

**HERITAGE IMPACT ASSESSMENT:
PROPOSED 132 kV POWERLINE FOR PAARDE
VALLEY PV2 AT DE AAR, DE AAR MAGISTERIAL
DISTRICT, NORTHERN CAPE**

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)
as part of a Heritage Impact Assessment

SAHRA Case ID: 18817

Report for:

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On behalf of:

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SUMMARY

ASHA Consulting (Pty) Ltd was appointed by Holland & Associates Environmental Consultants to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of (1) a 132 kV powerline and switching station to connect the Paarde Valley PV2 solar energy facility (SEF) to the national electricity grid and (2) an access road to the switching station. The project lies to the north and east of De Aar.

The landscape is generally very flat, although a low dolerite rise is crossed by the powerline corridor and a low but rocky dolerite hill occurs adjacent to the corridor in the south. The ground is well-vegetated with grass. In some areas the grass was extremely dense, especially in the north close to the Brak River, while in other places there were patches of exposed substrate which afforded good ground visibility. There are many existing powerlines and other electrical facilities in the landscape, and the access road and switching station will be adjacent to an already authorised SEF, while the powerline corridor runs from there past another authorised SEF.

The field survey showed that ephemeral archaeological traces were present in many areas. However, only two landscape features likely to have attracted precolonial settlement occurred in the corridor. One is the banks of the Brak River, and the other is a dolerite hill in the far south. Both areas had ephemeral traces of LSA occupation, but material seen elsewhere was largely from the Middle Stone Age and well-patinated indicating great age. One ephemeral historical scatter occurred along the Brak River, and the more significant historical site known to occur further north lies about 400 m away from the project.

The landscape was found to be heavily dominated by existing electrical infrastructure which forms a new layer on the landscape. The new development will thus be in keeping with this land use and will not introduce any new or significant impacts.

It is recommended that the proposed powerline (with either alternative), switching station and access road be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- Surface clearance is to be kept to the minimum required for the project; 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

Background scatter: Artefacts whose spatial position is conditioned more by natural forces than by human agency.

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

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

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

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.

Patina: The weathered surface of an artefact which has changed colour and/or texture (patinated, patination).

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

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

ECO: Environmental Control Officer

EGI: Electricity Grid Infrastructure

EMPr: Environmental Management Program

ESA: Early Stone Age

GP: General Protection

GPS: Global Positioning System

HIA: Heritage Impact Assessment

LSA: Later Stone Age

MTS: Main Transmission Station

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

OHPL: Overhead Power Line

PPP: Public Participation Process

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

SEF: Solar Energy Facility

SwS: Switching Station

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1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by Holland & Associates Environmental Consultants to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of (1) a 132 kV powerline and switching station to connect the Paarde Valley PV2 solar energy facility (SEF) to the national electricity grid and (2) an access road to the switching station. The project lies to the north and east of De Aar (Figures 1 to 3). The SEF was originally proposed to connect to the De Aar Substation, but that substation no longer has capacity and a new connection is required. The proposed project will run between the following points:

- S30° 37' 31.5" E24° 00' 39.4" in the west (this is the start of the access road);
- S30° 37' 31.5" E24° 00' 39.4" in the north (this is the location of the Paarde Valley on site substation); and
- S30° 41' 18.8" E24° 05' 38.6" in the southeast (this is the location of the proposed Vetlaagte Main Transmission Station (MTS) which is currently undergoing a separate authorisation process).

The proposed access road would be on Farm 145/2 only, the powerline corridor crosses or touches onto the following properties:

- | | | |
|----------------|--------------|------------------------|
| 1. Farm 145/2 | 8. Erf 5115 | 15. Farm 145/30 |
| 2. Erf 266 | 9. Erf 5121 | 16. Farm 145/31 |
| 3. Farm 145/6 | 10. Erf 5122 | 17. Farm 179/remainder |
| 4. Farm 145/29 | 11. Erf 5123 | 18. Farm 4/remainder |
| 5. Erf 268 | 12. Erf 5127 | 19. Farm 145/43 |
| 6. Erf 5113 | 13. Erf 5315 | |
| 7. Erf 5114 | 14. Erf 5316 | |

1.1. The proposed project

1.1.1. Project description

The project comprises of the following components:

- A 132kV, double circuit Overhead Power Line (OHPL) from the Switching Station connecting to the proposed Vetlaagte Main Transmission Substation (MTS)
- 132kV Feeder bay at the Vetlaagte MTS
- On-site Switching Station (SwS), adjacent to the authorised IPP 132 kV substation. (approximately 100 m x 100 m combined)

The technical details are as follows:

Overhead Powerline:

- Length: 13 km
- Height of pylons: up to 32 m
- Type of poles/ pylons to be used: Double Circuit configuration with Steel lattice or Monopole structures considered as alternatives
- Transmission line capacity: 132kV

- OHPL Service Road (to lie within the OHPL servitude):
 - Length of OHPL service road(s) – Twin tracked service road following line route
 - Width of OHPL service road(s) 6 m

Switching Station:

- Footprint of approximately 50 m – 100 m x 100 m adjacent to IPP Substation
- Area occupied by buildings (Control building, relay room, generator, storage warehouse, water tanks, ablutions) +-1.0 Hectares
- Switching Station Access Road (separate access servitude from the nearest public road to the Switching Station yard)
 - Compacted gravel
 - Length of access road: +- 2.34 km
 - Width of access road: 8 m.
- Security fencing height: 2.4 m
- Type of fencing: Eskom palisade fencing + chainlink fencing for temporary works
- Capacity of on-site switching station 132kv

1.1.2. Identification of alternatives

There are no location alternatives as the powerline route has been guided by property boundaries and existing powerlines to create a logical layout and minimise impacts to existing farming activities. Also, there are no other connection options available and the powerline needs to connect to the Vetlaagte MTS. The switching station must be located adjacent to the authorised on-site substation and the access road has been logically placed within but along the southern margin of the authorised PV footprint. As such, the only alternatives under consideration are the pylon type (i.e. lattice tower or monopole) and the No-Go option.

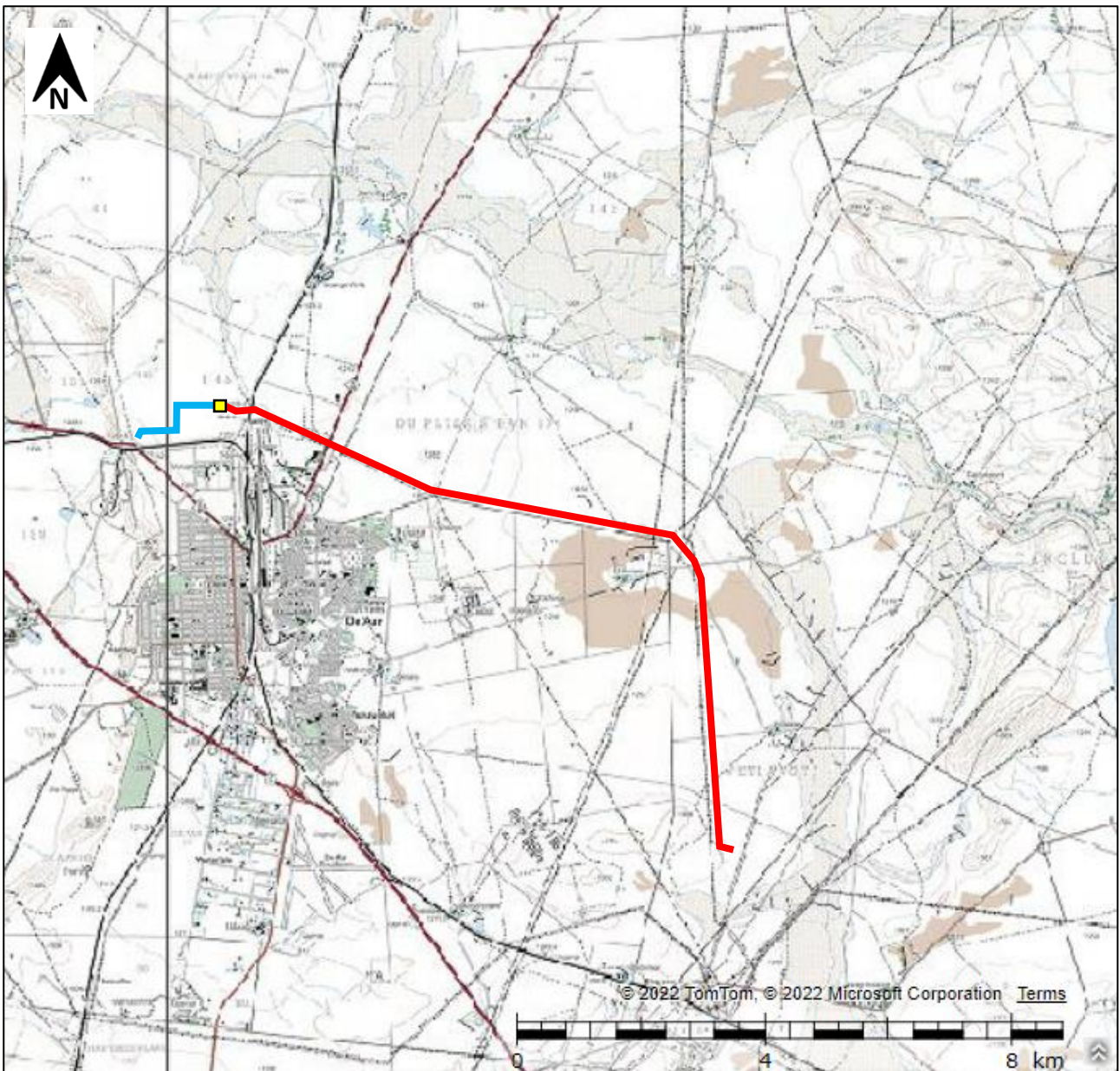


Figure 1: Extract from 1:50 000 topographic maps 3023DB and 3024CA showing the location of the project (red line shows the powerline, yellow square shows the switching station, blue line shows the access road). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: <http://www.cdngiportal.co.za/cdngiportal/>.

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.

