HERITAGE IMPACT ASSESSMENT:
PROPOSED 132 kV POWERLINES FOR DU PLESSIS DAM PV1 & 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

Report for:

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On behalf of:

Mulilo Renewable Project Developments

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SUMMARY

ASHA Consulting (Pty) Ltd was appointed by Landscape Dynamics to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of two 132 kV powerlines and switching stations to connect the Du Plessis Dam PV1 and PV2 solar energy facilities (SEFs) to the national electricity grid. Each switching station will also require an access road. Note that while a single report is presented, separate environmental authorisations will be applied for for the PV1 and PV2 projects. The projects lie to the north and east of De Aar.

The landscape is generally very flat, although a low dolerite rise occurs in the area where the switching stations will be situated and a low but rocky dolerite hill occurs adjacent to the PV2 corridor in the south. The ground is well-vegetated with grass, but in some areas were patches of exposed substrate which afforded good ground visibility. There are many existing powerlines and other electrical facilities in the landscape, and the newly proposed projects will be adjacent to already authorised SEFs and powerlines.

The field survey showed that ephemeral archaeological traces were present in many areas. However, only one landscape feature was likely to have attracted precolonial settlement. This is the dolerite hill in the far south of the PV2 powerline corridor. Ephemeral traces of LSA occupation were noted there, while material seen elsewhere in the study area was largely from the Middle Stone Age and well-patinated indicating great age.

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

It is recommended that the proposed powerlines, switching stations and access roads be authorised (using either alternative in the case of PV1), 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

PPP: Public Participation Process

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

SEF: Solar Energy Facility

Contents

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by Landscape Dynamics to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of two 132 kV powerlines and switching stations to connect the Du Plessis Dam PV1 and PV2 solar energy facilities (SEFs) to the national electricity grid. Each switching station will also require an access road but it is noted that the PV2 switching station access road follows the same alignment as that for PV1 but continues about 750 m further east. Note that while a single report is presented, separate environmental authorisations will be applied for for the PV1 and PV2 projects. The projects lie to the north and east of De Aar (Figures 1 to 3). The proposed projects will run between the following points (numbers keyed to Figure 1):

1. S30° 38' 02.8" E24° 01' 30.9" in the west (this is the start of the access road for both projects);
2. S30° 38' 15.7" E24° 02' 47.0" (this is the Du Plessis Dam PV1 switching station);
3. S30° 40' 41.0" E24° 04' 01.6" in the south (this is the location of the proposed Mulilo Cluster 1 Substation to which the Du Plessis Dam PV1 powerline would connect);
4. S30° 38' 19.0" E24° 03' 13.5" (this is the Du Plessis Dam PV2 switching station);
5. 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 access roads will both cross erf 274 and Farm 179. The proposed powerline corridors cross the following properties (listed from northwest to southeast in each case):

	PV1 Alternative 1		PV1 Alternative 2		PV2
1.	Farm 179/remainder	1.	Farm 179/remainder	1.	Farm 179/remainder
2.	Farm 180/10	2.	Farm 180/10	2.	Farm 180/10
3.	Farm 180/5	3.	Farm 180/9	3.	Farm 180/5
4.	Farm 180/4	4.	Farm 180/6	4.	Farm 180/4
5.	Farm 180/1	5.	Farm 180/1	5.	Farm 4/remainder

1.1. The proposed projects

1.1.1. Du Plessis Dam PV1 project description

The project comprises of the following components:

- ±2km, 12m wide access road
  - Starting point at the R48 and ends at the PV1 switching station
  - This access road is existing but will be widened to 12m
- Du Plessis Eskom Switching Station of ± 0.5 hectares in size (50m x 100m)
  - Internal access roads of 6m wide
- 132kV power line of ±8km
  - The power line will connect the PV1 Eskom Switching Station with the Mulilo Cluster 1 Substation
  - Servitude width approximately 31m
- ±6m wide access road will be constructed along the line route for construction and maintenance purposes – *this road will be inside the servitude*

- A laydown area of ±1 hectares directly adjacent to the PV1 Switching Station
- Diesel storage of less than 80m^3 for the 132kV Switching Station:
    - During construction, diesel is required for construction vehicles as well as generators for the construction camp and commissioning whilst waiting for the Eskom grid connection works to be completed
    - During operations, diesel is required for Operations & Maintenance vehicles at the PV plants but also required for backup Diesel generators at the substations. The Generators supply auxiliary power to the substation's protection and communications systems, should there be outages on the grid. This is an Eskom requirement together with a battery room at the substations to act as UPS for these critical systems.

