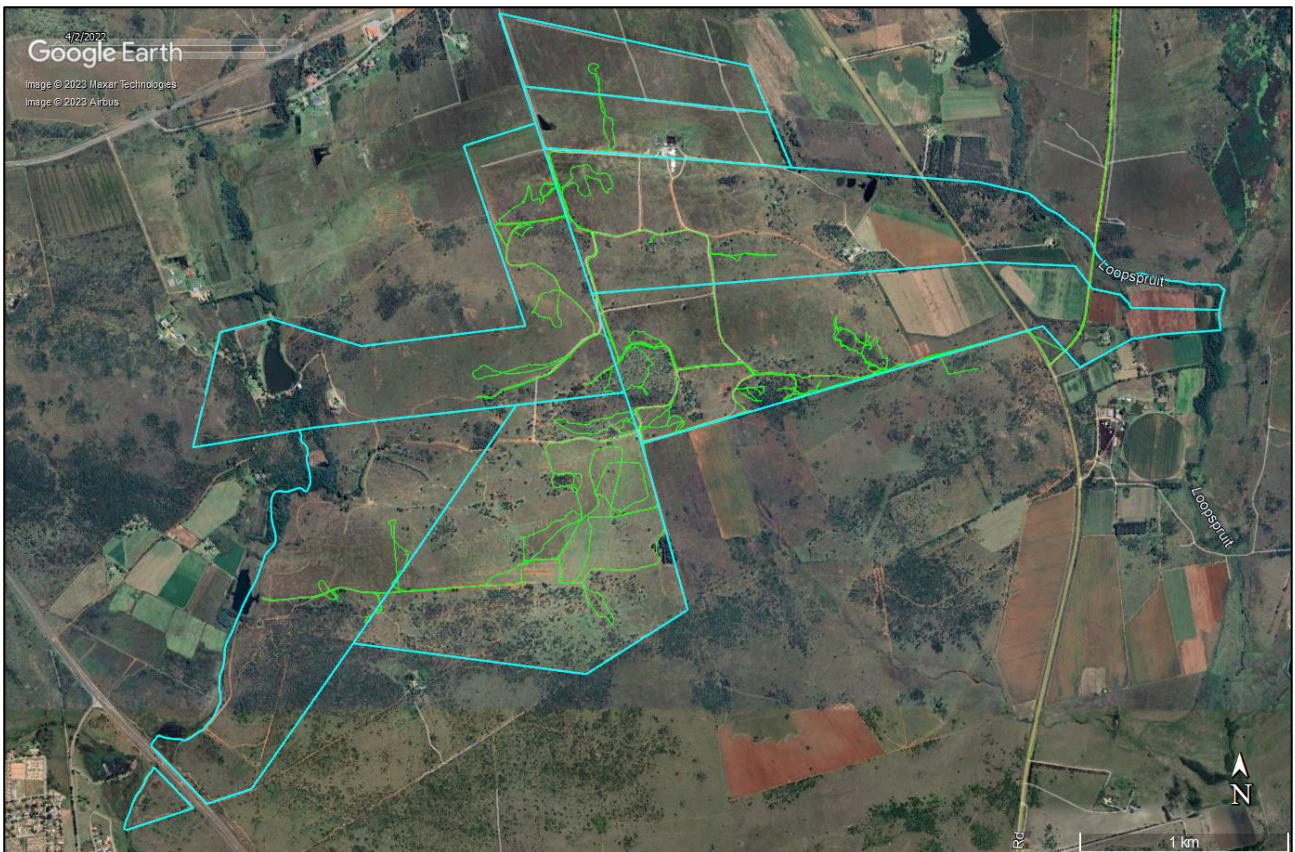


Figure 3: Aerial view of the study area (blue polygon) showing the survey tracks (green lines).

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.

3.3. Specialist studies

A separate palaeontological study was commissioned. This was conducted by Prof. Marion Bamford and is submitted separately with this HIA.

3.4. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a methodology supplied by WSP. Please see the main EIA Report for details.

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 system¹ 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. Although the survey focused on the WEF layout, an attempt was made to identify all obvious heritage resources in reasonably proximity to the project layout. Not all resources identified from aerial photography were visited, with the emphasis placed on visiting areas where impacts might occur. It is assumed that the findings would be indicative of the overall pattern on the landscape. It must also be noted that it is very easy to miss graves in this grassland landscape. Although visibility was reasonable, it must always be assumed that graves could have been missed.

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

An aerial view of the study area shows that the study area is farmland but that two major roads – the N12 and R500 – are close to the site, the town of Fochville lies just southwest of the site and various gold mines occur within a few kilometres of the site. One existing Eskom transmission line passes through the south-eastern part of the site and the entire study area falls within the Central Electricity Grid Infrastructure (EGI) Corridor. The nearest Renewable Energy Development Zone (REDZ) is some 30 km southwest of the site.

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

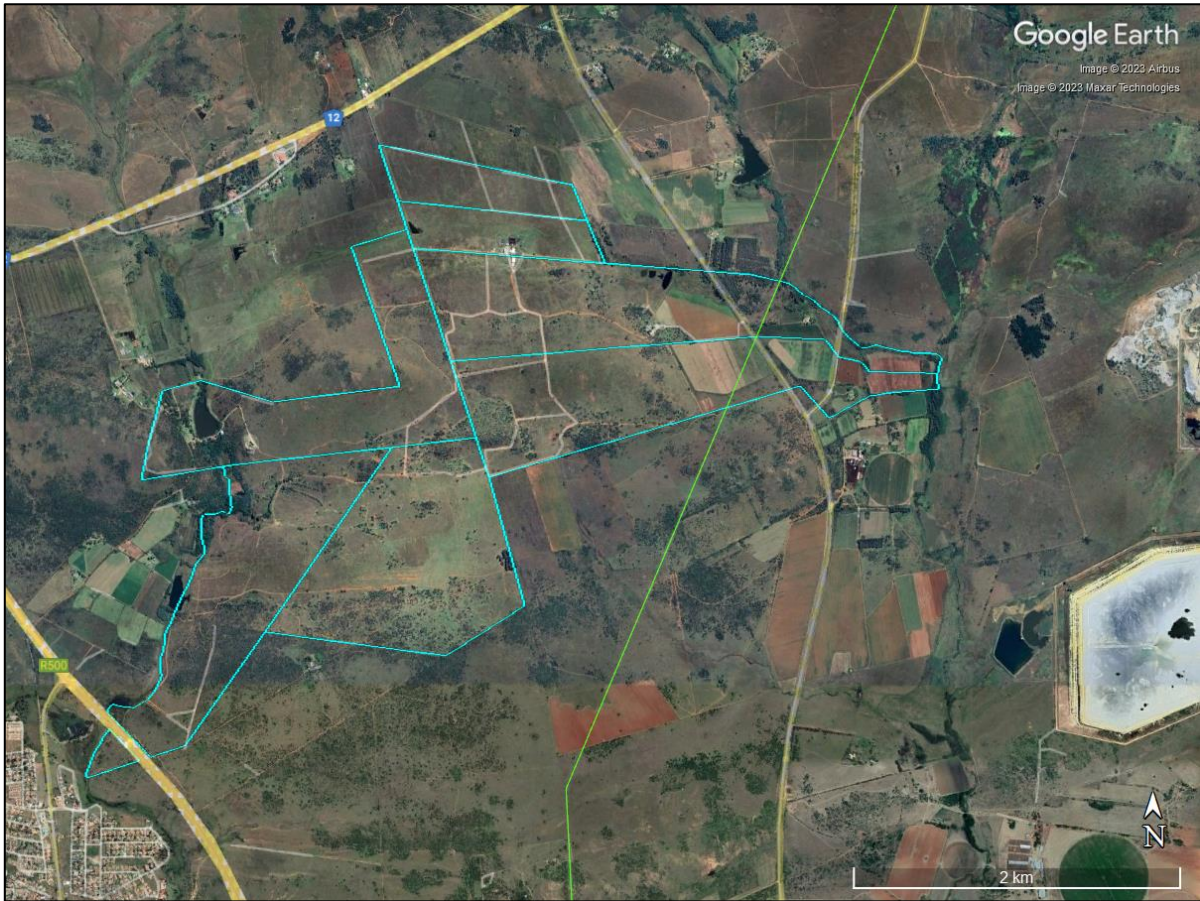


Figure 3: Aerial view showing the immediate context of the study area. The green line is an existing Eskom HV powerline.

4.2. Site description

The site is an undulating landscape comprised of relatively level (previously) ploughed lands and grazing lands between low hills. Clumps of thorn trees and bush are common, but mostly on the hills which also tend to be rocky. Areas between hills are grassed. Gravel/sand farm tracks cross the site. Figures 4 to 13 show views of the study area.



Figure 4: Rocky hill with thorn trees.



Figure 5: Grassland and gravel/sand track in the south-eastern part of the study area.



Figure 6: Dense dry season grass cover.



Figure 7: Dense dry season grass cover.



Figure 8: *Dense dry season grass cover and thorn trees in the central part of the study area.*



Figure 9: *Relatively sparse dry season grass cover in the southern part of the study area.*



Figure 10: *Dense dry season grass cover and scattered thorn trees.*



Figure 11: *Dense dry season grass cover with exposed rocks on a low hill.*



Figure 12: Grass and thorn trees.



Figure 13: Looking south over grass cover with exposed rocks in the southern part of the study area. Wind measuring mast is visible in the background.

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project.

5.1. Palaeontology

The SAHRIS Palaeosensitivity Map (Figure 14) shows the site to be of moderate and high sensitivity with the former dominating. Just two turbines fall within the high sensitivity area. It is notable that the majority of the high sensitivity area has been ploughed in the past which means that rock outcrops are absent from that area with the sensitive geology being deeply buried (as shown below, Iron Age stone-walled sites are also restricted to the areas of moderate palaeontological sensitivity because of the lack of stone to the north). For this reason, a desktop study was commissioned and is submitted separately with this HIA.

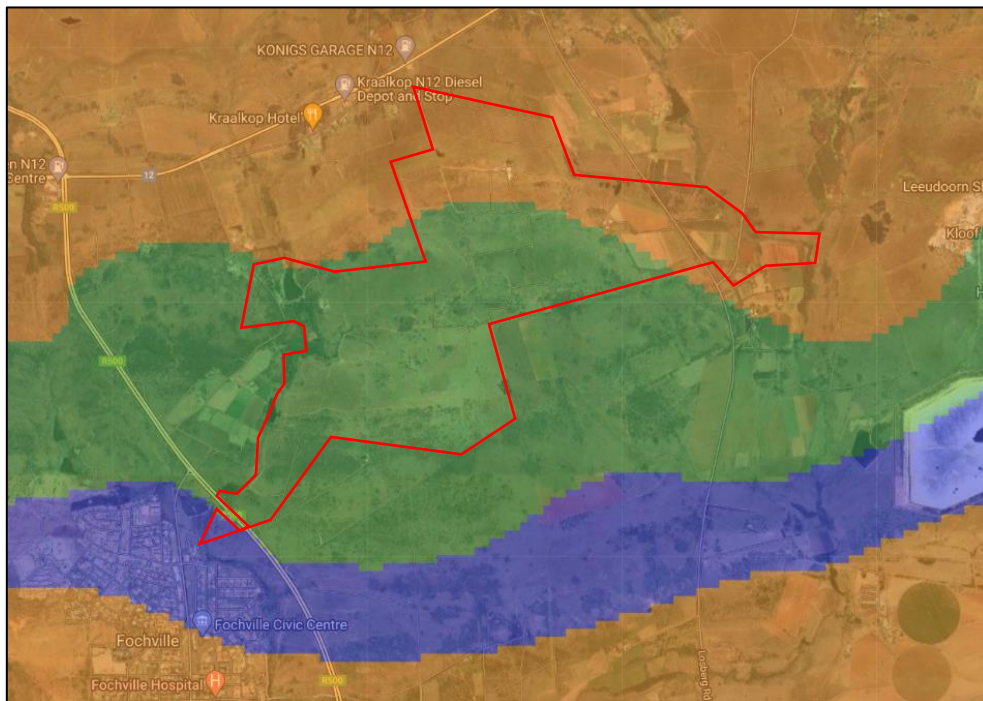


Figure 14: Extract from the SAHRIS Palaeosensitivity Map showing the site to be of moderate (green) and high (orange) sensitivity.