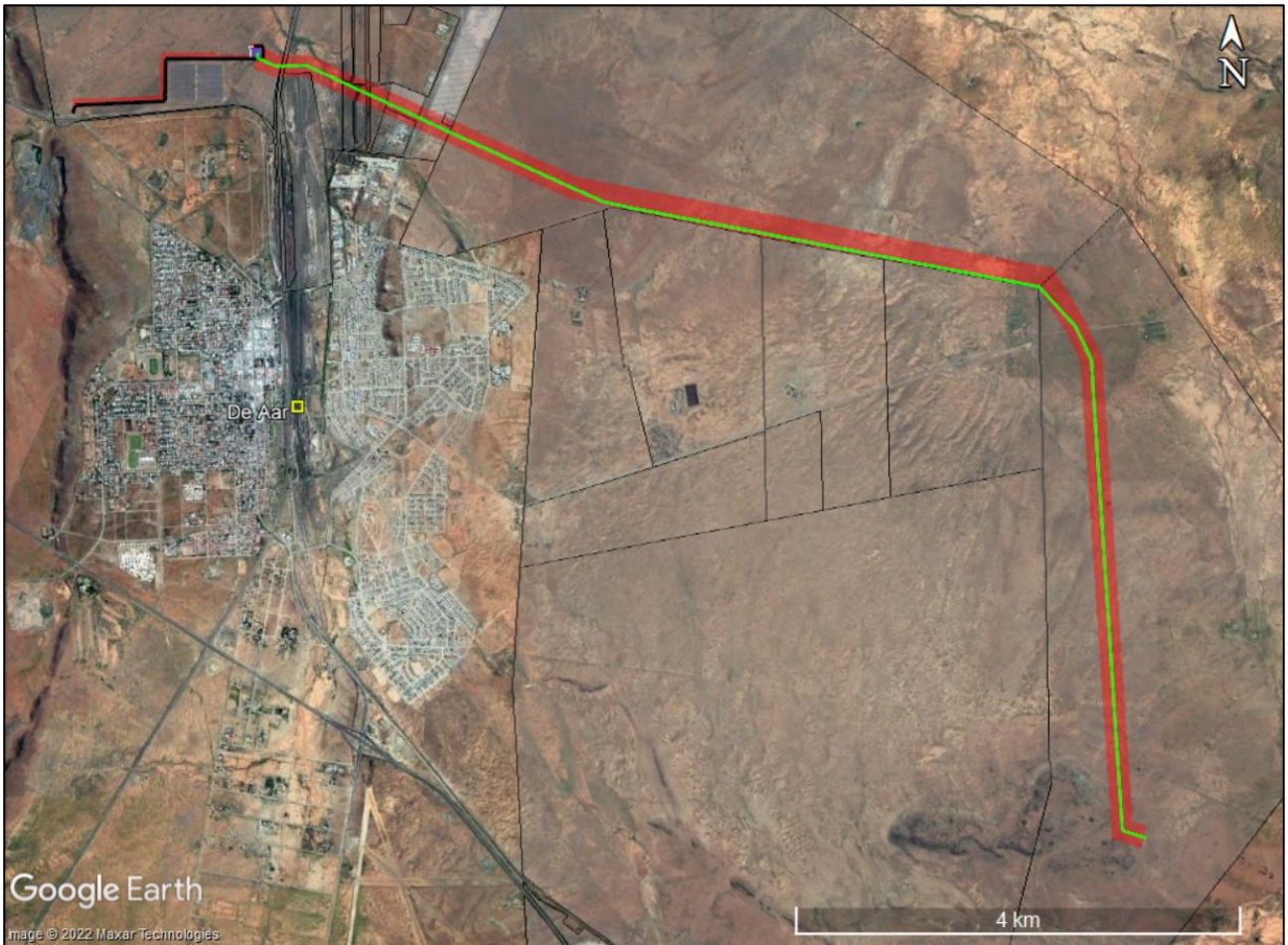


Figure 2: Aerial view of the De Aar area showing the proposed powerline (green line within red corridor) and access road (black line within red corridor) relative to the town (at left) and farm portions (black polygons).

1.2. Terms of reference

- Conduct a site inspection to look for any heritage resources within the project footprint;
- Produce a Site Sensitivity Verification Report; and
- Compile a specialist impact assessment report, in line with Appendix 6 of the EIA Regulations 2014, as amended.

1.3. Scope and purpose of the report

A heritage impact assessment (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 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 Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

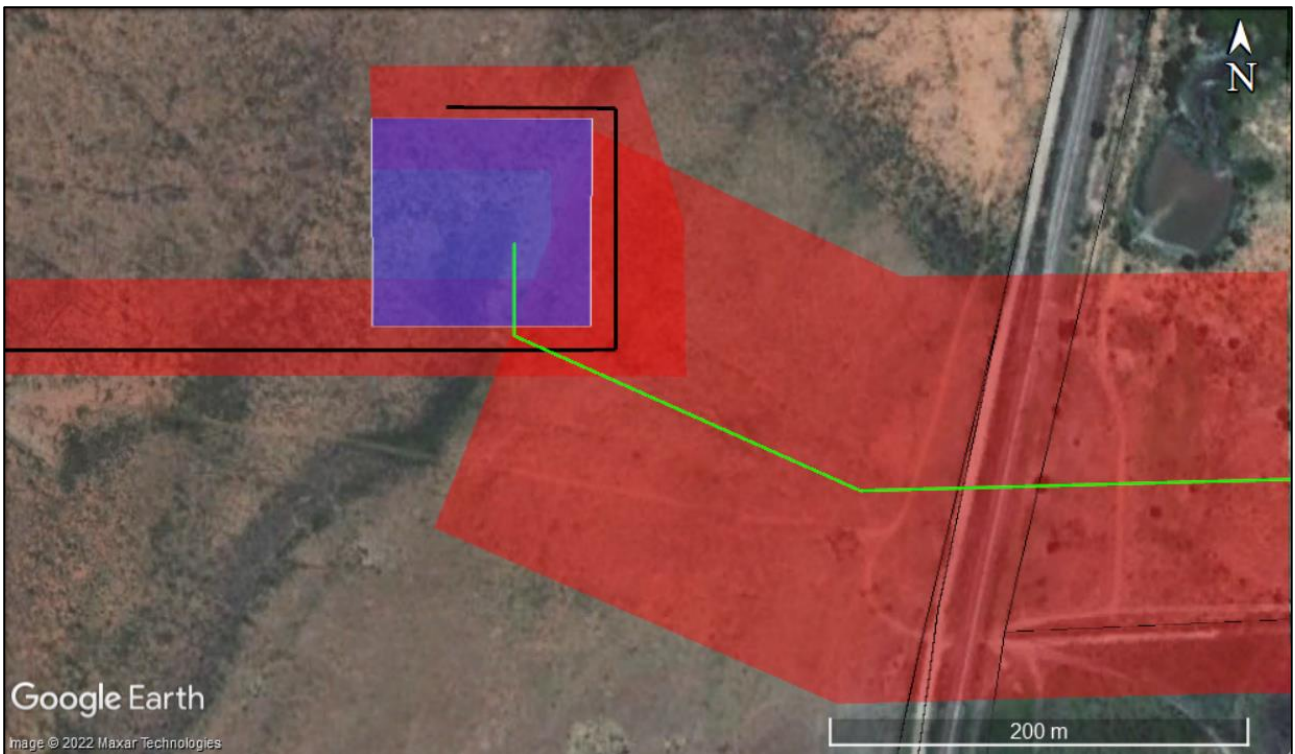


Figure 3: Detail of the northern part of the study area around the switching station (within purple polygon).

1.4. The author

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

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

1.5. Declaration of independence

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

2. LEGISLATIVE CONTEXT

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

The NHRA protects a variety of heritage resources as follows:

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

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

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

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

- a) its importance in the community, or pattern of South Africa’s history;
- b) its possession of uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage;
- c) its potential to yield information that will contribute to an understanding of South Africa’s natural or cultural heritage;

- d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i) sites of significance relating to the history of slavery in South Africa.

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

2.2. Approvals and permits

2.2.1. Assessment Phase

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BA. The present report provides the heritage component. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the National Department of Forestry, Fisheries and the Environment (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 done 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:

- 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.
- SAHRA. 2007. Minimum Standards: archaeological and palaeontological components of impact assessment reports. Document produced by the South African Heritage Resources Agency, May 2007.

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.

3.2. Field survey

The site was subjected to a detailed foot survey on 19 and 20 April 2022. This was during autumn. Very good summer rains had resulted in the grass cover being more dense than usual which did limit ground visibility for the archaeological survey. Part of the study area was surveyed on 8 and 9 December 2021 which was during early summer. The ground visibility was good at that time. 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 4). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