1.1.2. Du Plessis Dam PV2 project description

The project comprises of the following components:

- ±3km, 12m wide access road
    - Starting point at the R48 and ends at the PV2 switching station
    - This access road is existing but will be widened to 12m
- PV2 Switching Station of ±1 hectares in size (100m x 100m)
    - Internal access roads of 6m wide
- 132kV power line of ±8km
    - The power line will connect the PV2 Switching Station with the Vetlaagte MTS
    - Servitude width approximately 31m
- ±6m wide access road will be constructed along the line route for construction and maintenance purposes – *this road will be inside the servitude*
- A laydown area of ±1 hectares directly adjacent to the PV2 Switching Station
- Diesel storage of less than 80m^3 for the 132kV Switching Station:
    - During construction, diesel is required for construction vehicles as well as generators for the construction camp and commissioning whilst waiting for the Eskom grid connection works to be completed
    - During operations, diesel is required for O&M vehicles at the PV plants but also required for backup Diesel generators at the substations. The Generators supply auxiliary power to the substation's protection and communications systems, should there be outages on the grid. This is an Eskom requirement together with a battery room at the substations to act as UPS for these critical systems.

1.1.3. Identification of alternatives

The layouts of the various routes assessed here have been guided by property boundaries and existing powerlines as well as by the requirement to connect to the Mulilo Cluster 1 Substation and Vetlaagte MTS respectively. While the PV1 project has two options available for assessment, there is no possibility of a second option for the PV2 project because of space. The switching stations must be located adjacent to the respective authorised on-site substations and the access road has been placed within the authorised PV footprint. As such, the only alternatives under consideration are for the PV1 powerline and the No-Go option for both projects.

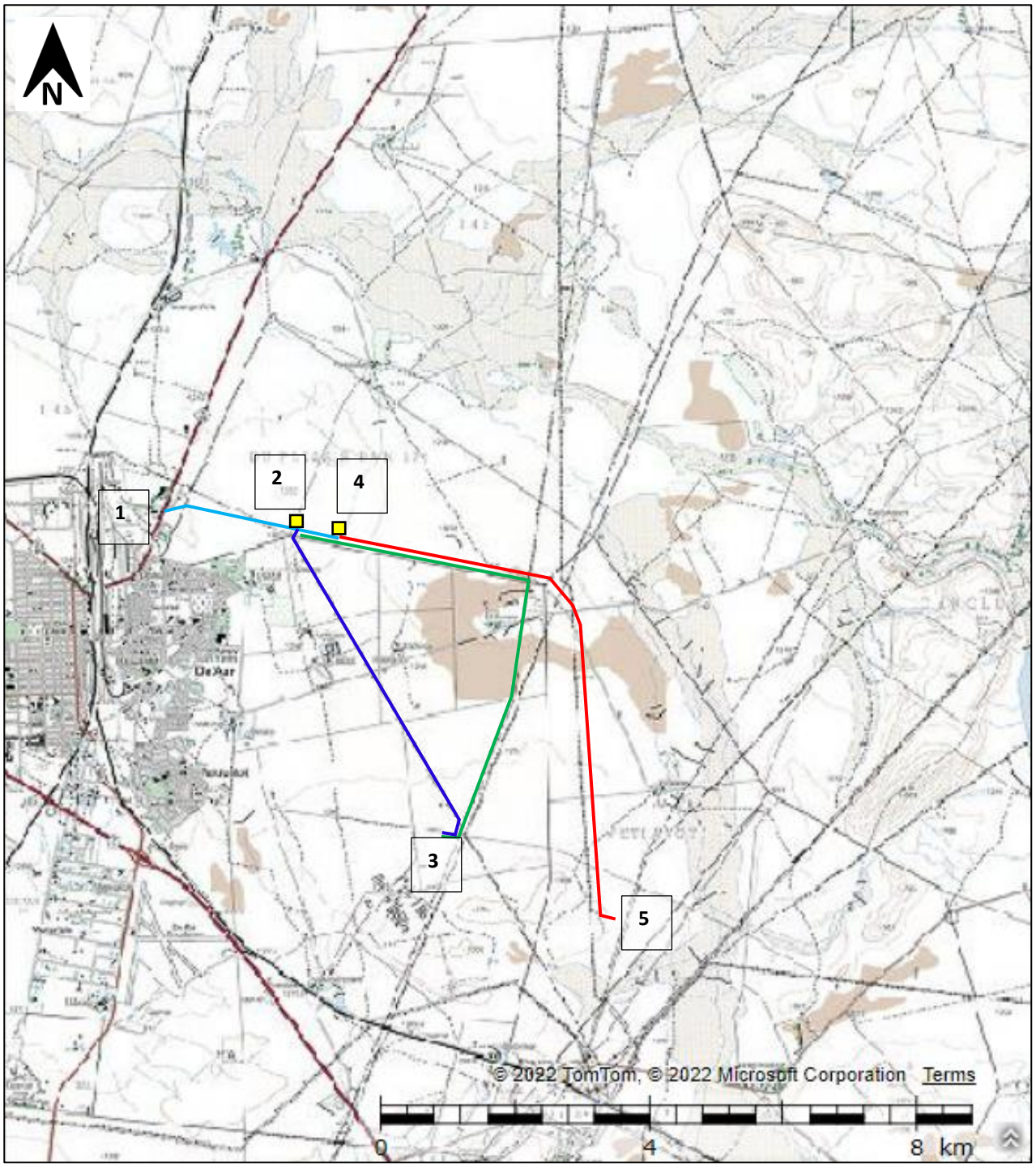

Figure 1: *Extract from 1:50 000 topographic map 3024CA showing the location of the project (red line shows the powerline, yellow square shows the switching station, blue line shows the access road). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: http://www.cdngiportal.co.za/cdngiportal/.*

1.1.4. 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.