5.2. Archaeology

5.2.1. Desktop study

Sections of the wider area have been previously surveyed (see Huffman *et al.* 1994, du Piesanie 2016) 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 2. A general discussion of local archaeology follows.

Table 2: 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.
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 stonewall, 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

Large stone walled complexes could be clearly seen on Google Earth and historical aerial imagery within the project area. These sites conform to the Central Cattle Pattern (CCP) with an outer or enclosing wall with several enclosures dating to the LIA as discussed above. Some of these sites were visited during the survey but some lay far enough from the project layout to not be of concern and were not visited. Those that were visited were generally only briefly examined since (1) they were sometimes in very bushy areas and (2) detailed recording was not necessary for the purposes of this impact assessment and would have taken a large amount of time. Table 2 lists and briefly describes all the sites on record from the study area and its immediate vicinity, regardless of whether they were visited or not. Their locations are mapped in Figure 15.





Table 2: List of finds.

Waypoint	Location	Description	Significance Grade
01	S26 27 40.3 E27 30 52.2	A Late Iron Age stone-walled settlement measuring about 1050 m by 540 m. Hundreds of enclosures are visible on aerial photography scattered over a hill. The walling at this site is well preserved and the site is therefore of high significance.	High IIIB

			
02	S26 27 47.0 E27 30 15.7	<p>An overgrown Late Iron Age stone-walled settlement measuring about 750 m by 500 m located on a low ridge. Many enclosures, some with large buttress walls, are visible on aerial photography but much of the site is under bush cover. The walling and spatial integrity of the site is well preserved.</p>  	High IIIB
03	S26 27 24.0 E27 30 39.5	<p>An overgrown Late Iron Age stone-walled settlement measuring about 110 m by 120 m and located on a relatively flat area. Not visited during the survey but several enclosures are visible on aerial photography.</p>	Medium GPA



			
04	S26 27 10.5 E27 30 46.6	A largely overgrown Late Iron Age stone-walled settlement measuring about 150 m by 110 m and located on a very slight rise. Not visited during the survey but several enclosures are visible on aerial photography.	Medium GPA
05	S26 27 00.6 E27 30 11.1	<p>A largely overgrown Late Iron Age stone-walled settlement measuring about 480 m by 340 m and located on a low hill. Most of the stone-walled features are in the northern half of the mapped area but a few isolated stone features occur in the southern part on a flat grassed area. These features are often isolated, consisting of a linear wall measuring about 123 m and small enclosures with an approximate diameter of less than 2 m. As these features are located in the flat grass land they have been impacted on by agricultural activities through the years. Also, in the north is a historical stone and cement ruin (4th photograph).</p> 	High IIIB




			
06	S26 26 55.2 E27 30 32.3	<p>A single roughly circular Late Iron Age stone-walled feature of about 45 m diameter and with some internal enclosures. The southern edge of it has been damaged by farm road construction along the northern edge of the study area with the preserved part being outside the study area. The site was not visited.</p>	Medium GPA



			
07	S26 26 50.8 E27 30 54.8	<p>An overgrown Late Iron Age stone-walled settlement measuring about 540 m by 150 m. The site is located on the crest of a fairly prominent hill extending to the west outside of the study area and therefore only the eastern end was visited. Some of the enclosures are still well preserved with the walls approximately 0.8 m high but in many places the walls have been removed and only the foundations are visible.</p>   	Medium GPA
08	S26 26 39.2 E27 30 58.8	<p>A Late Iron Age stone-walled settlement measuring about 360 m by 110 m. It is located on the crest of a ridge that runs downhill</p>	Medium GPA

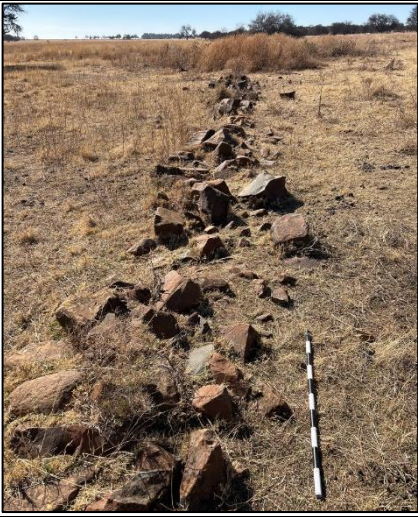


towards the south. Only the western end of the site was visited but many enclosures can be seen on aerial photography.







			
09	S26 26 52.8 E27 30 30.0	A single probable enclosure assumed be a Late Iron Age stone-walled feature measuring about 30 m by 30 m. It is not readily visible on aerial photography and was not visited.	Medium GPA
10	S26 26 56.2 E27 30 51.5	<p>An overgrown Late Iron Age stone-walled settlement measuring about 200 m by 70 m. It is located on the edge of high-lying ground looking downhill towards the southeast. The walls of the circular enclosure have mostly collapsed but are still visible, while the outer wall located on the southern side is only marked by the foundations.</p> 	Medium GPA



		 	
12	S26 26 43.1 E27 30 42.4	<p>A Late Iron Age stone-walled settlement measuring about 190 m by 100 m and located on a north-facing slope. It has two circular clusters of walling. It is located outside the study area.</p> 	Medium GPA


13A	S26 27 38.1 E27 31 22.6	13A: An overgrown Late Iron Age stone-walled settlement measuring about 310 m by 100 m. 13B: A second similar site measuring about 180 m by 120 m is located some 200 m further south. These sites are difficult to delimit on aerial photography, but some enclosures can be identified. The area was not visited and is located outside the study area.	Medium GPA
13B	S26 27 38.1 E27 31 22.6		
14	S26 27 57.9 E27 29 58.3	<p>An overgrown area that includes a large, rectangular feature and a probable ruin. The site is thus historical. It is not visible on the 1968, 1948 or 1934 aerial photography, either due to long disuse and seasonal vegetation cover or, more likely, because the feature is more recent and thus not heritage. The site was not visited, and this cannot therefore be confirmed. It is graded for precautionary reasons.</p> 	Low GPB
15	S26 26 15.7 E27 32 25.2	A small, recent graveyard located beneath an existing Eskom powerline. 2004 aerial photography shows what appears to be three graves, while by 2013 and in all more recent imagery there appear to be about 10 graves. Outside study area. Graves highly unlikely to be older than 60 years but might be associated with intangible heritage. Graded for precautionary reasons.	High IIIA
16	S26 27 34.0 E27 30 21.9	<p>A small historical stone-walled site just beyond the northern edge of the large Iron Age complex at waypoint 02. The main feature is a livestock kraal built with rocks and cement. Part of the site has been broken down with the rocks removed for reuse elsewhere. To the north of the kraal is a linear stone wall foundation visible over about 12 m.</p> 	Medium GPA

			
17		<p>A somewhat overgrown Late Iron Age stone-walled settlement measuring about 120 m by 60 m. It lies in a flat area on a slightly elevated ridge. Most of the walls have toppled over but the site layout is still clearly visible.</p>  	

			
18	S26 27 09.2 E27 31 00.5	<p>This is a dispersed but dense collection of stones highly suggestive of stone packed grave dressings marking two burials. Each feature measures about 2 m by 1 m and is aligned east to west in line with burial practices.</p> 	High IIIA
19	S26 27 22.8 E27 30 31.3	<p>A series of four piles of stones were found in this area. Historical aerial photography reveals that the areas to the south and west were cultivated several decades ago. These piles are not organised in anyway, are variable in form and certainly relate to the clearing of fields during the mid-20th century. They are not heritage.</p>	---

			
20		<p>A small, poorly-preserved and somewhat overgrown Late Iron Age settlement measuring about 160 m by 140 m and located on the west side of a slight rise. The outer section of the site is marked by low ephemeral walls but within dense bush towards the centre of the site better preserved walls was visible. Might be GPB but graded GPA for precautionary reasons.</p> 	Medium GPA

			
21	S26 26 33.1 E27 30 57.7	A collection of stones that are assumed to be anthropogenic in origin. They are located within an area that was ploughed on the 1963 aerial photograph and are thus not heritage.	---
22	S26 26 33.9 E27 30 54.0	A series of piles of stones. Historical aerial photography from 1963 shows them to be located within an area that was ploughed in the past. These piles are not organised in anyway, are variable in form and certainly relate to the clearing of fields during the late-20 th century. They are not heritage. 	---
23		This is a cemetery with graves present over an area of about 30 m by 50 m. They fall on both sides of a farm fence and the adjacent farm tracks have avoided the graves. Most graves are marked by stone packed grave dressings but a few head- and footstones are also present. These latter are located on the adjacent property and	High IIIA

		<p>could not be visited. The graves are difficult to see in the grass but are aligned east to west. There are at least 14 graves. Since the graves across the fence were not be visited, this is an estimation based on what was visible through the fence.</p> 	
25	S26 26 58.0 E27 31 55.8	<p>A small site in an area of about 60 m by 50 m. Several features occur here consisting of rectangular soil mounds (at least three) and the remains of a rectangular stone walled structure built of stones with mud mortar. All of these are considered as dwellings of farm labourers. At least two middens with glass, wire, metal fragments and other industrial artefacts are noted here. Sites like these could contain graves of still born babies and would then be potentially of higher significance.</p>	Medium GPA