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

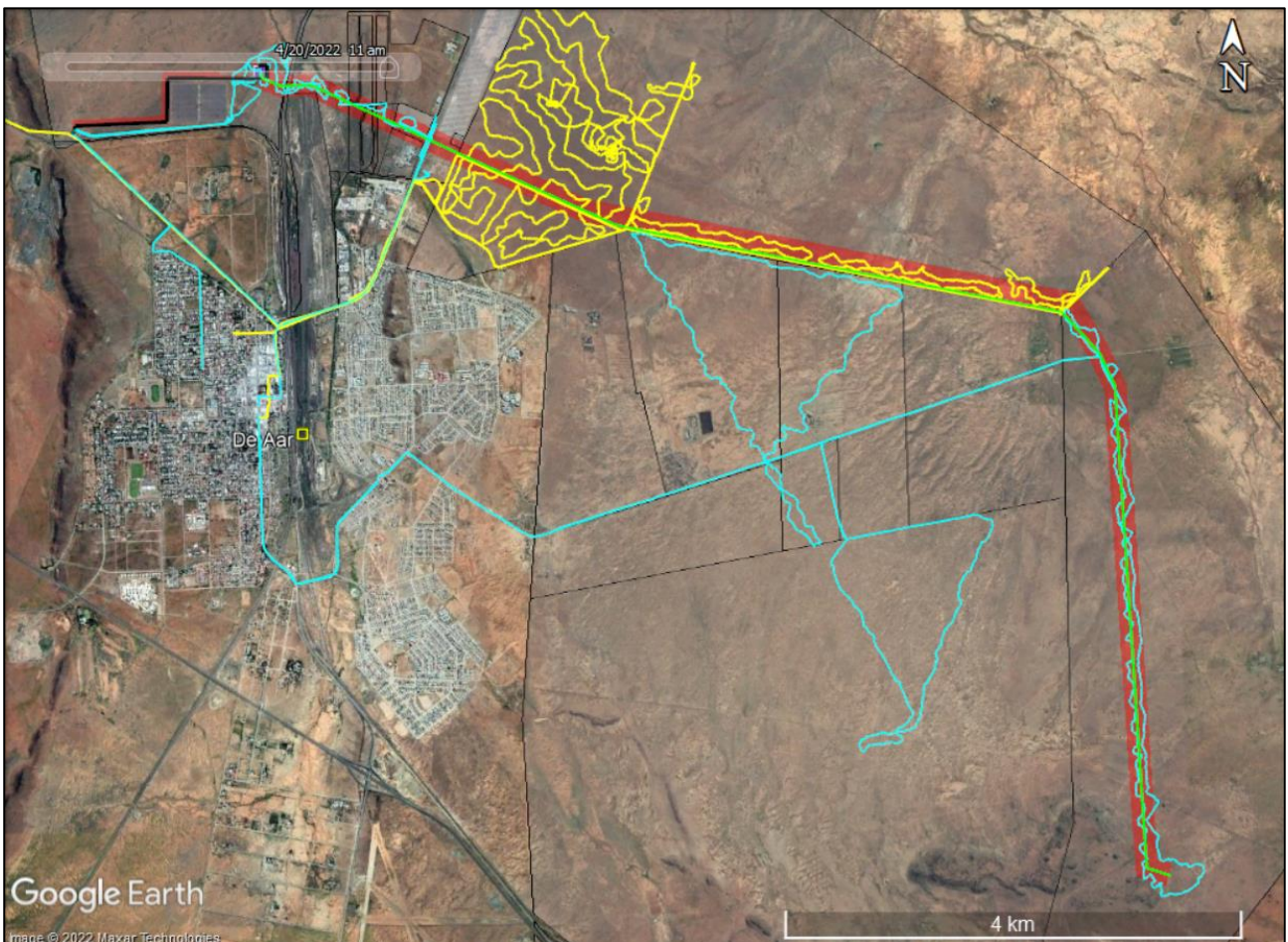


Figure 4: Aerial view of the study area (key as per Figure 2) showing the survey tracks (yellow lines from December 2021, turquoise lines from April 2022). The PV facility tracks (which would be in the northwest corner of this view) were not available.

3.3. Specialist studies

A separate specialist palaeontological study has been prepared by Elize Butler. It is submitted separately and must be read in conjunction with this HIA.

3.4. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a scale supplied by Holland & Associates.

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. Dense grass cover limited ground visibility with this problem being especially acute in the north (east of the R48 road). The access road was not surveyed since it lies within the already surveyed and authorised PV footprint and was also densely vegetated. Two areas could not be accessed for reasons unrelated to the fieldwork. Observations in the wider area suggest that significant precolonial heritage is associated with rivers, hills or ridges and that historical sites are more highly visible, even in grassy areas. These limitations are thus unlikely to have affected the overall assessment of impacts.

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

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The study area lies to the north and east of De Aar. A substantial railway junction is present at De Aar and splits the town into two. Several renewable energy facilities (both wind and solar) occur nearby, and powerlines are abundant, especially leading in and out of the Hydra Substation (2.5 km south of the south-eastern end of the study area). The study area falls wholly within the Central Electricity Grid Infrastructure (EGI) Corridor.

4.2. Site description

The site photographs shown in Figures 5 to 15 proceed from the western end of the study area towards the southeast. It is evident that the site is largely very flat and covered in thick grass. The corridor crosses the Brak River in the north, then crosses the R48 and runs over a low but wide dolerite hill. It then follows flat ground until its south-eastern corner where there is a rocky dolerite hill immediately adjacent to the corridor.



Figure 5: View towards the north across the area through which the proposed access road would run.



Figure 6: Looking towards the west along the proposed access road alignment. The existing PV facility can be seen to the left.



Figure 7: Looking south through the vicinity of the switching station and laydown area.



Figure 8: Looking west directly over the switching station site. The existing PV facility can be seen in the background.



Figure 9: Looking west along the powerline corridor with the railway line visible in the background. Note the very dense vegetation in this area.



Figure 10: A rare mudflat in the northern part of the study area.



Figure 11: Looking west through the northern part of the powerline corridor.



Figure 12: Looking east through the northern part of the powerline corridor from the R48. An existing SEF is visible to the left.



Figure 13: Looking east along the north-eastern part of the powerline corridor.



Figure 14: View towards the west along the powerline corridor from the north-eastern corner. This was during December 2021. Source: Orton (2021).



Figure 15: Looking north along the eastern part of the powerline corridor.



Figure 16: Looking south along the eastern part of the powerline corridor.



Figure 17: Looking towards the east across the south-easternmost part of the powerline corridor. The Vetlaagte Substation will be located on the flat ground between the foreground rocky hill and the powerline 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 shows the site to be of mostly high sensitivity, but small patches of zero, moderate and very high sensitivity also occur. As a result of these ratings, a separate specialist palaeontological study has been carried out and is submitted separately with this HIA. During the archaeological survey a number of pieces of petrified wood were noted in the eastern part of the powerline corridor.

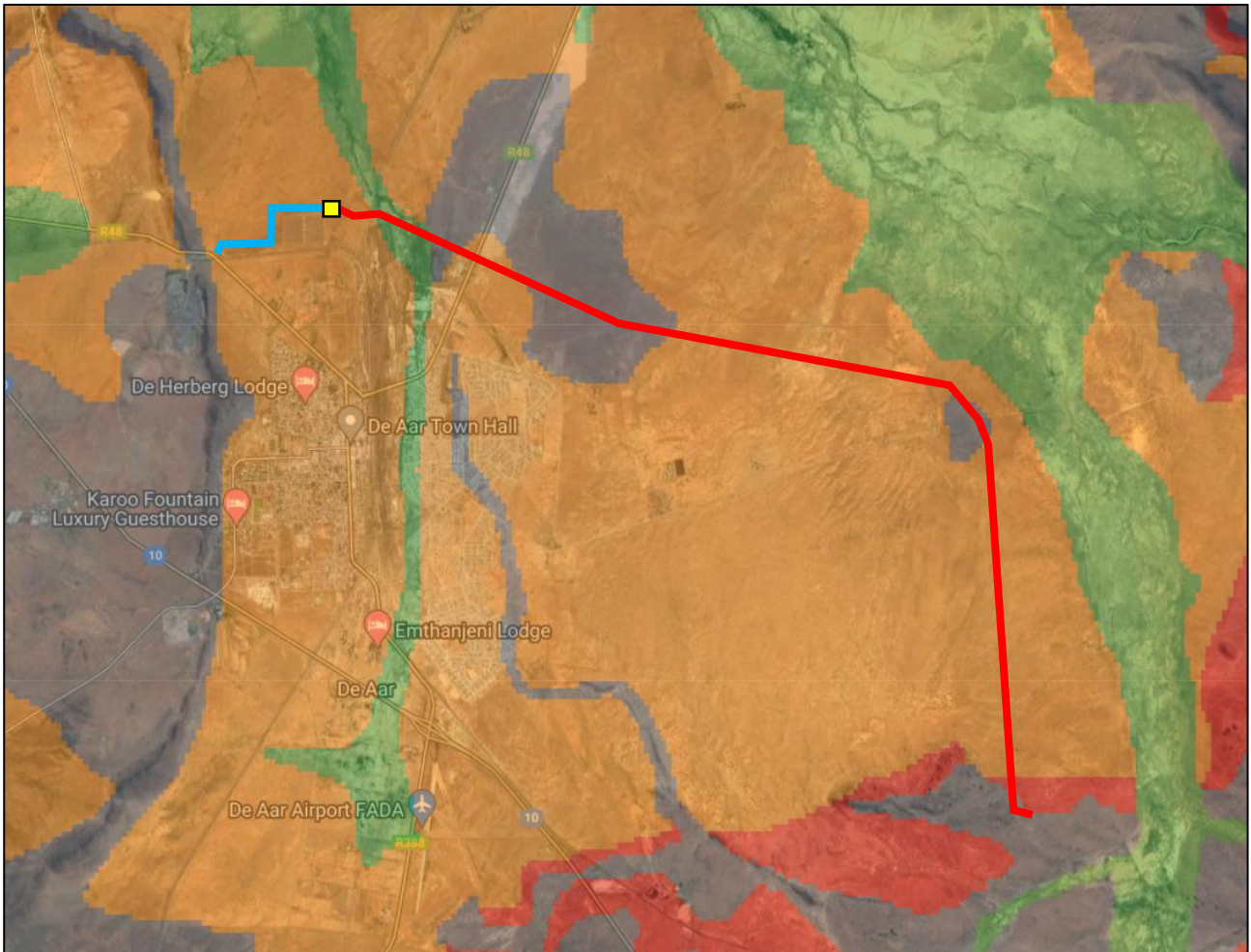


Figure 18: Extract from the SAHRIS Palaeosensitivity Map showing the site to be of largely high sensitivity (orange) but with patches of zero (grey), moderate (green) and very high (red).

5.2. Archaeology

5.2.1. Desktop study

The Karoo has a long pre-colonial history as testified by the many thousands of stone artefacts that can be found among surface gravels in many areas. Most of these artefacts are heavily weathered indicating great antiquity and relate to the Early Stone Age (ESA) and, more usually, the Middle Stone Age (MSA). Although ESA materials are not known from De Aar, local examples of MSA scatters have been recorded by Morris (2011), Kruger (2012) and Orton (2012).