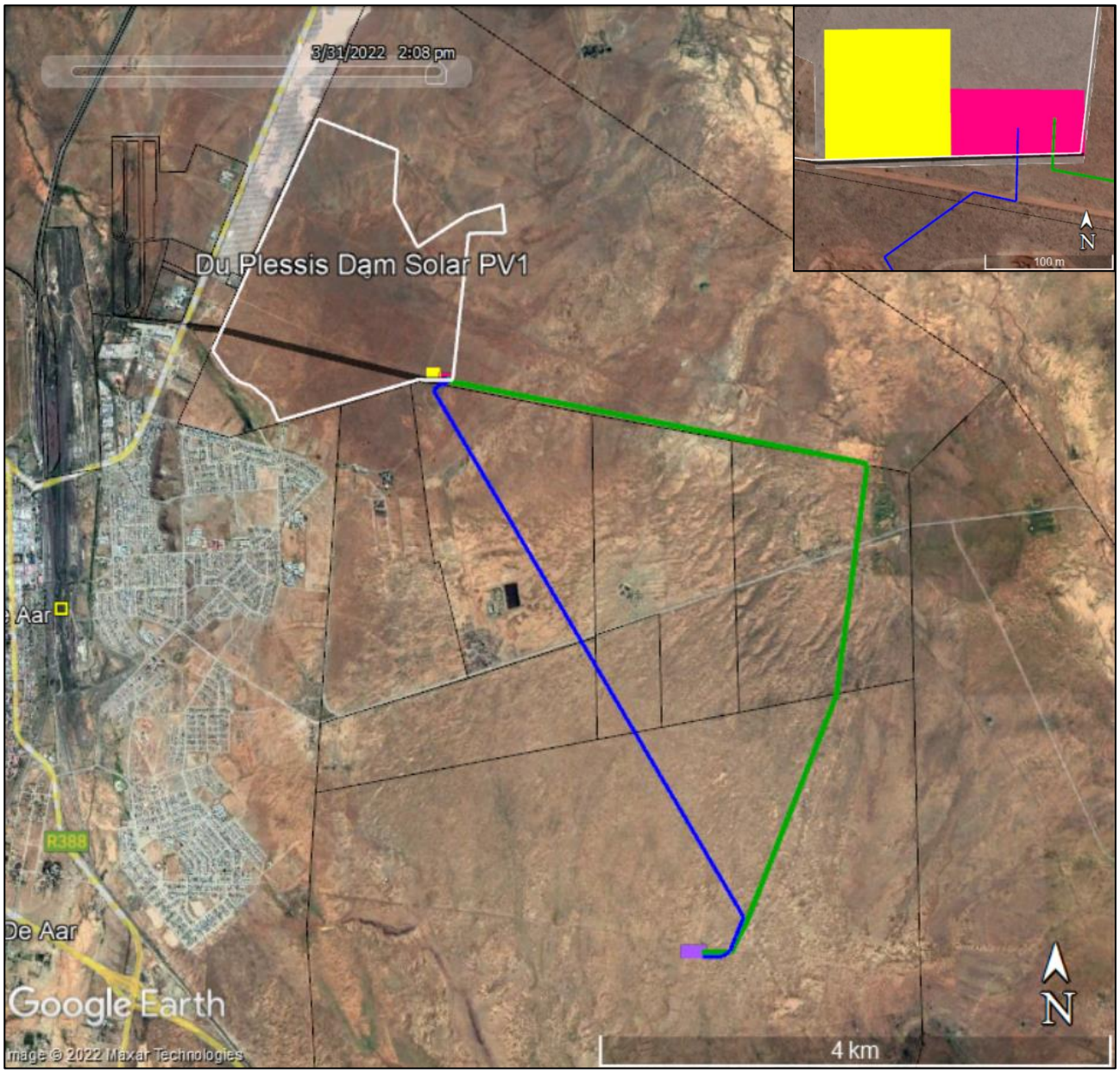

Figure 2: *Aerial view of the study area showing the proposed powerline alternatives (Alternative 1 in green, Alternative 2 in blue), the laydown area (yellow), the switching station (pink), and the access road (bold black line) relative to the town (at left) and farm portions (black polygons). The authorised PV footprint is outlined in white. Switching station area enlarged.*

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. A single report was to be produced for the two projects but with the impact assessment and recommendations clearly separated.