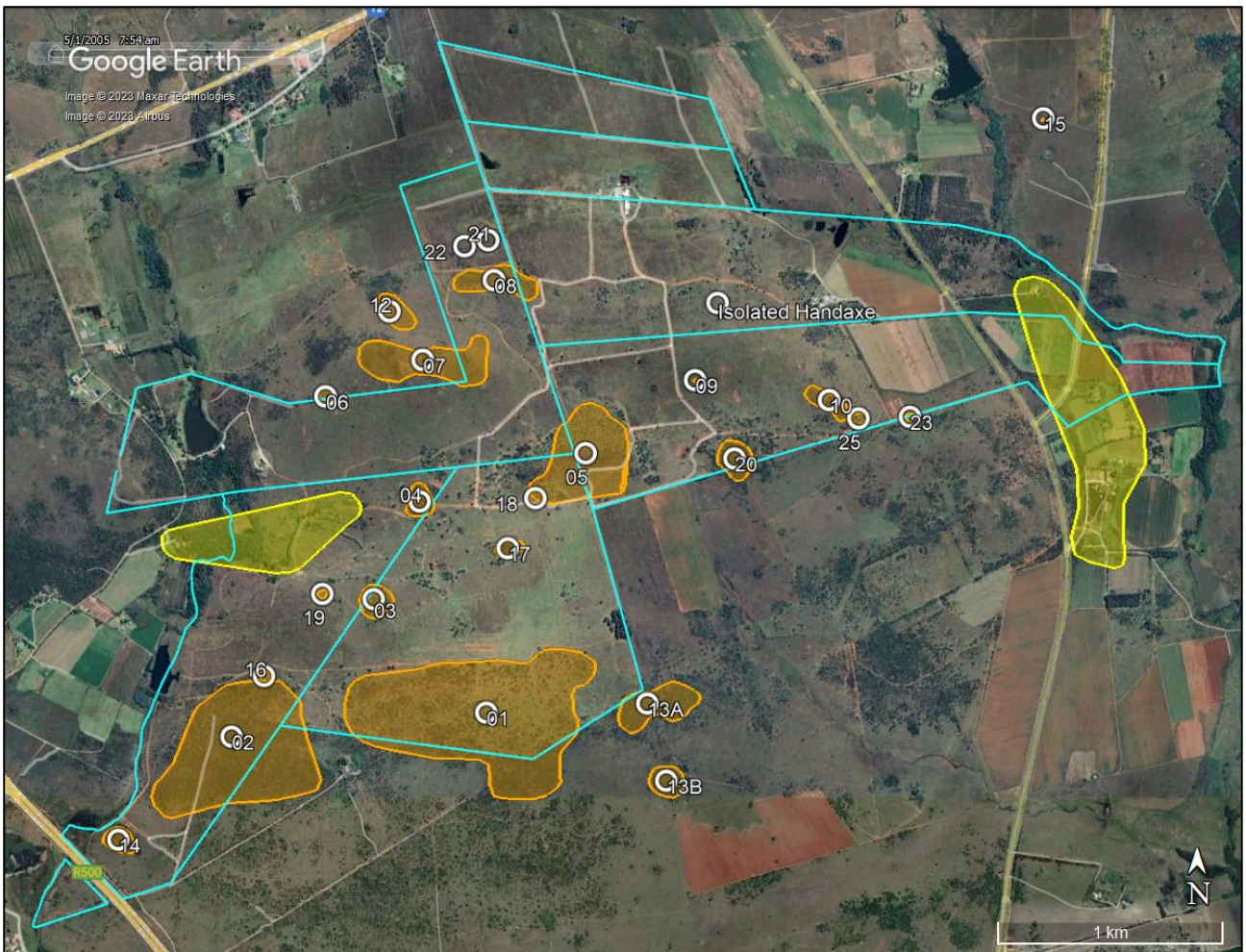


Figure 15: Aerial view of the study area showing archaeological sites and graves (white numbered symbols and orange shading), and areas containing farm buildings (yellow shading).

The photographs in Table 2 show the appearance of the LIA sites on the ground but a full appreciation of them can only be gained from the air. For this reason, a few aerial images from different dates are shown below. Figures 16 to 18 show identical views of Site 01 from three dates, while Figures 19 to 21 do the same for Site 02. Figures 22 and 23 provide two further aerial views of other LIA sites in the study area, while Figures 24 and 25 illustrate a historical site which seems very likely to be too recent to qualify as a heritage resource. It is evident from the comparative views that vegetation cover makes a huge difference to the visibility of these sites from the air.

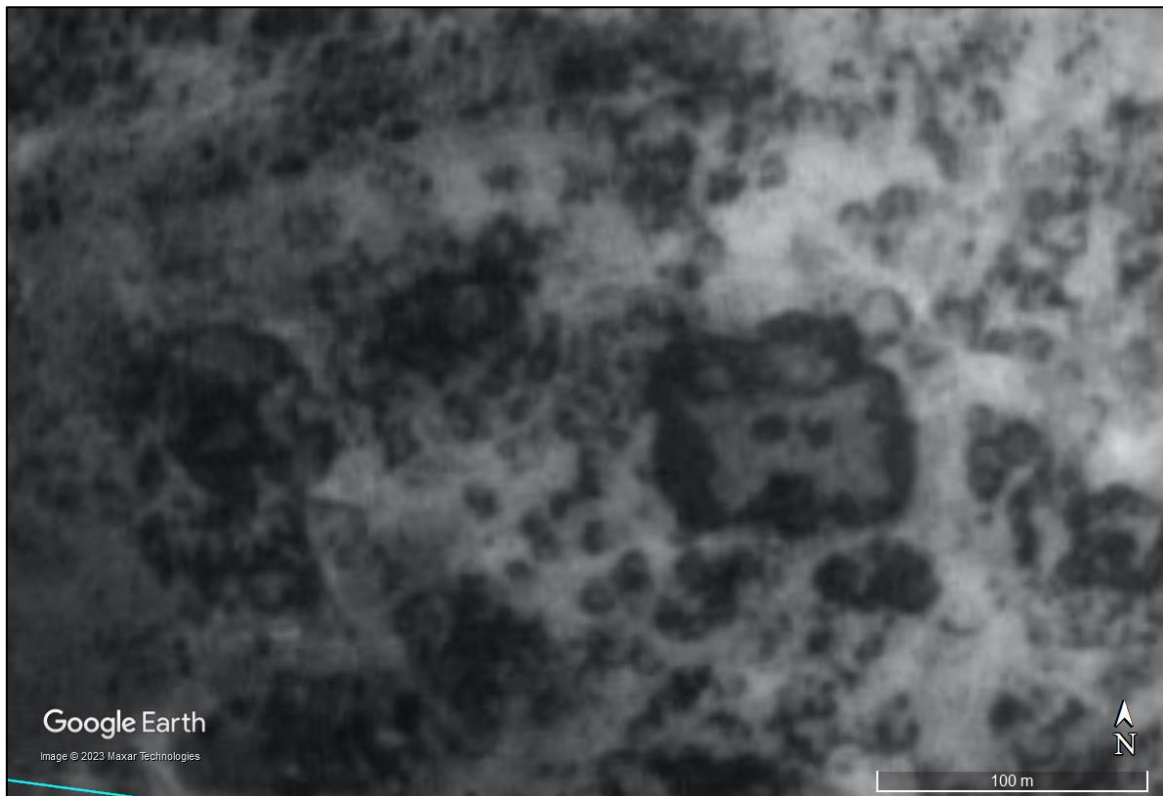


Figure 16: Aerial view of Iron Age Complex at Site 01 from 1948 (224_009_97288).



Figure 17: Aerial view of Iron Age Complex at Site 01 from 2011.



Figure 18: Aerial view of Iron Age Complex at Site 01 from 2023.

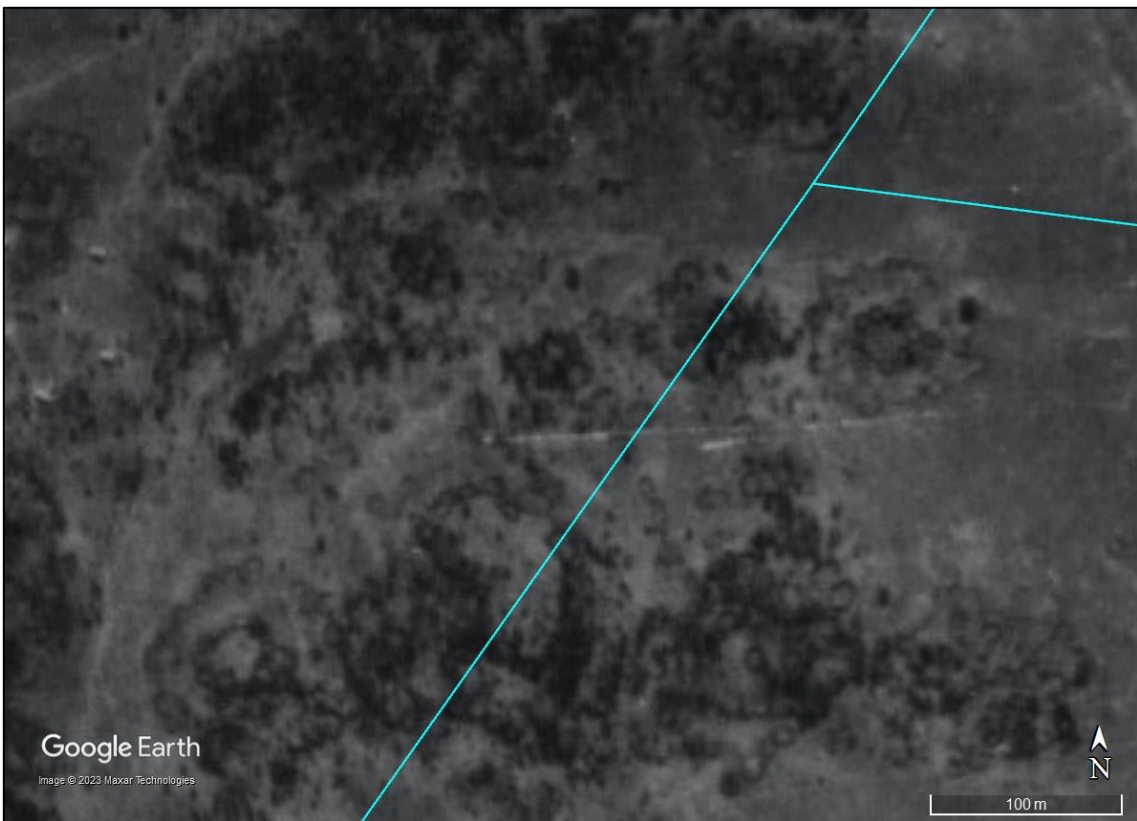


Figure 19: Aerial view of Iron Age Complex at Site 02 from 1948 (224_009_97288).



Figure 20: Aerial view of Iron Age Complex at Site 02 from 2013.



Figure 21: Aerial view of Iron Age Complex at Site 02 from 2023.