Because they are generally far better preserved, Later Stone Age (LSA) sites are more significant. Sites of this age are largely focused on landscape features such as rivers, pans, springs and hills. The stone artefacts from such sites are generally unweathered or else very slightly weathered and do not occur as widespread background scatters but are more concentrated indicating places where people actually camped. The assemblages also include distinctive retouched forms that can sometimes help to isolate more precisely the age of the site. Sampson's (1985) work in the Seacow River valley has led to the identification of three phases of LSA archaeology based on the types of stone artefacts found. During the early Holocene larger scrapers typified what Sampson called the "Lockshoek" Industry. The "Interior Wilton" followed with the sorts of microlithic tools commonly found on mid-Holocene sites throughout South Africa. Pottery was present on the latest of these sites and on most of the "Smithfield" sites that followed. These three industries are similar to those described as "late Pleistocene – early Holocene nonmicrolithic", "Holocene microlithic" and "late Holocene assemblages with pottery" which are more generalised and widely applicable throughout the country (Deacon 1984) though sites dating to the latter period are frequently not associated with pottery and assemblages from this phase are better referred to simply as "Late Holocene assemblages" (Orton 2006). Probably the most significant aspect of Karoo archaeology is the presence of many prehistoric stone kraals. Most notably, the Seacow River valley to the east of the present study area has revealed many such kraals (Sampson 1984, 1985, 1986, 2010) and enabled a kraal typology to be constructed (Hart 1989). The kraals are typically constructed on sloping ground against dolerite ridges and overlooking water sources. Domestic debris and stone artefacts are seldom associated with them, but when they are, they are taken to represent either the pastoralists camping alongside their kraals or else later re-occupation of the kraals by hunter-gatherer people (Sampson 1985). Although pottery is often taken to signify pastoralist occupation, Sampson (2010) and others (Bollong et al. 1993, 1997; Rudner 1979) have shown that in the interior some pottery is tempered with fibre and was made by Bushmen hunter-gatherers rather than Khoekhoe pastoralists.

The LSA stone artefacts found in the Karoo are not very well understood, perhaps largely as a result of the general lack of datable occurrences. Very few rock shelters have been found and excavated (e.g. Hart 1989) and the vast majority of occurrences on record are open scatters of artefacts with no or very few associated organic materials. Older LSA materials seem to be rather poorly represented in the Karoo, but sites dating within the last few thousand years are far more common. Small thumbnail and end scrapers are frequently encountered and adzes and spokeshaves also form an important part of the retouched component. Such LSA sites have been found locally by Morris (2011), Orton & Webley (2013a, 2013b) and Orton (2021).

A number of ephemeral stone circular features have been recorded on dolerite dykes in the area with many likely to be from the LSA (Orton 2012). However, some show clear evidence of historical construction techniques (Orton & Webley 2013a).

Rock paintings are also said to be known from the area (De Aar, n.d.) but further details are unknown. Orton & Webley (2013a) found a rock gong that also had a faint fine-line animal engraving on it. Some historical engravings (names, initials and dates) are also known from the area (Orton 2012).

Historical archaeology is far less common but a few noteworthy sites are known. Of greatest importance is a long-abandoned farmstead on Du Plessis Dam which has a spectacular dump containing abundant 19th century domestic refuse associated with it. There are also several other

features, including a small spring eye (Orton 2012; Orton & Webley 2013b). Alongside the Brak River on Paardevlei to the north of De Aar was an extensive, but low-density scatter of historical materials that may well represent an Anglo-Boer War camp. Another ephemeral scatter of such material was found by Orton (2021) on a very low hill to the north of and overlooking De Aar. Orton (2012) located a tumbled, rectangular kraal to the south of the present study area and which was thought to be older than any of the nearby structures on the farm.

5.2.2. Site visit

Archaeological materials were seen in a number of areas but they were generally more common in the north in close proximity to the Brak River that passes through the corridor there (Figures 19 to 21). They were largely associated with open mudflats and denuded areas; in the north these were part of the floodplain of the Brak River. All of the archaeological occurrences seen were of very low density (Table 2). The majority are what could be described as background scatter – either artefacts that have been lying on the surface for a long time and do not have spatial integrity, or isolated artefacts that do not relate to any specific site (essentially precolonial litter). They have often been moved by erosion and sheetwash. All artefacts were made on hornfels. These artefacts were often well-patinated which indicates great age (Figures 22 & 23), but some artefacts were somewhat darker in colour with less patination (Figure 24). Rare, isolated artefacts had fresh edges and still retained the typical dark colour of freshly broken hornfels.

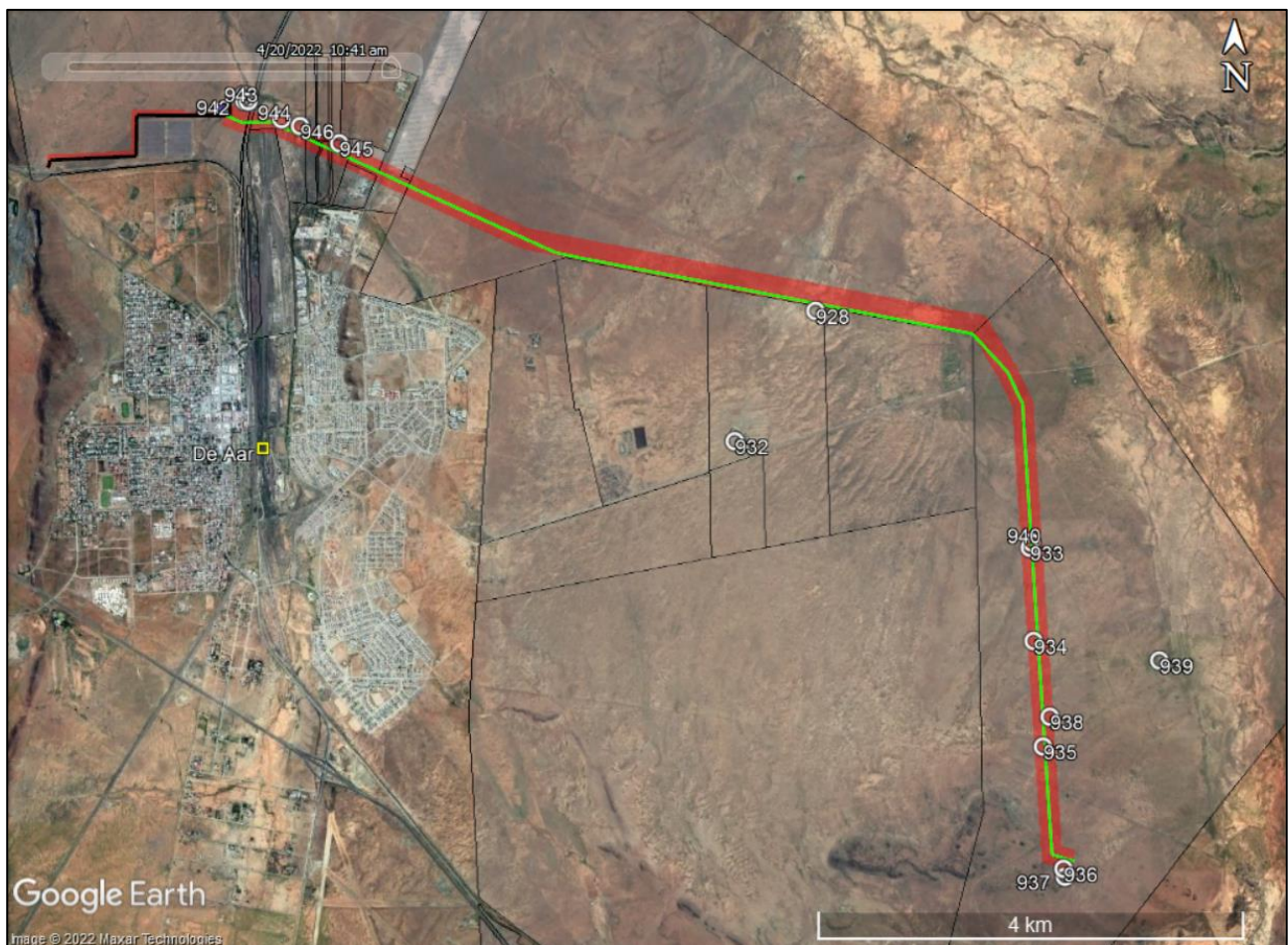


Figure 19: Aerial view of the study area showing the distribution of recorded heritage resources (white numbered symbols).