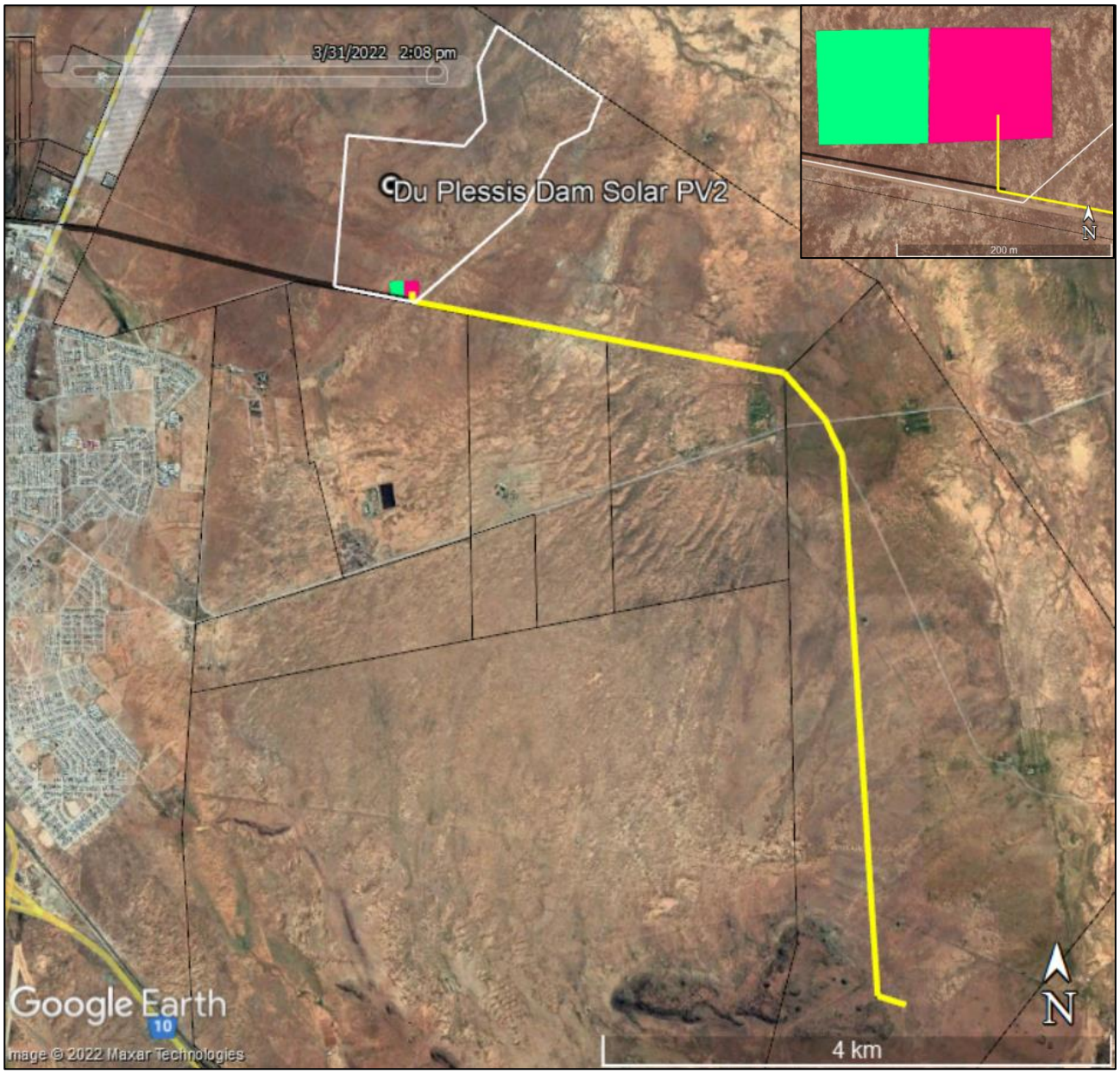

Figure 3: *Aerial view of the study area showing the proposed powerline (yellow), the laydown area (green), the switching station (pink), and the access road (bold black line) relative to the town (at left) and farm portions (black polygons). The authorised PV footprint is outlined in white. Switching station area enlarged.*

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.

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	Various	Spatial	Historical aerial photography of the study area and

	Information			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.