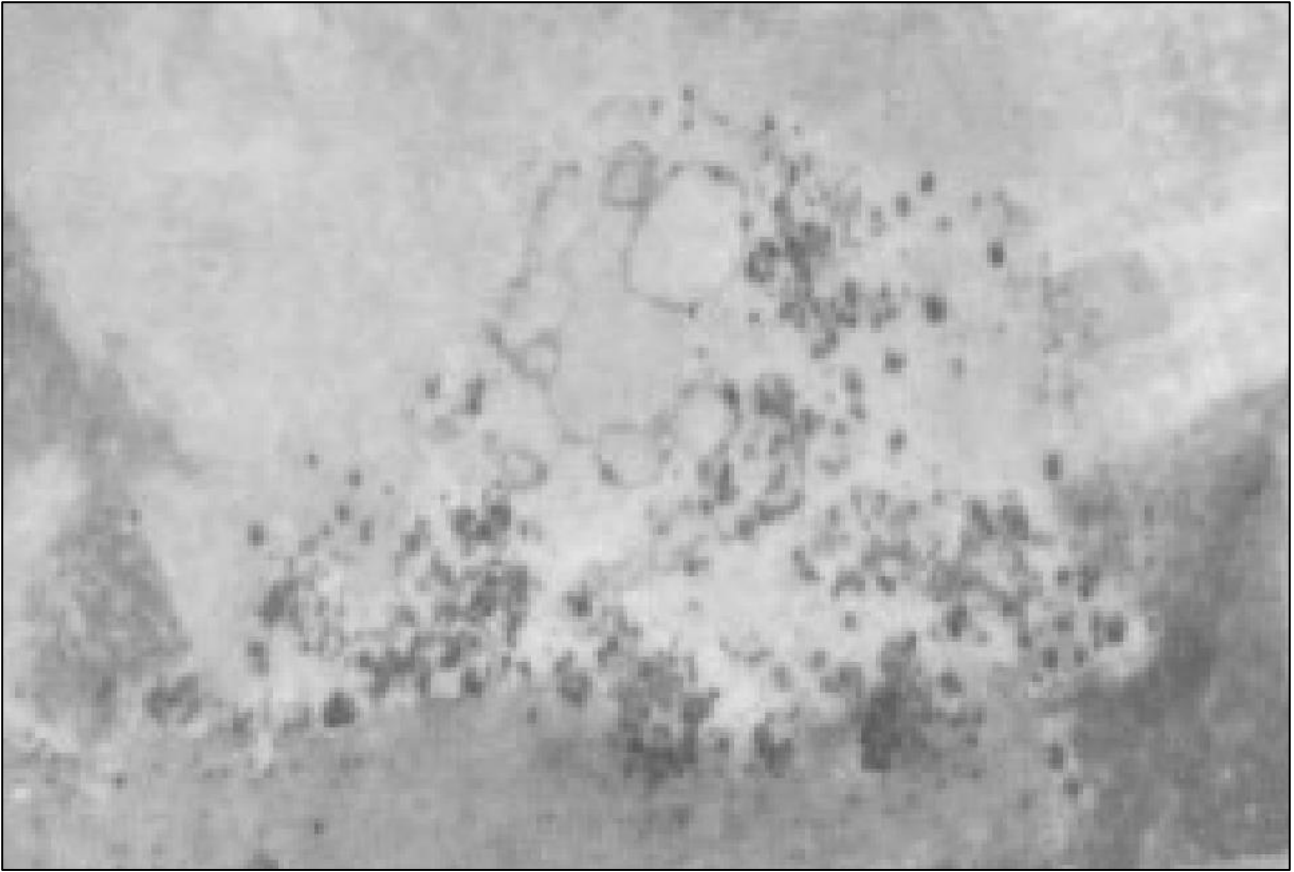


Figure 22: Aerial view of Iron Age Complex at Site 05 from 1968 (603_030_09829).



Figure 23: Aerial view of the Iron Age Complex at Site 08 from 2014.

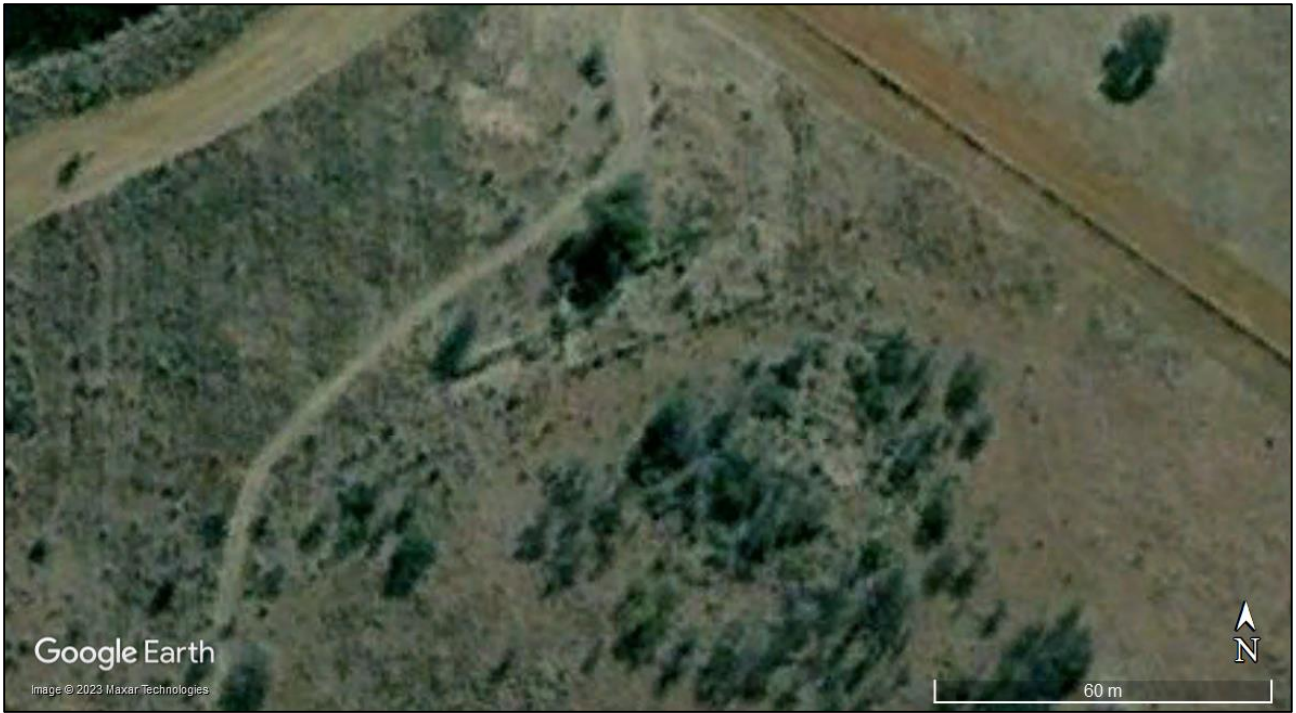


Figure 24: Aerial view of Site 14 from 2005.



Figure 25: Aerial view of a suspected historical site from 2023.

Due to the grass cover, ground visibility was very limited and artefacts were not seen in association with the Late Iron Age sites. Just one isolated stone artefact was noted during the survey. This was an Acheulean ESA handaxe (Figures 26 & 27).



Figure 26 & 27: *Opposite faces of the single ESA handaxe seen in the study area. Scale bars are in 2 cm intervals.*

5.3. Graves

One historical cemetery (Site 23) and a burial site marked by at least two stone packed graves (Site 18) were seen within the study area. There is also a possibility that burial sites can be associated with the Iron Age settlements. A modern graveyard was noted from aerial photography just beyond the north-eastern edge of the study area (Site 15). It must be noted that graves can easily be concealed in the grass and further graves may well be present in the area.

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).

5.4.2. Site visit

Historical structures occurred in two clusters (Figure 15). All structures were avoided by more than 400 m (turbine placements) and more than 200 m (project roads) and hence none were visited during the survey. Historical aerial photography has revealed that the structures in the cluster to the east of the WEF site mostly date before 1938 (Figure 28), while those in the western cluster are largely older than 1968 with just one being older than 1938 (Figure 29). Two older structures in the western cluster were, however, demolished before 1968 and are no longer visible on aerial photography today.



Figure 28: Area containing structures to the west of the project site.

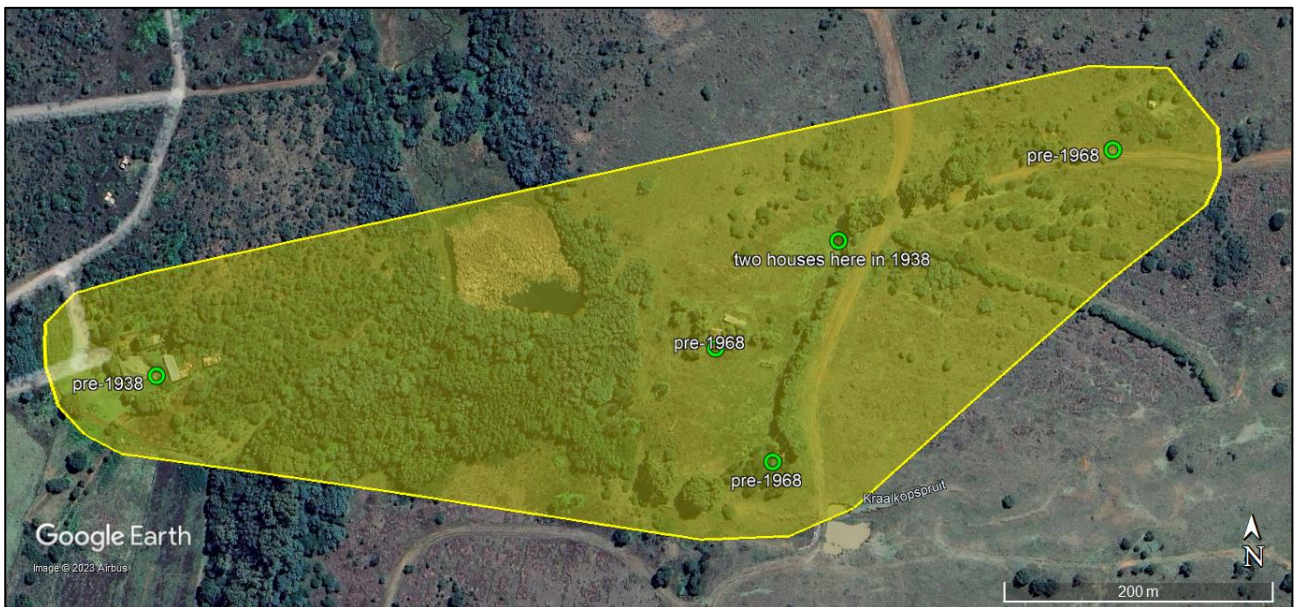


Figure 29: Area containing structures to the east of the project site.

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 immediate on-site land use is agriculture and livestock/game grazing which provides a rural context for the development. However, very nearby are various gold mines and the town of Fochville (the edge of the town is immediately adjacent to the study area but 1.5 km from the south-westernmost turbine). These other land uses alter the overall sense of place of the rural environment.

Figures 30 to 32 show a sequence of aerial photographs of the study area. It is evident that the amount of ploughed land increased dramatically between 1938 and 1968 but that subsequently a number of areas have been left fallow. Internal farm roads have also changed considerably over time as fields were reconfigured and new areas were ploughed. Although several farmsteads and/or buildings were present in 1938 (see discussion above), a number of new structures have been added after 1968. It is also evident that the N12 and R500 roads were built after 1968, partly following existing roads. The various gold mines and associated slimes dams scattered around the wider area have also all appeared post-1968 adding an industrial layer to the landscape (these lie beyond the northern and western edges of the images in Figures 30 to 32). These observations show a continually evolving cultural landscape with modern industrial uses (i.e. mining) becoming visually prominent on the landscape.