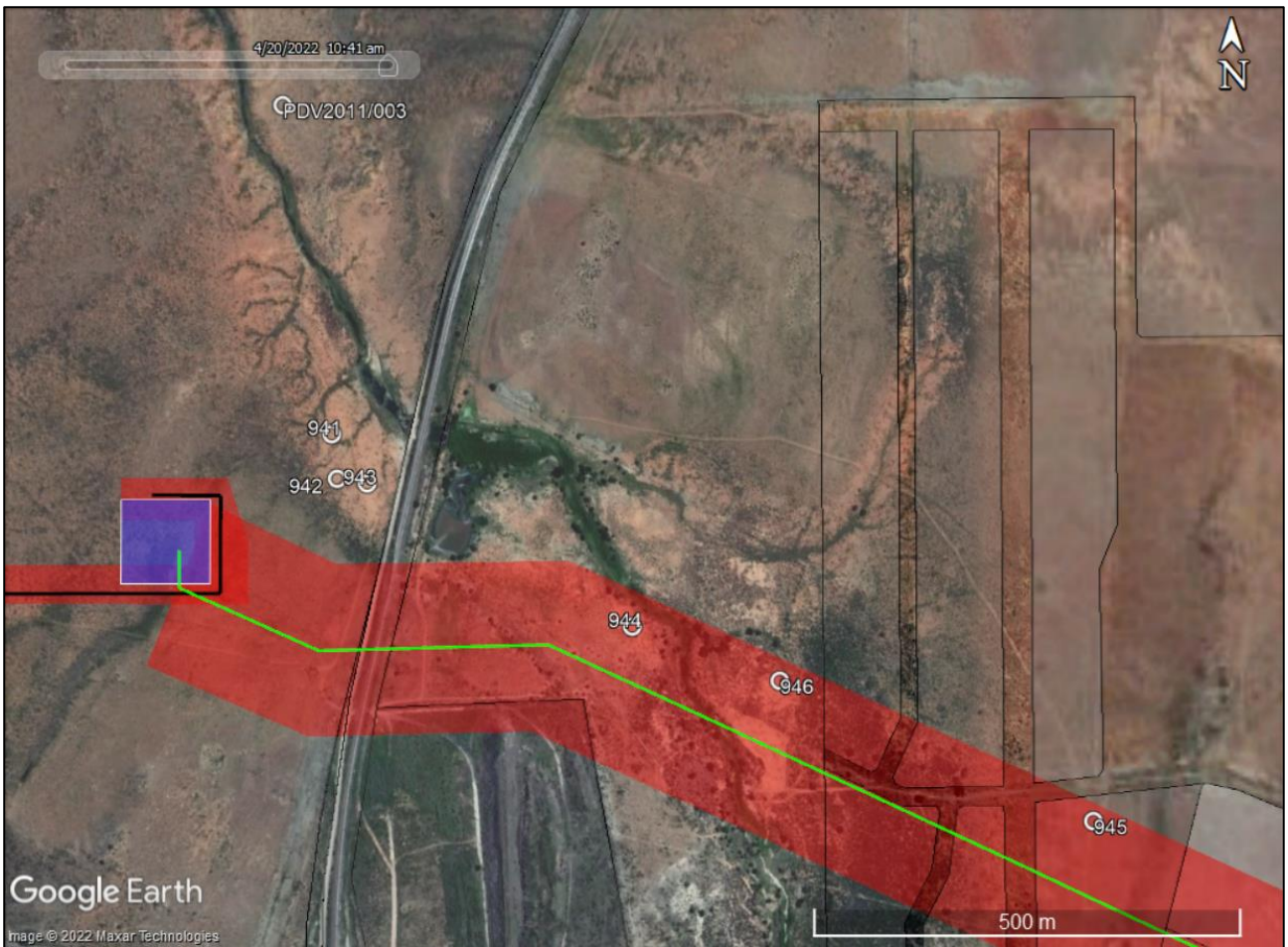


Figure 20: Aerial view of the northern part of the study area showing the distribution of recorded heritage resources (white numbered symbols). PDV2011/003 (from Orton 2012) is also shown.

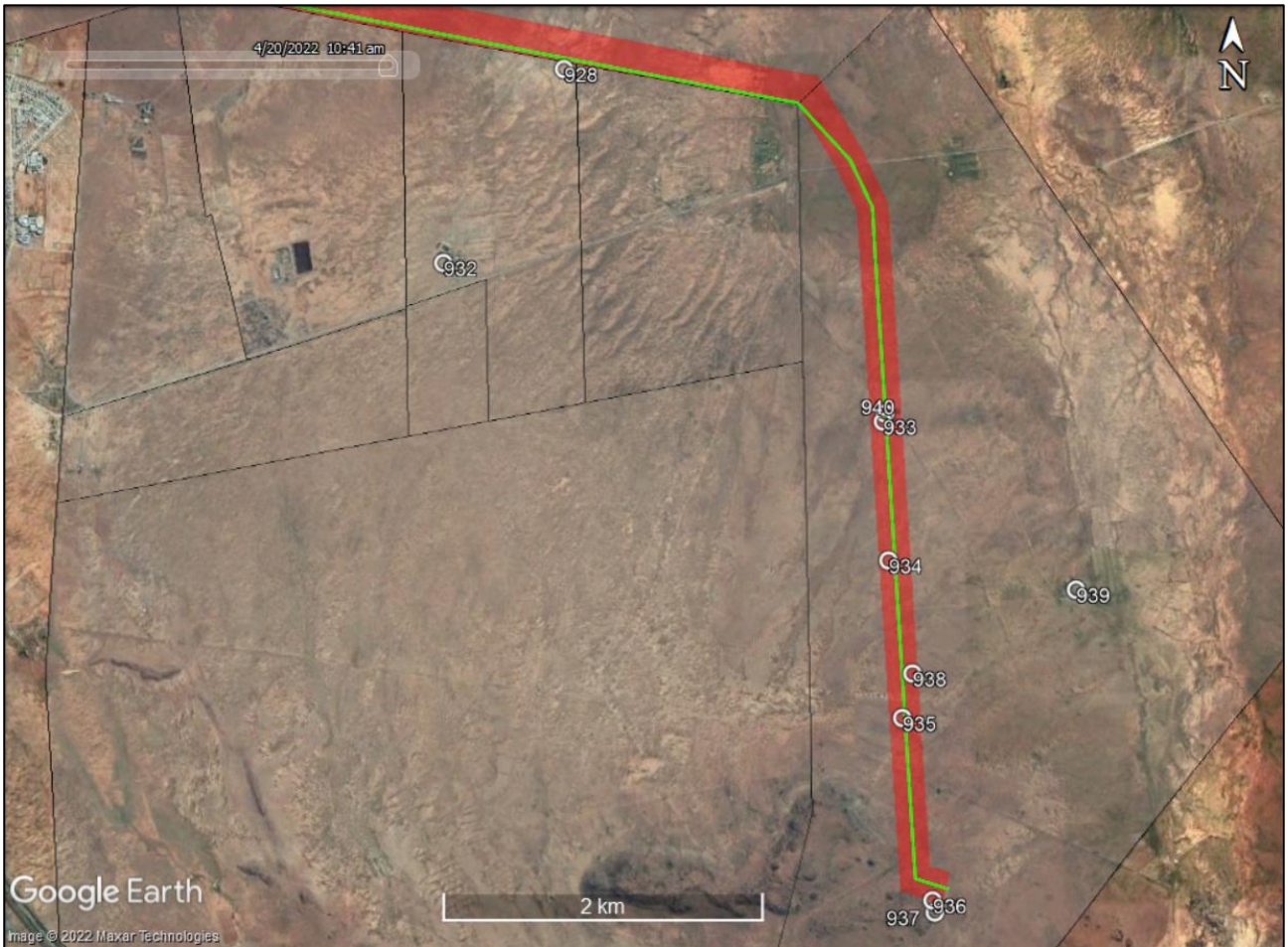


Figure 21: Aerial view of the eastern part of the study area showing the distribution of recorded heritage resources (white numbered symbols).

Table 2: List of heritage resources recorded during the survey.

Waypoint	Location	Description	Significance [Grade]
928	S30 38 32.9 E24 04 08.2	A mixed age scatter of hornfels flaked artefacts in a denuded area.	Very low [GPC]
932	S30 39 12.3 E24 03 39.7	A mid-20 th century farmhouse located about 1.3 km from the powerline corridor. It is surrounded by other features such as sheds, a cement block labourer's cottage and some concrete portable toilets.	Medium
933	S30 39 44.5 E24 05 23.4	An ephemeral scatter of well-patinated MSA hornfels flaked stone artefacts in a denuded area. Some petrified wood was also seen here.	Very low [GPC]
934	S30 40 12.6 E24 05 24.7	An ephemeral scatter of petrified wood fragments.	Very low [GPC]
935	S30 40 44.4 E24 05 27.9	An ephemeral scatter of petrified wood fragments.	Very low [GPC]
936	S30 41 21.1 E24 05 34.9	An ephemeral scatter of LSA hornfels flaked stone artefacts at the eastern edge of a low dolerite hill. The artefacts were not completely fresh but the	Very low [GPC]

		degree of patination evident was minimal. One slightly more patinated piece was also seen.	
937	S30 41 23.5 E24 05 35.4	An ephemeral scatter of LSA hornfels flaked stone artefacts at the eastern edge of a low dolerite hill.	Very low [GPC]
938	S30 40 35.4 E24 05 30.3	An ephemeral scatter of petrified wood fragments.	Very low [GPC]
939	S30 40 18.5 E24 06 09.0	This is the Vetlaagte farm complex. It was not visited as it lies about 1.0 km away from the corridor. It was also recorded by Kruger (2012) as HP01.	Medium
940	S30 39 42.9 E24 05 23.9	An ephemeral scatter of well-patinated MSA hornfels flaked stone artefacts in a denuded area. Some petrified wood was also seen here.	Very low [GPC]
941	S30 37 27.5 E24 00 46.8	An ephemeral LSA hornfels scatter was seen in a denuded area alongside the Brak River. There were only a few flaked artefacts, including a core, but a lower grindstone with grinding on both faces was also present.	Very low [GPC]
942	S30 37 29.2 E24 00 47.0	A light scatter of historical materials was seen in a denuded area alongside the Brak River. It consisted of fragments of at least three glass bottles (two dark green and one clear) and part of the sole of a shoe (probably rubber but very weathered).	Very low [GPC]
943	S30 37 29.4 E24 00 48.4	This was another denuded area along the Brak River that had a widespread, very ephemeral scatter of both MSA and LSA hornfels flaked stone artefacts on it.	Very low [GPC]
944	S30 37 34.9 E24 01 00.2	This was another denuded area along the Brak River that had an ephemeral scatter of LSA hornfels flaked stone artefacts on it.	Very low [GPC]
945	S30 37 42.2 E24 01 20.5	Four LSA artefacts and one MSA flaked stone artefact, all in hornfels, were seen in a small sandy area that was clear of grass.	Very low [GPC]
946	S30 37 36.9 E24 01 06.7	Four LSA flaked stone artefacts in hornfels were seen in a denuded area to the east of the Brak River. Two of them were large scrapers.	Very low [GPC]



Figure 22: Well-patinated MSA artefacts from waypoint 933 in the eastern part of the study area.



Figure 23: Well-patinated MSA artefacts and a historical pink glass fragment from waypoint 940 in the eastern part of the study area.



Figure 24: Artefacts with variable patination from waypoint 928 in the northern part of the study area. Scale in cm.

Two small, ephemeral scatters of LSA artefacts with only very light patination were noted in the southeast, at the foot of a dolerite hill (Figure 25). These are likely related to people having actually camped in that area. Another site was found in a denuded area along the western bank of the Brak River and consisted of a light scatter of flaked hornfels artefacts and a lower grindstone displaying grinding on both faces (waypoint 941; Figures 26 & 27). A few more artefacts were seen to the southeast near waypoint 943 and these may have been another scatter or simply an extension of the first one. Another ephemeral scatter was seen to the east of the Brak River. The scatter was unusual in that two of the four artefacts were large scrapers (Figures 28 & 29).