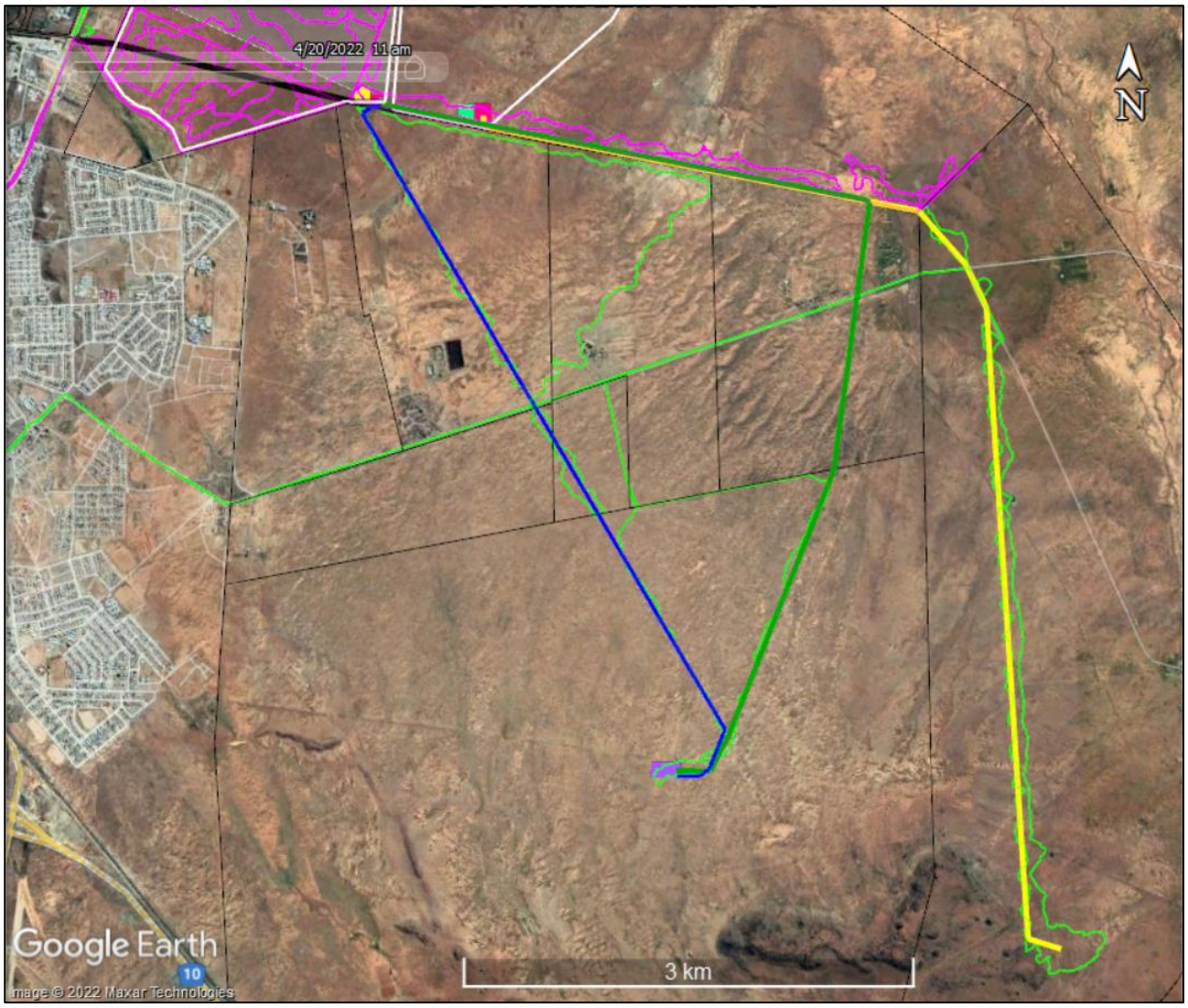

Figure 4: *Aerial view of the study area (key as per Figures 2 & 3) showing the survey tracks (pink lines from December 2021, green lines from April 2022).*

3.3. Specialist studies

A separate specialist palaeontological study has been prepared by Marion Bamford. 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 Landscape Dynamics.

3.5. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources

authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

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

3.6. Consultation

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

3.7. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Dense grass cover limited ground visibility in places. The access road was not surveyed since it lies within the already surveyed and authorised PV footprints. One area crossed by Alternative 1 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.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The study area lies to the northeast 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.

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

4.2. Site description

The site photographs shown in Figures 5 and 6 show views of the northern section of the study area, while Figures 7 and 8 show the remainder of the PV1 Alt. 1 corridor, Figures 9 to 11 show the remainder of the PV1 Alt. 2 corridor and Figures 12 and 13 show the short section in the south shared by PV1 Alt. 1 and 2. Figures 14 to 16 show the eastern section of the PV2 corridor. It is evident that the site is mostly very flat but two high-lying areas exist. These are a low but wide dolerite hill in the northwest where the switching stations will be, and a far rockier dolerite hill in the southeast which is skirted by the PV2 powerline corridor. The surface is generally covered in thick grass, but a number of denuded areas exist.