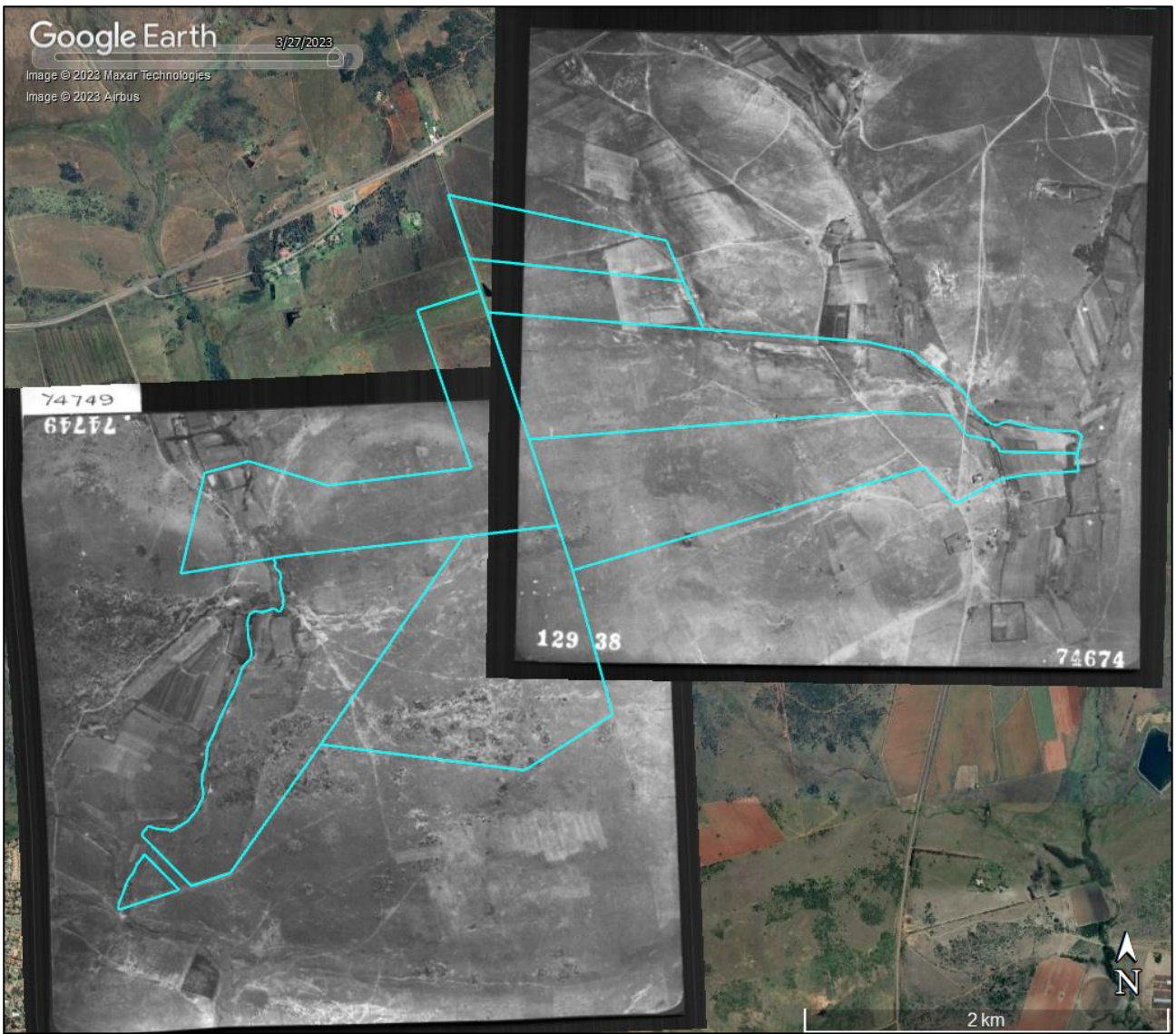


Figure 30: 1938 (129_035_74674 & 74749) aerial photography overlaid on Google Earth



Figure 31: 1968 (603_030_09829) aerial photography overlaid on Google Earth

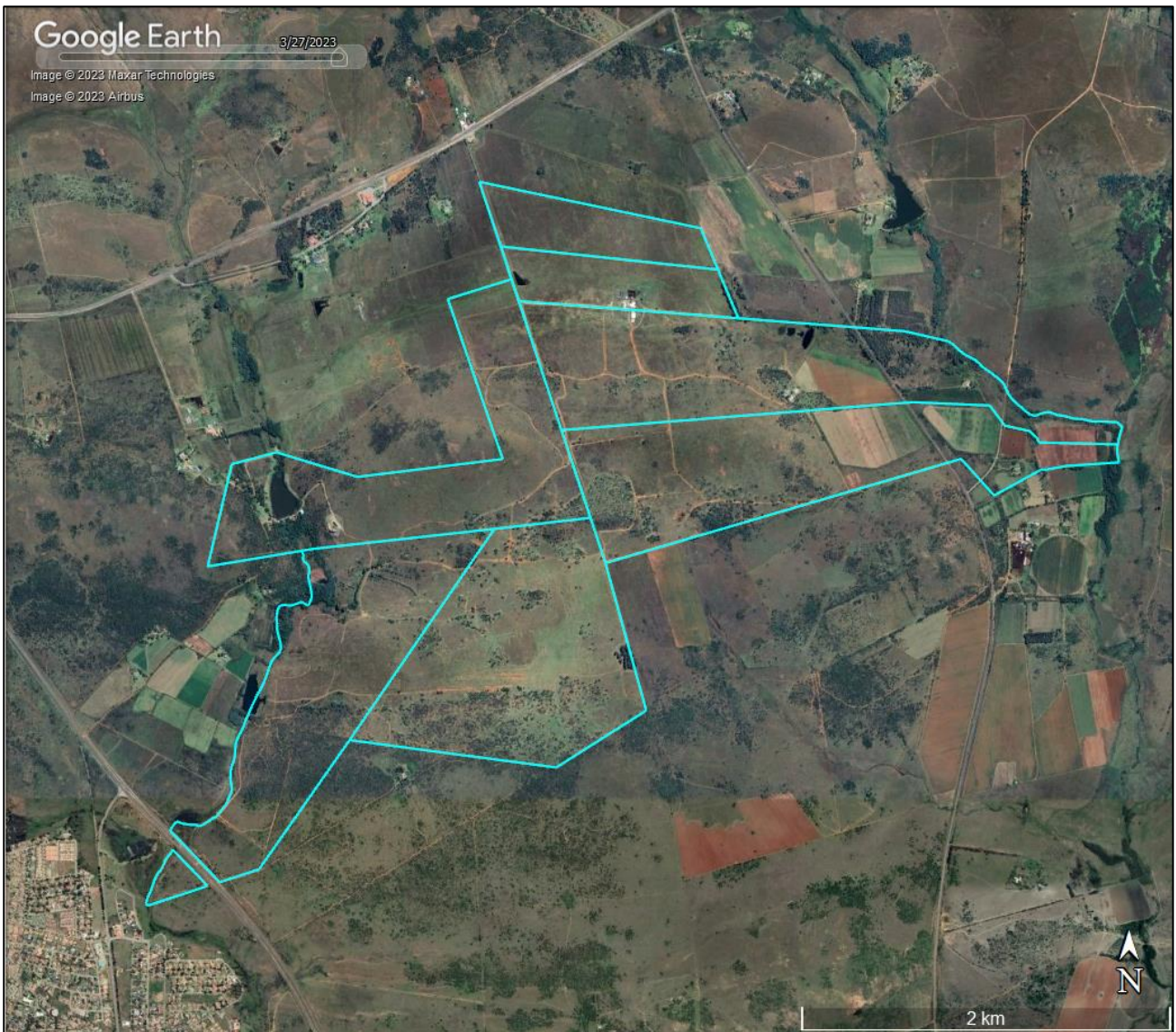


Figure 32: Modern aerial view of the study area.

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 high cultural significance at the local level for their historical and scientific values. They can be graded up to IIIB. Most of the sites have been allocated grades of GPA, however, with just the three largest LIA settlements accorded grade IIIB.

Graves are deemed to have high cultural significance at the local level for their social value. They are allocated a grade of IIIA.

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

Figure 33 shows all recorded heritage resources by grade relative to the project layout.

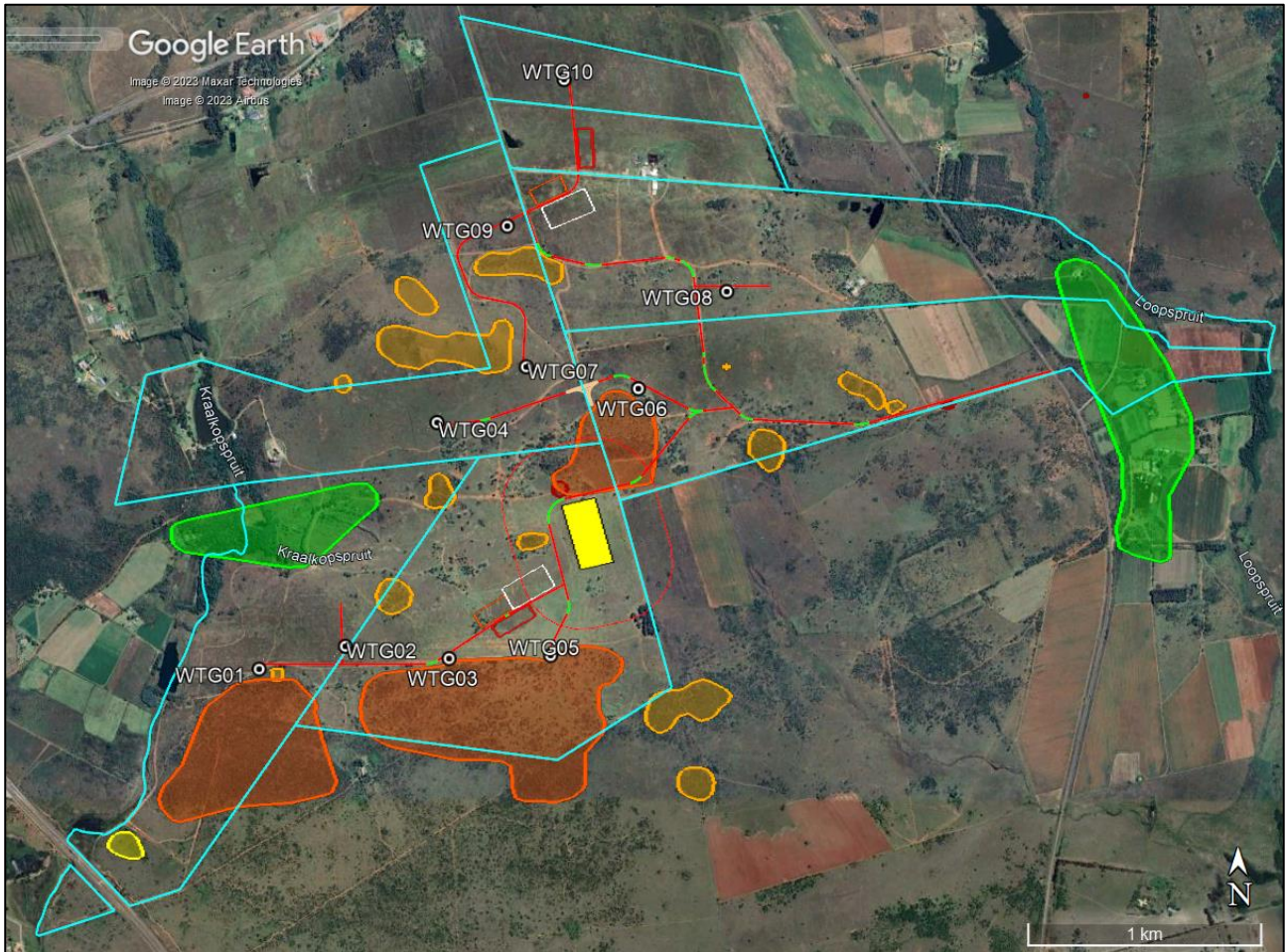


Figure 33: Aerial view of the project layout relative to the archaeological sites (dark red = IIIA, light red = IIIB, orange = GPA, yellow = GPB) and areas with buildings (yellow polygons).