Figure 25: Very lightly patinated LSA hornfels artefacts from waypoint 936 in the south-eastern part of the study area. The lower left artefact is somewhat older than the rest.



Figure 26: The location of the LSA site at waypoint 941.



Figure 27: Lower grindstone and flaked hornfels artefacts from waypoint 941. Scale = 70 mm long.



Figure 28: The ventral surfaces of the four hornfels artefacts seen at waypoint 946.



Figure 29: The dorsal surface of the two large scrapers from waypoint 946.

Just one historical archaeological scatter was found (waypoint 492). This was on the west bank of the Brak River, some 440 m south of the larger similar and more significant scatter recorded by Orton (2012) at PDV2011/003. This new scatter could well be associated with British camps located

along the river during the Anglo-Boer War. However, the scatter is far too ephemeral to be meaningful.



Figure 30: The denuded area in which the historical artefacts at waypoint 942 were seen.



Figure 31: Glass bottle base fragment at waypoint 942.



Figure 32: Glass fragments from waypoint 943.



Figure 33: Shoe sole from waypoint 943.

5.3. Graves

Small farm graveyards can be found from time to time but these are generally close to houses and protected from impacts (e.g. Kruger 2012). Isolated graves – either Stone Age or historical – can be found but none are known from the area. No graves were seen during the survey.

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

The colonial period history of the area only dates back to the 19th century. The town only came into being after it was decided that the railway line to Beaufort West should be extended to Kimberly. The

railway was constructed as far as De Aar by 1883 and a junction named Brounger Junction was built in recognition of William Brounger, the railway engineer who supervised railway construction in the Cape Colony. It was intended that the Western and Midlands lines would meet at Brounger Junction. Brounger Junction was opened on 31st March 1884 and the first passenger train passed through two days later. The name De Aar relates to a perennial spring on the farm on which the station lies, and due to local pressure the name De Aar was soon given back to the place now housing the junction (Burman 1984; Frandsen 2019). Figures 34 and 35 show the railway junction at the end of the 19th century. The junction was very important with lines from all over the subcontinent coming together there. Schoeman (2013) notes that by the 1960s there were around 110 km of railway within the vicinity of the town and some 92 trains passed through every day.



De Aar station in 1895



Figure 34: Two views of the De Aar Junction in 1895. Source: Frandsen (2019).

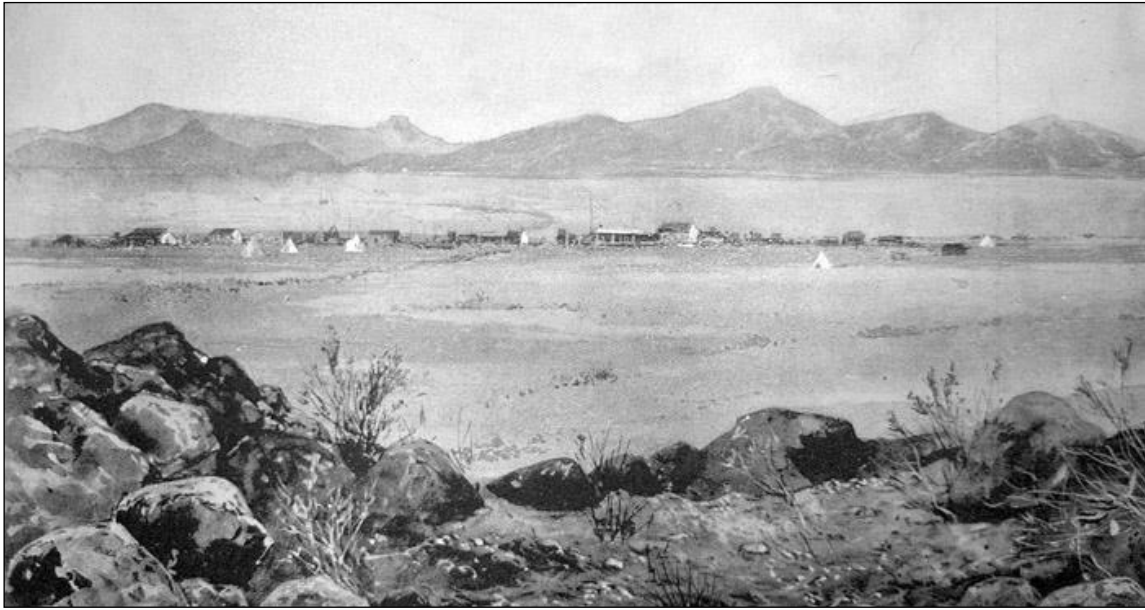


Figure 35: View of De Aar around the time of the Anglo-Boer War and showing the railway line and station hotel at De Aar (Source: AngloBoerWar.com 2011).

Farms were granted in the area during the 19th century. From its survey diagram, Vetlaagte dates to 1863 and, although diagrams for De Aar and Du Plessis Dam do not appear on the Surveyor General website, those farms are shown as bordering Vetlaagte on its diagram. Paarde Valley, immediately north of De Aar, was surveyed in 1830 and granted in 1837. De Aar town is later, having only been founded well after the railway junction was created. Brothers Isaac and Wulf Friedlander ran a hotel and shop at the junction and they bought the farm De Aar in 1899, establishing the town immediately after the end of the 1899-1902 Anglo-Boer War (Schoeman 2013).

The De Aar Junction was very important to the British during the Anglo-Boer War and was heavily garrisoned. De Aar became a military hospital and depot holding many medical and other supplies. St Paul's Church in De Aar was built in 1894 and inaugurated the following year. It was used by the British and its Garden of Remembrance has 182 soldiers and seven members of the Imperial Military Railways buried there (Schoeman 2013). There does not appear to have been any significant military action in and around De Aar.

De Aar was also the site of the first use of wireless telegraphy in South Africa. It was used by the British to maintain contact between their local forces. However, owing to the climatic conditions in the Karoo, the wireless sets, which were designed for shipboard use, could not perform properly and were soon withdrawn from inland service (Baker 1998).

The well-known author, Olive Schreiner, lived in De Aar at 9 Grundligh Street from 1907 to 1913 (Schoeman 2013). The house was declared a National Monument on 22nd August 1980 and, under the NHRA, is now considered a Provincial Heritage Site (PHS; SAHRIS n.d.a). St Paul's Church is also a declared PHS (SAHRIS (n.d.b).

Many other historical buildings occur within De Aar but some lie on surrounding farms as well. Included here is a well-maintained house dated 1930 and recorded by Kruger (2012) to the northeast of the study area.

5.4.2. Site visit

The only historical resources seen near the study area are two farmhouses. One lies along a road in the central part of the study area on Portion 5 of the farm De Aar 180 and looks to date to the early-mid-20th century (Figure 36). The other lies on the remainder of Vetlaagte 4 and, although not visited, looks like an early 20th century house (Figure 37). The latter was recorded by Kruger (2012) as HP01.



Figure 36: Farmhouse at waypoint 932.



Figure 36: Farmhouse at waypoint 939.

5.5. Cultural landscapes and scenic routes

The Karoo is a generally scenic landscape but the area around De Aar is visually dominated by electrical infrastructure. There are large numbers of powerlines crossing the landscape, the railway line has its overhead power supply, there are three solar to the north and northeast of the town,

while wind energy facilities stand on the skyline hills to the east and west. The very large Hydra Substation is just southeast of De Aar. The land is otherwise used only for grazing, although few animals were seen on site. There are small remnants of agriculture visible on aerial photography but it is evident on the ground that this land use has not been practiced for many years. A short section of the powerline corridor passes through an area subdivided for development on the northern edge of town. The cultural landscape is thus somewhat degraded and is dominated by its modern electrical layer.

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 very low cultural significance at the local level for their scientific value and all can be graded GPC.

Graves are deemed to have high cultural significance at the local level for their social value. They would be allocated a grade of IIIA but none are known.

The cultural landscape is largely a natural landscape with a strong electrical component overlaid. The broader landscape has aesthetic value but is heavily compromised and is rated as having low cultural significance at the local level.

6. ASSESSMENT OF IMPACTS

Only three aspects of heritage are relevant here. These are archaeological resources and graves which may be impacted during the construction phase and the cultural landscape which may be impacted during construction, operation and decommissioning.

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 the surface is grubbed prior to any excavations and/or road building. Because the archaeology found on site has very low cultural significance, the extent and magnitude are low which leads to a significance of **very low negative** (Table 3). Because of the low cultural significance, no mitigation is suggested and the significance with mitigation is thus also **very low negative**. There is no difference between the alternatives and there are no fatal flaws in terms of construction phase impacts to archaeology.

Impacts from the No-Go option would relate to trampling of artefacts by animals or vehicles, but this impact is minimal (magnitude rated zero) with the result that the significance is **negligible**

negative. No mitigation is suggested for the No-Go option and the significance remains unchanged at **negligible negative.**

Table 3: Assessment of archaeological impacts.

	Proposed project		"No go"	
	Without Mitigation	With mitigation	Without Mitigation	With mitigation
Nature	Negative	Negative	Negative	Negative
Extent	Site-specific (1)	Site-specific (1)	Site-specific (1)	Site-specific (1)
Magnitude	Low (1)	Low (1)	Zero (0)	Zero (0)
Duration	Long term (3)	Long term (3)	Long term (3)	Long term (3)
Consequence	Slightly detrimental (5)	Slightly detrimental (5)	Slightly detrimental (4)	Slightly detrimental (4)
Significance	10 Very low (-)	10 Very low (-)	4 Negligible (-)	4 Negligible (-)
Probability	Possible (2)	Possible (2)	Unlikely (1)	Unlikely (1)
Confidence	High	High	High	High
Reversibility	Zero	Zero	Zero	Zero
Irreplaceable loss of resources	Low	Low	Low	Low
Cumulative Impact	Low	Low	Zero	Zero
Degree to which the impact can be avoided	Low		Low	
Degree to which the impact can be managed	High		Low	
Degree to which the impact can be mitigated	Low		Low	

6.1.2. Impacts to graves

Direct impacts to graves would occur during the construction phase when excavations and/or road building take place. Although graves have high cultural significance, the chances of impacts occurring are minimal which leads to a significance of **very low negative** (Table 4). Because the locations of graves are not known, no mitigation is suggested and the significance with mitigation is thus also **very low negative**. There is no difference between the alternatives and there are no fatal flaws in terms of construction phase impacts to archaeology.