Figure 5: *Looking east along the north-western part of the PV1 Alt. 1 and PV2 powerline corridor.*

Figure 6: *View towards the west along the PV2 powerline corridor from the north-eastern corner. This was during December 2021. Source: Orton (2021).*

Figure 7: *View towards the northeast along the north-eastern part of the PV1 Alt. 1 corridor. This view looks from the farm fence across the land that was not accessible for the survey.*

Figure 8: *View towards the southwest along the southern part of the PV1 Alt. 1 corridor.*

Figure 9: *Looking towards the north along the northern part of the PV1 Alt. 2 powerline route.*

Figure 10: *Looking towards the north along the central part of the PV1 Alt. 2 powerline route.*

Figure 11: *Looking south along the southern part of the PV1 Alt. 2 corridor.*

Figure 12: *Looking northeast from the point at which the PV1 Alt. 1 and Alt. 2 corridors meet.*

Figure 13: *Looking east from the southern end of the PV1 Alt. 1 and Alt. 2 corridors.*

Figure 14: *Looking north along the eastern part of the PV2 powerline corridor.*

Figure 15: *Looking south along the eastern part of the PV2 powerline corridor.*

Figure 16: *Looking towards the east across the south-easternmost part of the PV2 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 largely high sensitivity (Figure 17). Because of this rating a separate specialist palaeontological study has been carried out and is submitted separately with this HIA. During the archaeological survey several pieces of petrified wood were noted in the eastern part of the PV2 powerline corridor. These finds are included in the separate palaeontological study.

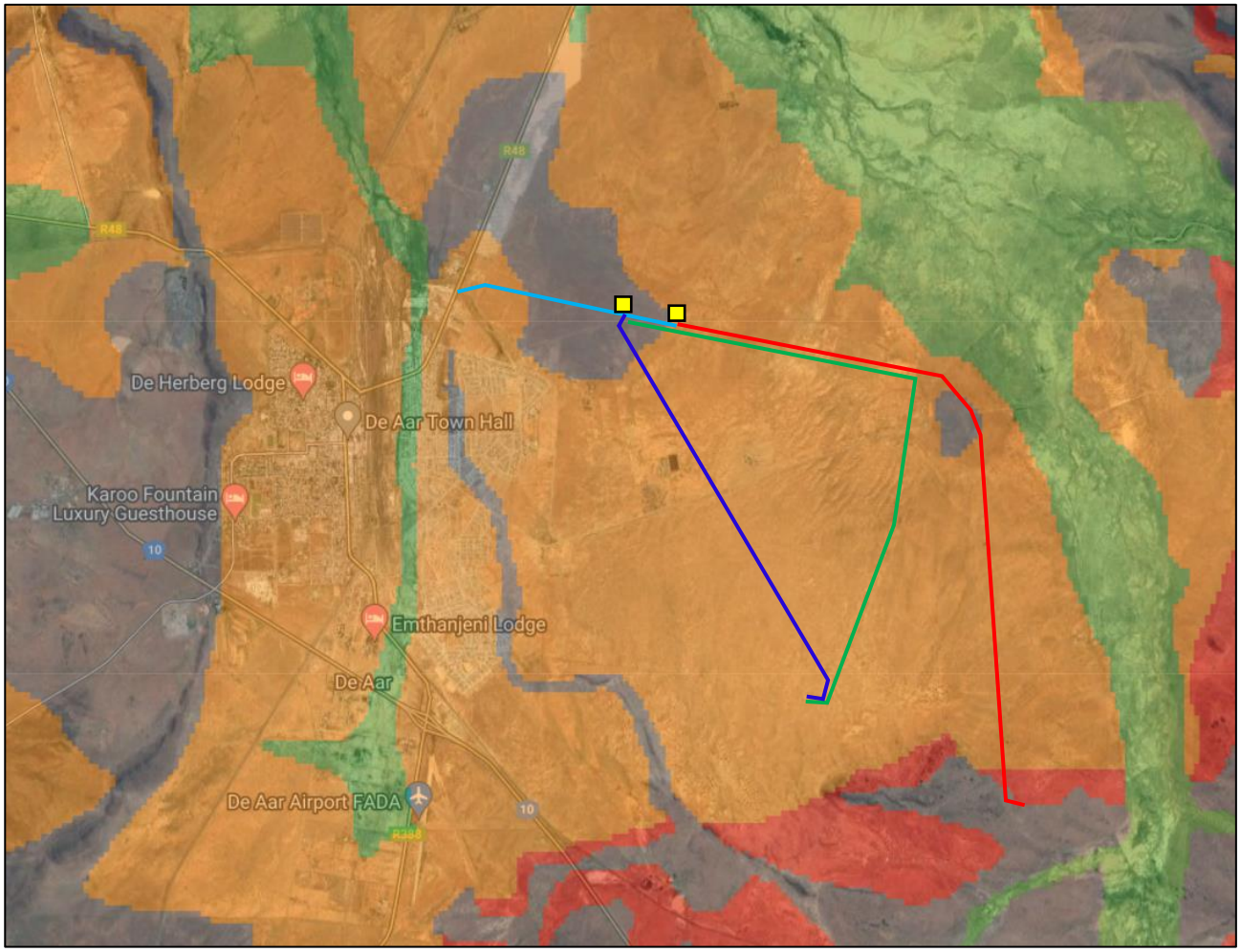

Figure 17: *Extract from the SAHRIS Palaeosensitivity Map showing the site to be of largely high sensitivity (orange) but with patches of zero (grey) and very high (red). Key to project components as for Figure 1.*

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 signifiy 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 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 and other heritage resources recorded during the survey are mapped in Figures 18 to 20 and listed in Table 2.