6. ASSESSMENT OF IMPACTS

The impacts identified for this project are as follows:

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

Impacts to built heritage were considered during scoping but no impacts are expected to occur and this aspect of heritage is thus not assessed further. While palaeontological heritage is discussed in the separate specialist study, all the other expected impacts are considered here.

6.1. Construction Phase

6.1.1. Impacts to archaeological resources

Direct impacts to archaeological resources would occur during the construction phase when equipment is brought onto site and grubbing and excavation begin. The layout shows no turbines within known archaeological sites but some are very close which means that once the full width of the hardstands is cleared some impacts are likely. Furthermore, a project road passes through an archaeological site. The potential significance calculates to **moderate negative** before mitigation (Table 3). Mitigation will involve:

- Several small alterations to the project layout to ensure 30 m buffers between the archaeological sites and the proposed infrastructure (it is recognised that a 30 m buffer may be impossible to the south of Site 05 due to the farm boundary but the buffer in this area should be as large as is technically feasible); and
- Reporting of any chance finds made during development.

With this mitigation applied, the impact significance is expected to be **very low negative**.

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

6.1.2. Impacts to graves

Direct impacts to graves could occur during the construction phase when equipment is brought onto site and grubbing and excavation begin. Graves are known from two locations within the study area, with one of these being vulnerable to potential impacts. The calculated significance before mitigation is rated as **moderate negative** (Table 3). Mitigation would entail:

- Implementing a minimum 30 m no-go buffer around the graveyard at Site 23 and fencing the portion of the graveyard falling within the project site with a farm-style fence with pedestrian gate.

The post-mitigation impact significance is **low negative**. It is not very low because the chance still remains that graves hidden in the grass might be impacted during development. If human remains

are located on site then work in the immediate area must stop, the find must be protected *in situ* and it should be reported to SAHRA and/or an archaeologist.

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

6.1.3. Impacts to the cultural landscape

Note that the Iron Age landscape is also significant as a cultural landscape but is included in the consideration of impacts to archaeology above. Direct impacts to the cultural landscape would occur during the construction phase when equipment is brought onto site and work begins. Because the landscape already has industrial features related to gold mining and an existing transmission line crosses its eastern part, the magnitude is low and, although an impact will definitely occur, it is only rated **moderate negative** before mitigation (Table 3). Mitigation will entail:

- Ensuring that all areas not required during operation are rehabilitated; and
- Keeping the construction phase as short as possible.

With mitigation the rating will drop slightly but not enough to go below **moderate negative**. This rating is likely higher than it should be but calculates to this level because the impact will definitely happen.

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 impacts to the cultural landscape would occur during the operation phase through the presence of the facility in the landscape, as well as from the red aircraft navigation lights that would be lit at night. The impacts might be **moderate negative** before mitigation (Table 3). Mitigation would entail:

- Ensuring that all maintenance activities remain in designated and approved areas;
- Paint buildings in earthy colours where feasible to reduce contrast and
- Making use of an early-warning system to switch the red lights on only when required.

The latter measure is less significant in the context of a landscape in which large industrial facilities (mines) occur and which are generally lit at night resulting in an already visually polluted night sky. Although the calculated rating drops slightly, the post-mitigation significance remains **moderate negative**. This rating is again possibly higher than it should be.

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

6.3. Decommissioning Phase

Impacts at decommissioning are similar to those occurring during construction except that the activities would largely be occurring in reverse. The impact significance before mitigation would be **moderate negative** (Table 3). Mitigation would entail:

- Rehabilitation of all areas not required for post-decommissioning use and must be undertaken according to a rehabilitation plan; and
- The decommissioning phase should be kept as short as possible.

With mitigation the impacts would reduce slightly but would still remain at the **moderate negative** level. This again seems slightly too high.

Table 3: Impact assessment.

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	4	60	N3	1	1	5	5	1	12	N1
Significance						N3 - Moderate							N1 - Very Low						
Impact 2:	Graves	Damage to or destruction of graves	Construction	Negative	moderate	5	2	5	5	5	51	N3	5	1	5	5	1	16	N2
Significance						N3 - Moderate							N2 - Low						
Impact 3:	Cultural landscape	Visual intrusion into the cultural landscape	Construction	Negative	low	2	3	1	2	5	40	N3	1	3	1	2	5	35	N3
Significance						N3 - Moderate							N3 - Moderate						
Impact 4:	Cultural landscape	Visual intrusion into the cultural landscape	Operation	Negative	low	2	3	1	4	5	50	N3	1	3	1	4	5	45	N3
Significance						N3 - Moderate							N3 - Moderate						
Impact 5:	Cultural landscape	Visual intrusion into the cultural landscape	Decommissioning	Negative	low	2	3	1	2	5	40	N3	1	3	1	2	5	35	N3
Significance						N3 - Moderate							N3 - Moderate						

graves is expected to be **very low negative** because of the small overall footprint and high degree of survey coverage of the footprint.

Cumulative impacts to the landscape are not expected to be of much concern because of the many gold mines occurring in the area. The mines undoubtedly result in higher magnitude visual intrusions and have effectively established an industrial component to the landscape into which the wind turbines would fit fairly easily. However, the proposed turbines are very tall. The contribution to cumulative impacts is rated as **low negative**.

6.5. 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 facility will be providing electricity to South Africa which will result in obvious benefits to society at many levels. There will be local job creation during construction and operation but, more widely, an improvement in electricity supply in South Africa will stimulate the economy and result in new job opportunities opening up and quality of life improving. These are clear economic and social benefits and, if mitigation is applied as suggested above, then the socio-economic benefits outweigh the residual impacts.

6.6. Existing impacts to heritage resources

The only identified threat comes from the farm boundaries and associated tracks which have, at times, cut through Iron Age settlements (Figure 35). The impact significance can be rated as **moderate negative**. The only other threats to heritage resources on the site are the natural degradation, weathering and erosion that will affect archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. The wider cultural landscape has been impacted by the gold mining infrastructure in the wider area. These impacts would be of **moderate negative** significance.



Figure 35: Aerial photographs from 2005 and 2014 showing a farm boundary road having been cut through Site 07.

6.7. The No-Go alternative

If the project were not implemented then the site would stay as it currently is (impact significance of **moderate negative**). The heritage impacts with implementation would not be greater than the existing impacts, and the loss of potential socio-economic benefits would be of concern. This 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. Although the project is likely to be visible from many public locations, the presence of gold mines in the area, which contribute visual clutter, means that the impacts are not deemed unacceptable.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The actions recorded in Table 4 should be included in the environmental management programme (EMPr) for the project.

Table 4: 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	<u>Planning Phase</u> : Compile heritage management plan to ensure that sites are adequately protected during and after development.	Compile management plan with appropriate recommendations	Once-off	Project developer
Damage or destruction of archaeological sites	Avoid impacts	<u>Planning & Construction Phase</u> : In the event that any sites are still impacted, an archaeologist is to be consulted regarding mitigation measures.	Commission archaeologist to plan and implement mitigation well in advance of construction (preferably 6 months)	Once-off	Project developer
Damage or destruction of archaeological sites	Locate sensitive areas before damage occurs and avoid impacts	<u>Construction Phase</u> : No-Go signage will need to be placed along the margins of the following sites adjacent to the final layout: Sites 01, 02, 05, 07, 08, 16, 17, 18, 20, 23 and 25.	Monitoring of No-Go areas (construction period only)	Ongoing basis	Construction Manager or Contractor or ECO
				Whenever on site (at least weekly)	ECO
Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	<u>Construction Phase</u> : 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
Impacts to the cultural landscape					
Visible landscape scarring	Minimise landscape scarring	<u>Construction Phase</u> : Ensure disturbance is kept to a minimum and does not exceed project requirements. 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	<u>Operation Phase</u> : 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	<u>Operation Phase</u> : 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	Operator
Intrusion into cultural landscape	Minimise contrast and light pollution	<u>Operation Phase</u> : Make use of early warning system (if available) to allow red aircraft navigation lights to remain off at night.	Monitor that this has been considered in the design and operation of the facility	Once off	Operator
Visible landscape scarring	Minimise landscape scarring	<u>Decommissioning Phase</u> : Ensure all areas are rehabilitated following specialist rehabilitation plan.	Monitor compliance and success of rehabilitation	As required	EO

8. CONCLUSIONS

The main concerns for this project are impacts to archaeology and impacts to the cultural landscape. The landscape is generally rural but strong nodes of industrial activity occur and are expected in this landscape. These relate to gold mining. As such, although a local impact to the cultural landscape will occur if development proceeds, this is unlikely to be seen as unacceptable in this context. Impacts to archaeology are of more concern and in a number of instances, as mitigation, the project layout will need to be adjusted to avoid impacts. These instances are discussed and illustrated below.

Near the project access point in the east a road will need to be realigned towards the north approximately as shown in Figure 36. This is to allow a suitable buffer around a cemetery. Near the centre of the study area a road will need to be rerouted to avoid a grade IIIB archaeological site (Figure 37). The realigned road will also probably require that the substation is shifted slightly, although the substation location itself is not problematic. In the southwest, turbines 1, 3 and 5 and associated project roads have been placed very close to the edges of large LIA sites and one historical site. This proposed infrastructure will all need to be shifted slightly north to ensure a buffer around the sites (Figure 38). The proposed location of turbine 7 and its access road are acceptable, but it is noted that the actual footprints are far wider than the lines depicted in the mapping. The developer will need to ensure that all infrastructure is placed as far east as possible in this area so as to maintain a buffer around the LIA site (Figure 39). The project road adjacent to the LIA complex at Site 08 should be shifted slightly towards the northeast to maintain a protective buffer around the site (Figure 40).



Figure 36: Aerial view of a project access road (red line) passing the edge of a cemetery (Site 23). The rerouted road should be placed north of the black line.

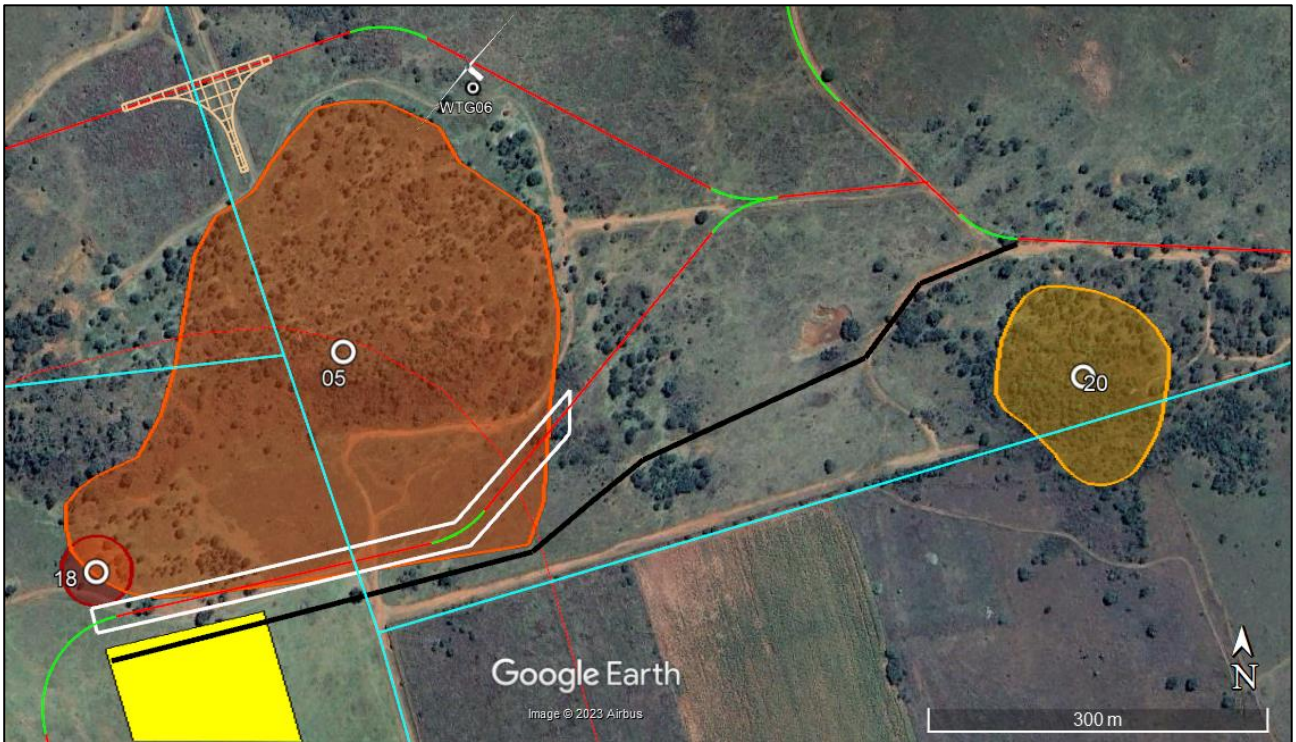


Figure 37: Aerial view of a project access road (red/green line) passing the edge of an LIA settlement (Site 05) and grave (Site 18). The white polygon indicates the section of road that may not be used. The black line is a suggested new alignment.