With the No-Go option, there would be no anthropogenic changes to the land and impacts could only arise from natural causes (e.g. a river in flood exposes a grave buried on its bank). These, however, are highly unlikely to happen (but are not impossible and do occur). Impacts are also rated as **very low negative** and, since no mitigation is proposed, they would remain at the **very low negative** level.

Table 4: Assessment of impacts to graves.

	Proposed project		"No go"	
	Without Mitigation	With mitigation	Without Mitigation	With mitigation
Nature	Negative	Negative	Negative	Negative
Extent	Site-specific (1)	Site-specific (1)	Site-specific (1)	Site-specific (1)
Magnitude	High (3)	High (3)	High (3)	High (3)
Duration	Long term (3)	Long term (3)	Long term (3)	Long term (3)
Consequence	Moderately detrimental (7)	Moderately detrimental (7)	Moderately detrimental (7)	Moderately detrimental (7)
Significance	7 Very low (-)	7 Very low (-)	7 Very low (-)	7 Very low (-)
Probability	Unlikely (1)	Unlikely (1)	Unlikely (1)	Unlikely (1)
Confidence	High	High	High	High
Reversibility	Zero	Zero	Zero	Zero

Irreplaceable loss of resources	High	High	Low	Low
Cumulative Impact	Low	Low	Zero	Zero
Degree to which the impact can be avoided	Low		Low	
Degree to which the impact can be managed	High		Low	
Degree to which the impact can be mitigated	Low		Low	

6.1.3. Impacts to the cultural landscape

Direct impacts to the cultural landscape would occur during the construction phase when equipment is brought onto site and construction activities commence. However, the landscape is already so heavily compromised by powerlines and other electrical infrastructure that the erection of another powerline would make very little difference. The two alternative pylon types do have a different visual appearance but, in the context just mentioned, they are seen as equal in terms of their visual intrusion. The extent and magnitude are thus local and low with a significance of **very low negative** (Table 5). No mitigation measures are suggested other than the best practice measures of keeping the construction duration as short as possible and minimising surface disturbance. These will make no difference to the significance rating which remains **very low negative**. There is no difference between the alternatives and there are no fatal flaws in terms of construction phase impacts to the cultural landscape.

With the no-go option, the landscape would remain unchanged and no new impacts would occur.

Table 5: Assessment of impacts to the cultural landscape.

	Proposed project		"No go"	
	Without Mitigation	With mitigation	Without Mitigation	With mitigation
Nature	Negative	Negative	Neutral	Neutral
Extent	Local (2)	Local (2)	Zero (0)	Zero (0)
Magnitude	Low (1)	Low (1)	Zero (0)	Zero (0)
Duration	Short Term (1)	Short Term (1)	None (0)	None (0)
Consequence	Slightly detrimental (4)	Slightly detrimental (4)	Zero (0)	Zero (0)
Significance	16 Very low (-)	16 Very low (-)	0 Zero	0 Zero
Probability	Definite (4)	Definite (4)	None (0)	None (0)
Confidence	High	High	High	High
Reversibility	High	High	n/a	n/a
Irreplaceable loss of resources	Low	Low	n/a	n/a
Cumulative Impact	Low	Low	n/a	n/a
Degree to which the impact can be avoided	Low		n/a	
Degree to which the impact can be managed	Low		n/a	
Degree to which the impact can be mitigated	Low		n/a	

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 intrusive presence of the powerline and switching station on the landscape. The road would only be very minimally visible. The impacts are very similar to those from the construction phase except that the duration is longer (being equal to the lifespan of the powerline). The significance calculates to **low negative** (Table 6). No mitigation is suggested, and the post-mitigation significance thus remains

low negative. There is no difference between the alternatives and there are no fatal flaws in terms of operation phase impacts to the cultural landscape.

With the no-go option, the landscape would remain unchanged and no new impacts would occur.

Table 6: Assessment of impacts to the cultural landscape.

	Proposed project		"No go"	
	Without Mitigation	With mitigation	Without Mitigation	With mitigation
Nature	Negative	Negative	Neutral	Neutral
Extent	Local (2)	Local (2)	Zero (0)	Zero (0)
Magnitude	Low (1)	Low (1)	Zero (0)	Zero (0)
Duration	Long Term (3)	Long Term (3)	None (0)	None (0)
Consequence	Moderately detrimental (6)	Moderately detrimental (6)	Zero (0)	Zero (0)
Significance	24 Low (-)	24 Low (-)	0 Zero	0 Zero
Probability	Definite (4)	Definite (4)	None (0)	None (0)
Confidence	High	High	High	High
Reversibility	High	High	n/a	n/a
Irreplaceable loss of resources	Low	Low	n/a	n/a
Cumulative Impact	Low	Low	n/a	n/a
Degree to which the impact can be avoided	Low		n/a	
Degree to which the impact can be managed	Low		n/a	
Degree to which the impact can be mitigated	Low		n/a	

6.3. Decommissioning Phase

6.3.1. Impacts to the cultural landscape

Decommissioning phase impacts to the cultural landscape would be the same as the construction phase, except that the amount of infrastructure would decrease rather than increase. The ratings are the same, i.e. **very low negative** both before and after mitigation. Mitigation would entail keeping the duration of activity as short as possible and ensuring that all areas are rehabilitated.

6.4. Cumulative impacts

Despite the very large number of other electrical developments in the area (see list in BAR), the cumulative impacts in all instances are rated as **low** or even **very low**. This is because:

- The amount of significant archaeology likely to have been disturbed in the area is negligible;
- The chances of graves having been disturbed by construction activities are negligible; and
- The addition of another powerline, switching station and access road to a landscape already dominated by electrical infrastructure will make almost no noticeable difference to the landscape.

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 project is intended to support a SEF. This facility will produce much needed power and reduce the economic losses that occur through load shedding. Without the powerline the SEF will not be able to function. Given that there are no significant impacts to heritage, the provision of more electricity in South Africa is deemed to be a socio-economic benefit that outweighs the impacts to heritage.

6.6. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials and/or graves. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible or very low negative** significance. The cultural landscape is already heavily dominated by electrical infrastructure and this impact could be rated as **medium negative**.

6.7. The No-Go alternative

If the project were not implemented then the site would stay as it currently is (impact significance of **negligible negative** for archaeology, **very low negative** for graves and **medium negative** for the cultural landscape). Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable in heritage terms.

6.8. Levels of acceptable change

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

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

The actions recorded in Table 7 should be included in the environmental management program (EMPr) for the project.

Table 7: 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	Rescue information, artefacts or burials before extensive damage occurs	Reporting chance finds to SAHRA and/or an archaeologist as early as possible, protect <i>in situ</i> and stop work in immediate area	Inform staff to be vigilant and carry out inspections of new excavations through Environmental Awareness training	Ongoing basis	Construction Manager or Contractor
				Whenever on site	Environmental Control Officer (ECO)

Impacts to the cultural landscape					
Visible landscape scarring	Minimise landscape scarring	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

8. CONCLUSIONS

This assessment has found that although archaeological materials occur in various places, they are always at a density that is far too low to be academically meaningful, including at the two landscape features initially identified as potentially sensitive (banks of the Brak River and a dolerite hill in the south). All occurrences were rated as of very low significance. Note that one of the MSA scatters referred to as SA03 in Kruger (2012) and graded GPB by him is within the current corridor. CTS Heritage (2021) subsequently renamed it Vetlaagte 3 and recommended recording of this locality. Once this mitigation was done, it yielded only 6 artefacts (CTS Heritage 2022)². Although denser scatters of such artefacts occur in the same general area, none are worthy of any mitigation.

Two historical structures occur in the area but, considering the number of other powerlines in the area, no new or significant impacts to them would occur. Similarly, the cultural landscape is strongly dominated by electrical infrastructure in the form of powerlines, wind and solar facilities, the railway line and substations that no new or significant impacts would occur. The access road and switching station are adjacent to an already authorised SEF and the powerline would be adjacent to existing powerlines and another authorised SEF which means the electrical land use is well-established and acceptable.

8.1. Reasoned opinion of the specialist

Given that impacts to heritage resources would be minimal and of low significance, it is the opinion of the heritage specialist that the proposed powerline, switching station and access road may be authorised in full.

9. RECOMMENDATIONS

It is recommended that the proposed powerline (with either alternative), switching station and access road be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- Surface clearance is to be kept to the minimum required for the project; and

² It appears from the photograph in Kruger (2012) and CTS (2022) and the mention by Kruger (2012) of mixed age artefacts disturbed by riverbank erosion that this occurrence may have been incorrectly described or located by Kruger.

- 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.

10. REFERENCES

- AngloBoerWar.com 2011. De Aar. Accessed online at: www.angloboerwar.com/forum/6-places/294-de-aar on 14th April 2022.
- Baker, D.C. 1998. Wireless telegraphy during the Anglo-Boer War of 1899 – 1902. *Military History Journal* 11(2). <http://rapidttp.co.za/milhist/vol112db.html>. Accessed 29th December 2011.
- Baumann, N. & Winter, S. 2005. Guideline for involving heritage specialists in EIA process. Edition 1. CSIR report No ENV-S-C 2005 053E. Provincial Government of the Western Cape: Department of Environmental Affairs and Developmental Planning.
- Bollong, C.A., Sampson, C.G. & Smith, A.B. 1997. Khoikhoi and bushman pottery in the Cape Colony: ethnohistory and Later Stone Age ceramics of the South African interior. *Journal of Anthropological Archaeology* 16: 269-299.
- Bollong, C.A., Vogel, J.C., Jacobson, L., Van der Westhuizen, W. & Sampson, C.G. 1993. Direct dating and identity of fibre temper in pre-Contact Bushman (Basarwa) pottery. *Journal of Archaeological Science* 19: 41–55.
- Burman, J. 1984. *Early Railways at the Cape*. Cape Town & Pretoria: Human & Rousseau.
- CTS Heritage. 2021. Archaeological Specialist Study In terms of Section 38(8) of the NHRA for a Proposed Development of the Vetlaagte infrastructure associated with the authorised PV Facilities near De Aar. Report for Savannah Environmental (Pty) Ltd. Plumstead: CTS Heritage.
- CTS Heritage. 2022. Archaeological Specialist Study In terms of Section 38(8) of the NHRA for a Proposed Development of the Vetlaagte infrastructure associated with the authorised PV Facilities near De Aar. Detailed Site Recording at SA03, SAHRIS ID 34471. Report for Landscape Dynamcis. Plumstead: CTS Heritage.
- De Aar. n.d. The town in a nutshell. Accessed online at: <http://www.angelfire.com/tv2/deaar/newpage13.htm> on 14th April 2022.
- Deacon, J. 1984. Later Stone Age people and their descendants in southern Africa. In: Klein, R. G., ed., *Southern African Prehistory and Paleoenvironments*. Rotterdam: A. A. Balkema, pp. 221–328.
- Frandsen, D. 2019. History. Accessed online at: <https://www.karoo-southafrica.com/eastern-upper-karoo/de-aar/history-of-de-aar/> on 14th April 2022.