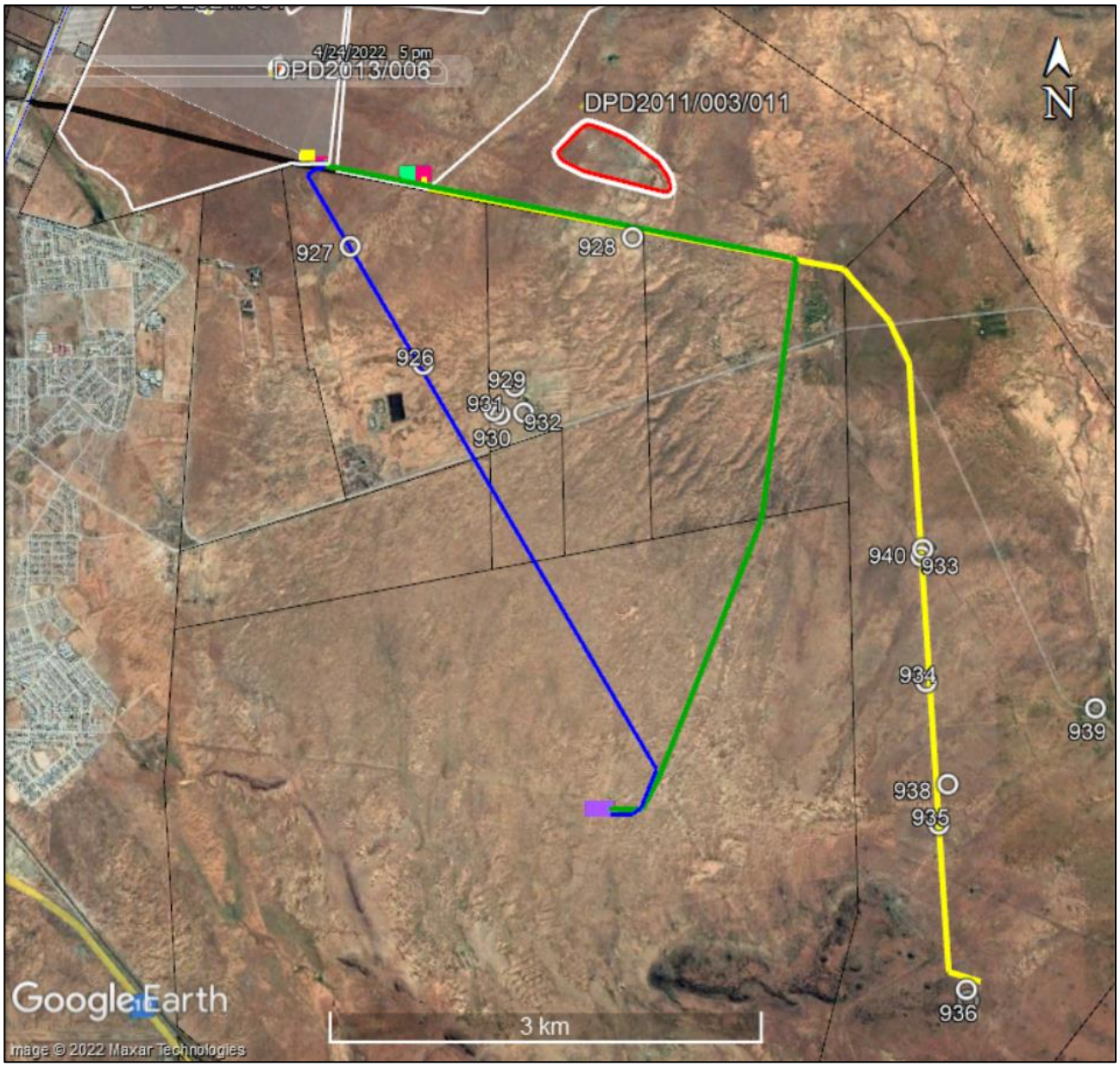

Figure 18: *Aerial view of the study area showing the distribution of recorded heritage resources (white numbered symbols). Two other significant sits located jut to the north are also mapped (DPD2013/006 [LSA] and DPD2013/001 [historical]).*

Figure 19: *Aerial view of the central part of the PV1 Alt. 2 corridor showing a nearby farm complex.*