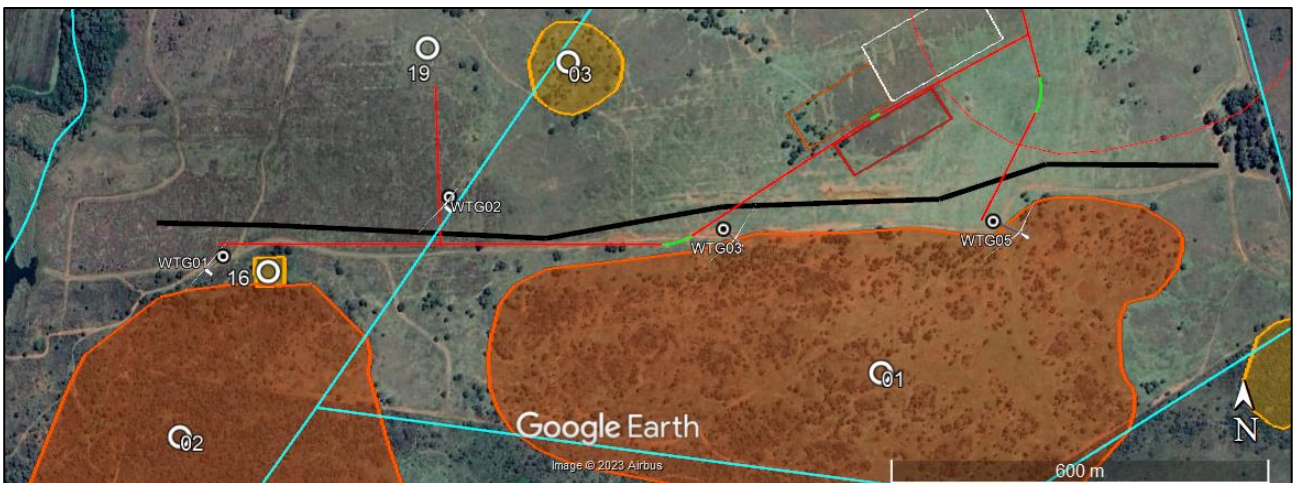


Figure 38: Aerial view of project roads (red/green) and turbines (numbered dots) located along the edge of two LIA sites (Sites 01 & 02) and a historical site (Site 16). All infrastructure should be located to the north of the black line to allow a buffer.

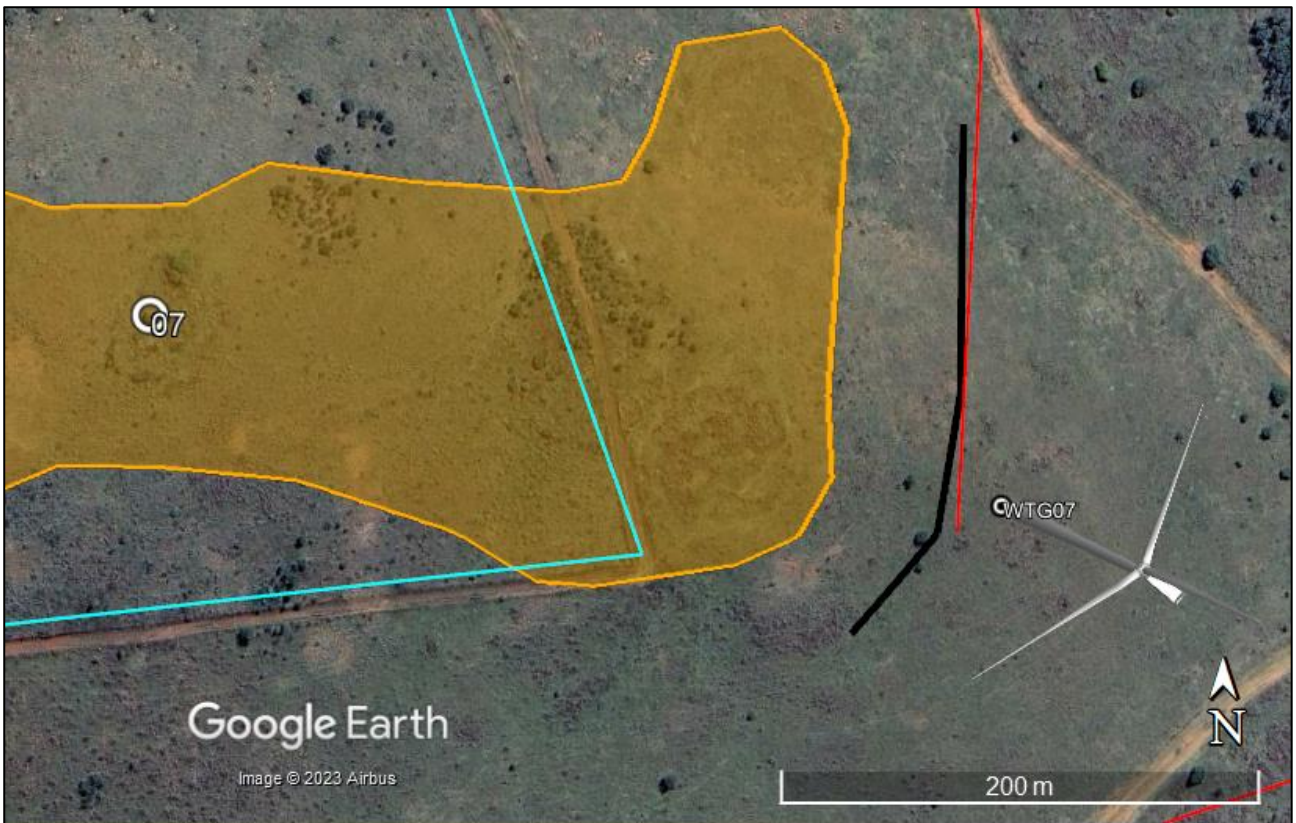


Figure 39: Aerial view of a project access road (red line) passing close to an LIA settlement (Site 07). The proposed road and turbine locations are acceptable, but infrastructure should all be placed east of the black line.



Figure 40: Aerial view of a project access road (red/green line) passing close to an LIA settlement (Site 08). The road will need to be shifted slightly towards the northeast to allow a buffer, possibly along the black line.

All of these issues should be easily manageable as mitigation measures and, if applied successfully, there is no objection to the development of the Igolide WEF. Nonetheless, all work on site should proceed on the assumption that graves could be encountered at any time. This is because it can be very difficult to locate graves in the grass and, even though the layout has been surveyed, it is possible to miss graves located just a few meters away from the archaeologist.

8.1. Reasoned opinion of the specialist

The Igolide WEF layout is generally acceptable subject to the implementation of the recommended mitigation measures. If these measures are successfully implemented in the final layout then there is no objection to the project and it is the opinion of the heritage specialists that it may be authorised in full.

9. RECOMMENDATIONS

The proponent must make the following adjustments to the layout prior to final submission of the application for environmental authorisation:

- The project road past the graveyard at Site 23 should be shifted north to allow a 30 m no-go buffer around the graveyard;
- The project road passing through the Late Iron Age site at Site 05 should be rerouted towards the south. It is recognised that the project site boundary provides a constraint in terms of buffer width (30 m would be ideal) and the road should thus be placed as far south as possible;
- Turbines 1, 3 and 5 and their associated roads should be shifted to the north to allow a 30 m no-go buffer between them and the Late Iron Age and historical Sites 01, 02 and 16;
- The project infrastructure at Turbine 7 must be placed far enough east to allow a 30 m no-go buffer around the Late Iron Age Site 07; and
- The project road passing the north-eastern part of Late Iron Age Site 08 should be shifted towards the northeast to allow a 30 m no-go buffer between it and the site.

If the above layout changes are implemented then it is recommended that the proposed Igolide WEF be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- Given the high density of archaeological sites, a heritage management plan should be compiled to ensure adequate protection of the sites both during and after construction;
- No roads are permitted to cross Late Iron Ages sites;
- A 30m no-go buffer must be applied around all archaeological sites and graves;
- The portion of the graveyard falling within the site must be fenced (farm-style fence with pedestrian gate);
- No-go signage should be placed along the margins of Sites 01, 02, 05, 07, 08, 16, 17, 18, 20, 23 and 25, adjacent to the project infrastructure and the ECO should monitor compliance;

- Should the layout be revised as part of an amendment process post Environmental Authorisation, an archaeologist must check the revised layout before grubbing commences to ensure that no-go areas are avoided and that No-Go signage is in place;
- No stones may be removed from any archaeological sites;
- An early warning system to allow the red aircraft warning lights to remain off until required should be considered for use;
- Buildings to be painted in earthy colours where feasible;
- Ensure effective rehabilitation of all disturbed areas not required during operation;
- Ensure effective rehabilitation of all disturbed areas after decommissioning; and
- 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: 23 Dover Road, Muizenberg, 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 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

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)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

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

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 –
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	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