- Hansen, K. 2011. Proposed photo-voltaic facilities near De Aar, N Cape: Paarde Valley, Badenhorst Dam, Annex Du Plessis. Level 3 Visual Impact Assessment. Unpublished report prepared for Aurecon South Africa (Pty) Ltd.
- Hart, T.J.G. 1989. Haaskraal and Volstruisfontein: Later Stone Age events at two rockshelters in the Zeekoe Valley, Great Karoo, South Africa. Unpublished M.A. dissertation, University of Cape Town.
- Kruger, N. 2012. Ennex Developments: proposed establishment of a Solar Energy Facility near De Aar, Northern Cape Province: Phase 1 Archaeological Impact Assessment Report. Report prepared for Ennex Developments. Pretoria: AGES.
- Morris, D. 2011. Paarde Valley Ilanga Lethemba PV Solar Energy Facility: specialist input for the Environmental Impact Assessment Phase and Environmental Management Programme for the proposed Ilanga Lethemba Solar Energy Facility, near De Aar, Northern Cape Province. Archaeology. Report prepared for Savannah Environmental (Pty) Ltd. Kimberly: McGregor Museum.
- Orton, J. 2006. The Later Stone Age lithic sequence at Elands Bay, Western Cape, South Africa. *Southern African Humanities* 18 (2): 1-28.
- Orton, J. 2012. Heritage Impact Assessment for three Solar Energy Facilities at De Aar, Western Cape. Unpublished report prepared for Aurecon South Africa (Pty) Ltd. St James: ACO Associates cc.
- Orton, J. 2021. Pre-construction archaeological survey: proposed Du Plessis Dam PV1 Solar Energy Facility and associated power line, Northern Cape. Report prepared for Landscape Dynamics Environmental Consultants (Pty) Ltd. Muizenberg: ASHA Consulting (Pty) Ltd.
- Orton, J. & Webley, L. 2013a. Heritage Impact Assessment for multiple proposed Solar Energy Facilities on De Aar 180/1 (Badenhorst Dam Farm), De Aar, Northern Cape. Unpublished report prepared for Aurecon South Africa (Pty) Ltd. Diep River: ACO Associates cc.
- Orton, J. & Webley, L. 2013b. Heritage Impact Assessment for multiple proposed solar energy facilities on Du Plessis Dam 179, De Aar, Northern Cape. Unpublished report prepared for Aurecon South Africa (Pty) Ltd. Diep River: ACO Associates cc.
- Rudner, J. 1979. The use of stone artefacts and pottery among the Khoisan peoples in historic and proto-historic times. *South African Archaeological Bulletin* 34: 3-17.
- SAHRA. 2007. Minimum Standards: archaeological and palaeontological components of impact assessment reports. Document produced by the South African Heritage Resources Agency, May 2007.
- SAHRIS. n.d.a. Olive Schreiner House, 9 Grundlingh Street, De Aar. Accessed online at: <https://sahris.sahra.org.za/node/32715> on 14 April 2022.

- SAHRIS. n.d.b. St Paul's Church, Friedlander Street, De Aar. Accessed online at: <https://sahris.sahra.org.za/node/32761> on 14 April 2022.
- Sampson, C.G. 1984. A prehistoric pastoralist frontier in the Upper Zeekoe Valley, South Africa. In: Hall, M., Avery, G., Avery, D.M., Wilson, M.L. & Humphreys, A.J.B (eds) *Frontiers: southern African archaeology today*: 96 – 110. Oxford: British Archaeological Reports International series 207.
- Sampson, C.G. 1985. Atlas of Stone Age settlement in the central and upper Seacow Valley. *Memoirs of the National Museum (Bloemfontein)* 20: 1-116.
- Sampson, C.G. 1986. Model of a prehistoric herder-hunter contact zone: a first approximation. *South African Archaeological Society Goodwin Series* 5: 50-56.
- Sampson, C.G. 2010. Chronology and dynamics of Later Stone Age herders in the Seacow River valley, South Africa. *Journal of Arid Environments* 74:848-848.
- Schoeman, C. 2013. *The Historical Karoo: traces of the past in South Africa's arid interior*. Cape Town: Zebra Press.
- 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.
- Winter, S. & Oberholzer, B. 2013. *Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape*. Report prepared for the Provincial Government of the Western Cape Department of Environmental Affairs and Development Planning. Sarah Winter Heritage Planner, and Bernard Oberholzer Landscape Architect / Environmental Planner, in association with Setplan.

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
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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 –
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, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (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 – 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:

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

Method of the Site Sensitivity Verification

Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. This was used to determine areas of potential sensitivity that should be focused on during the fieldwork. Two such areas were identified: the banks of the Brak River in the north and a low, rocky dolerite hill in the south. The site was then ground truthed, including areas identified as potentially sensitive. Desktop research was also used to inform on the heritage context of the area. This information is presented in the report (Sections 5.2.1 and 5.4.1).

Outcome

The map below is extracted from the screening tool report and shows the archaeological and heritage sensitivity to be low but with small spots of high scattered through the wider area. The site visit showed that in fact the entire study area is of low sensitivity with only heritage resources of very low cultural significance being found. A photographic record and description of the relevant heritage is contained within the impact assessment report.

The palaeontological component is dealt with in the relevant specialist report.

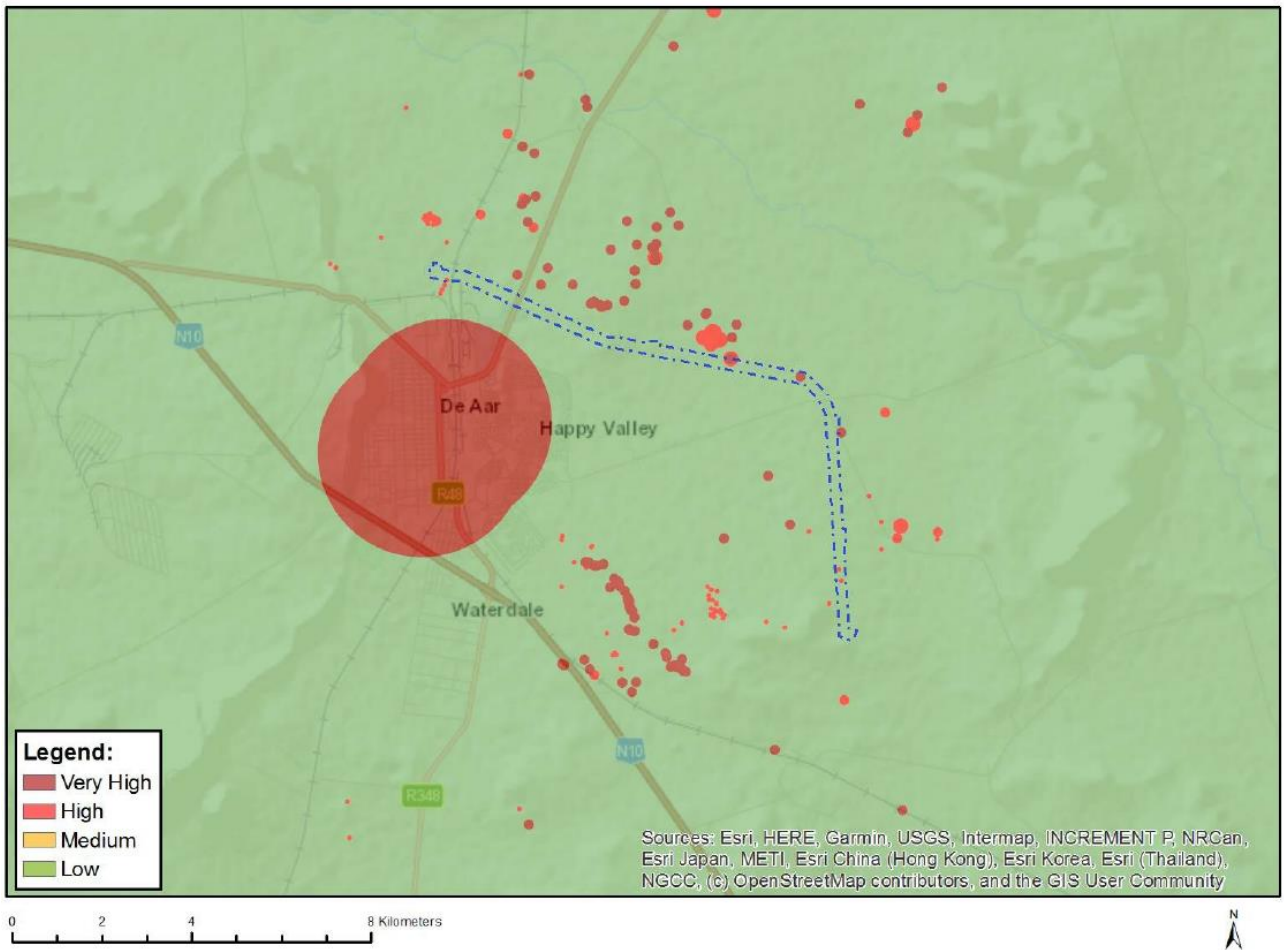


Figure A2.1: Screening tool map for archaeology and cultural heritage.