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

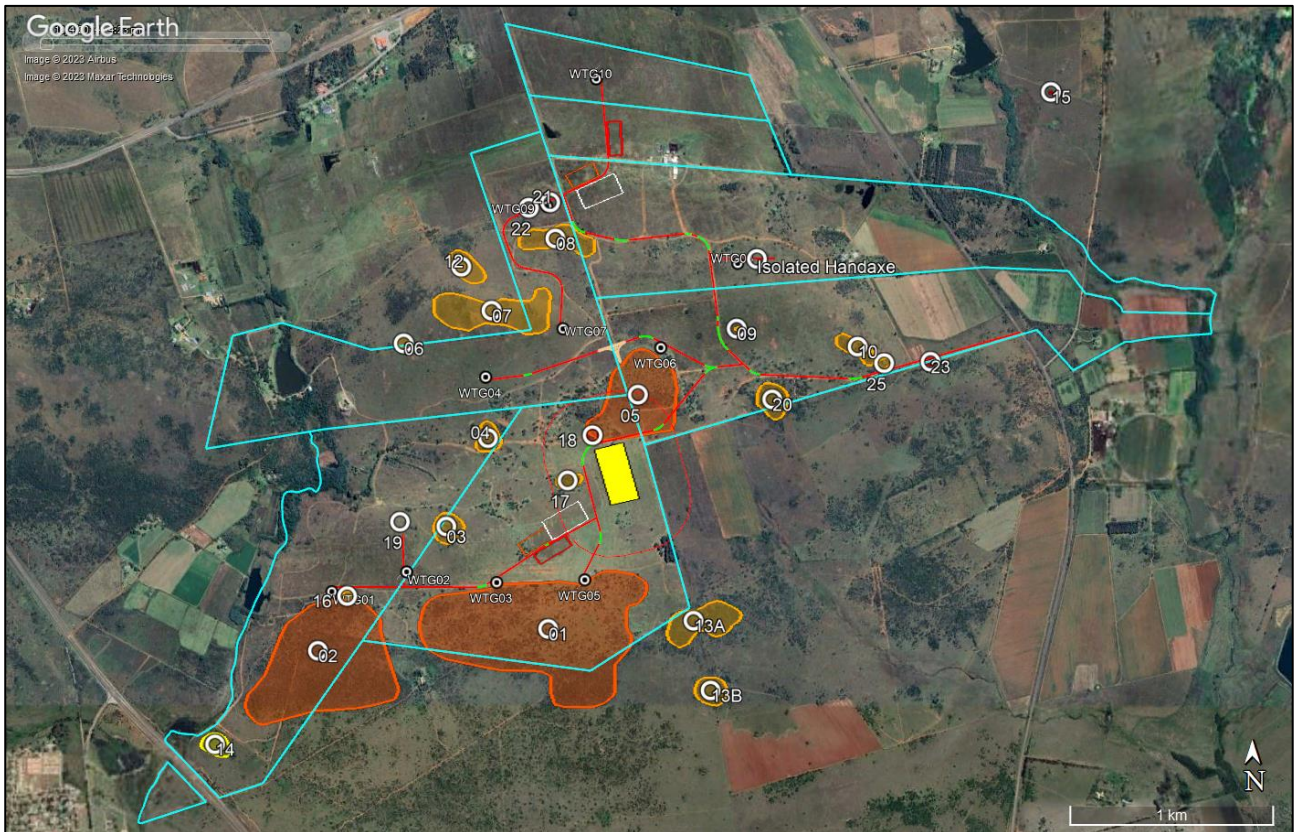
Awards:

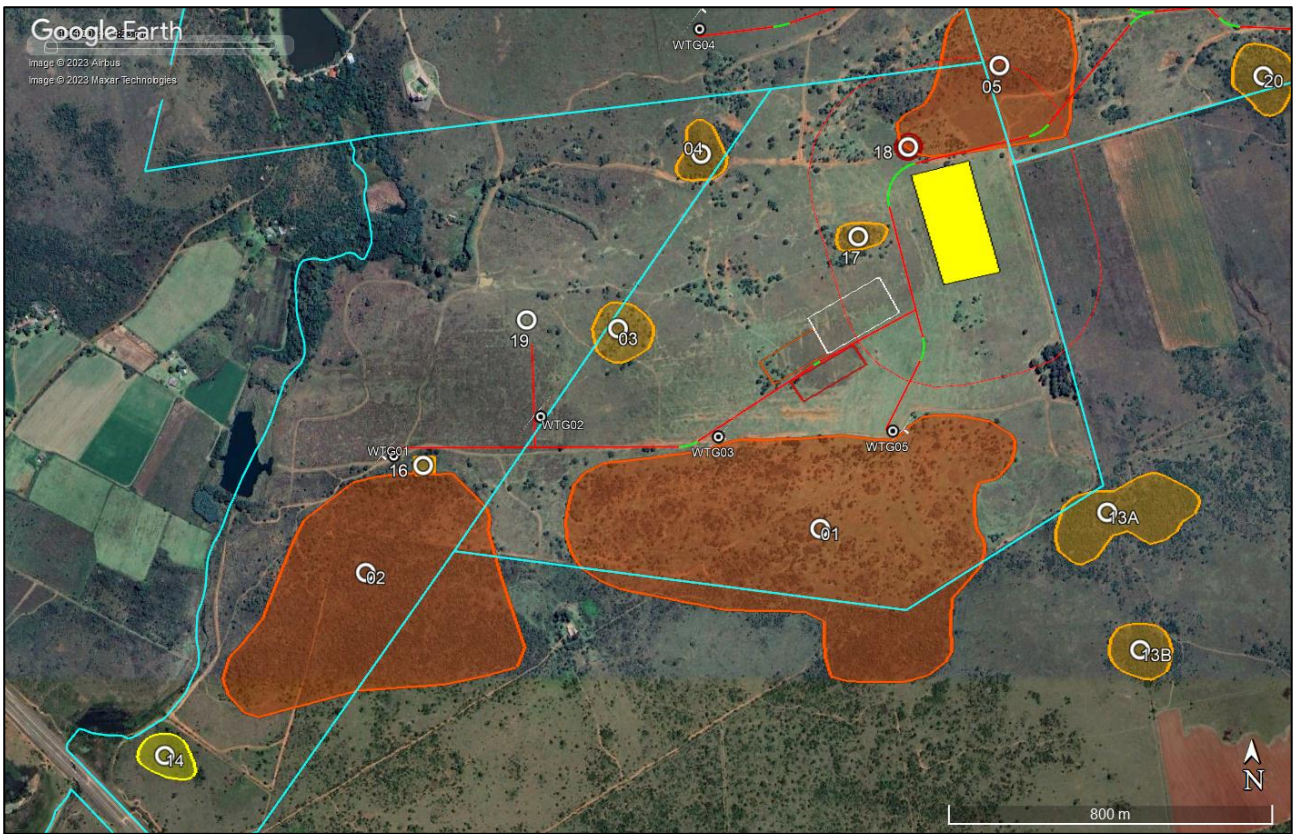
Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

APPENDIX 2 – Mapping

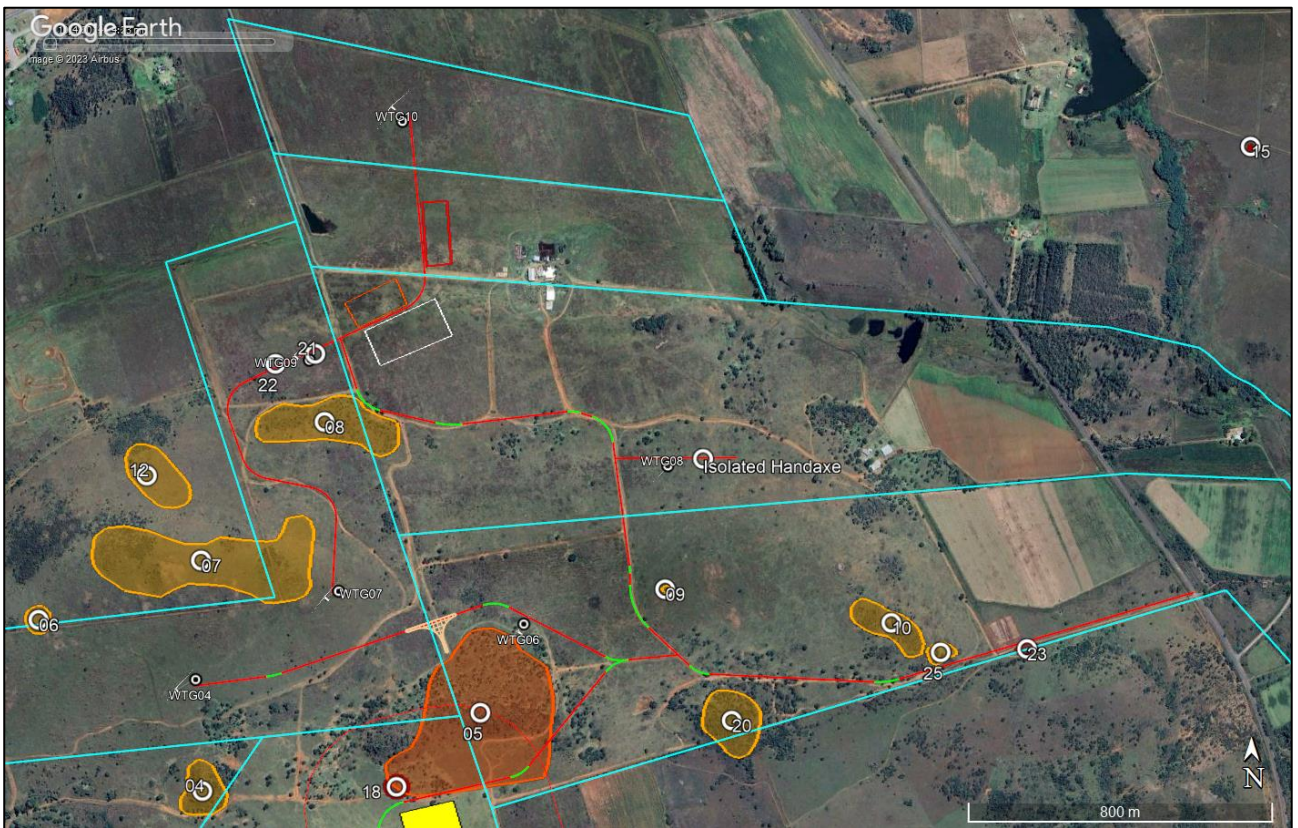
This appendix shows the locations of heritage sites relative to the proposed turbine layout. Key as follows:

- Turquoise polygons = farm portions;
- Black/white numbered dots = wind turbine generators (WTG);
- Yellow polygon = substation complex (with red buffer area);
- Numbered polygons = known archaeological sites (dark red = IIIA [these are graves], light red = IIIB, orange = GPA, yellow = GPB).





South-western part of project area.



North-eastern part of project area.

APPENDIX 4 – 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	23 rd and 24 th August 2023
Specialist Name	Dr Jayson Orton (report) & Jaco van der Walt (fieldwork & report)
Professional Registration Number	ASAPA: 233; APHP: 043 (JO) ASAPA: 159; APHP: 114 (JvdW)
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd Beyond Heritage

Method of the Site Sensitivity Verification

Initial work was carried out using satellite aerial photography in combination with the authors' accumulated knowledge of the local landscape and some desktop research. This was used to provide sensitivity data which informed the scoping report and initial layout. Subsequent fieldwork confirmed the findings as well as locating further sites and graves. This information is presented in the report.

Outcome

The first map below is extracted from the screening tool report and shows the archaeological and heritage sensitivity to be low throughout the study area. The aerial photography and ground survey showed very clearly that there are many archaeologically sensitive areas scattered across the study area. A number of farm buildings were also shown to pre-date 1938 but these are all located away from the proposed layout. The second map below shows the areas considered to be sensitive from a heritage point of view. All are assigned medium or high sensitivity with one exception (which was not visited) that may not be old enough to be a heritage resource and was considered to be of low sensitivity.

Sites of Grade IIIA (high cultural significance), IIIB (high cultural significance) and GPA (medium cultural significance) should be regarded as of high sensitivity. GPB sites (low cultural significance) can be seen as medium. There are no sites graded GPC in the study area. The heritage specialists thus **dispute** the Screening Tool report.