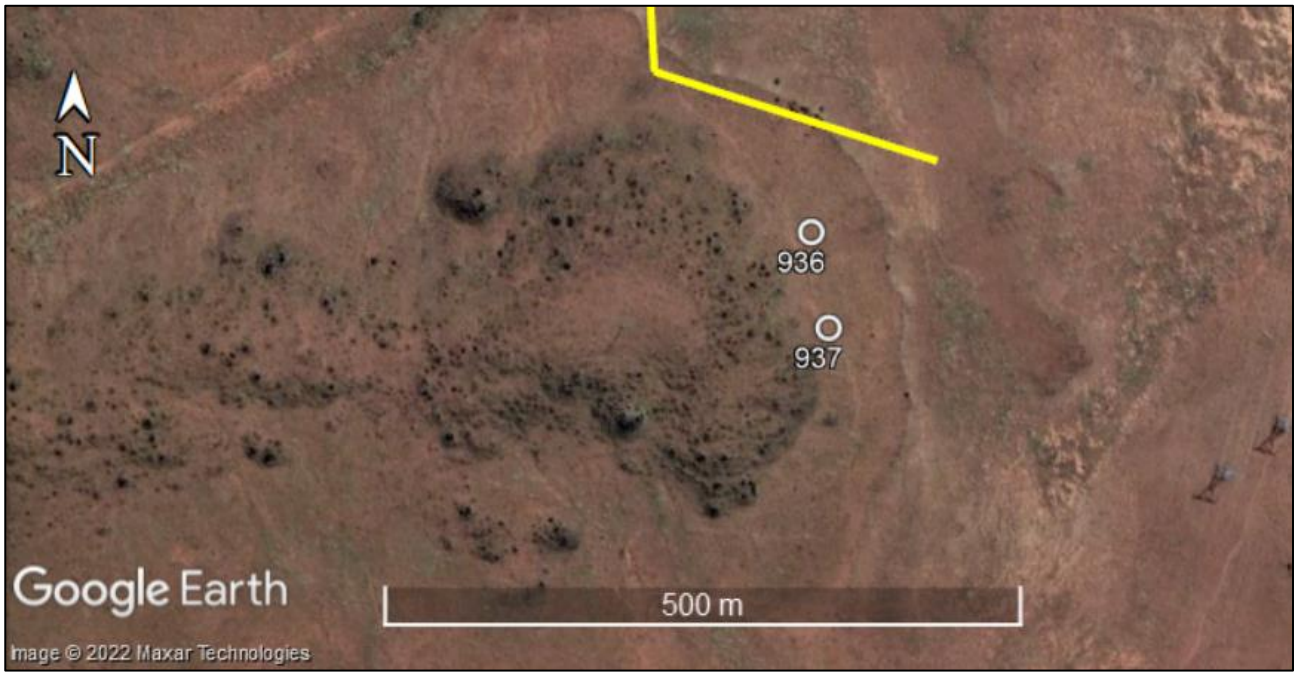

Figure 20: *Aerial view of the south-eastern part of the study area showing the distribution of recorded heritage resources alongside a rocky dolerite hill (white numbered symbols).*

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

Waypoint	Location	Description	Significance [Grade]
926	S30 39 01.6 E24 03 13.5	A mixed age scatter of hornfels flaked artefacts in a denuded area.	Very low [GPC]

927	S30 38 35.1 E24 02 54.4	A mixed age scatter of hornfels flaked artefacts in a denuded area.	Very low [GPC]
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-20th 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 degree of patination evident was minimal. One slightly more patinated piece was also seen.	Very low [GPC]
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]

Stone artefacts were seen in a number of areas but generally in association with open mudflats and denuded areas. All of the archaeological occurrences seen were of very low density. 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 to 24), and almost certainly an origin in the MSA. Some artefacts were somewhat darker in colour with less patination (Figures 23 & 24). Rare, isolated artefacts had fresh edges and still retained the typical dark colour of freshly broken hornfels. These latter artefacts relate to the LSA. Two ephemeral scatters of such LSA artefacts were noted in the southeast, close to the proposed Vetlaagte MTS and at the foot of a dolerite hill (Figure 25). It was not possible to tell how extensive these scatters were due to the dense grass, but they are likely larger than what was seen. They would relate to spots where LSA people camped.

Figure 21: *Well-patinated MSA artefacts from waypoint 933 in the eastern part of the study area.*

Figure 22: *Well-patinated MSA artefacts and a historical pink glass fragment from waypoint 940 in the eastern part of the study area.*

Figure 23: *Well-patinated MSA artefacts from waypoint 927 in the western part of the study area. The one on the left is younger than the rest, as evidenced by its grey colour.*

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

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 as evidenced by its slight orange patina.*

Just one historical artefact – a piece of pink glass – was seen (Figure 22).

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 extened 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 consrruction 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 26 and 27 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.

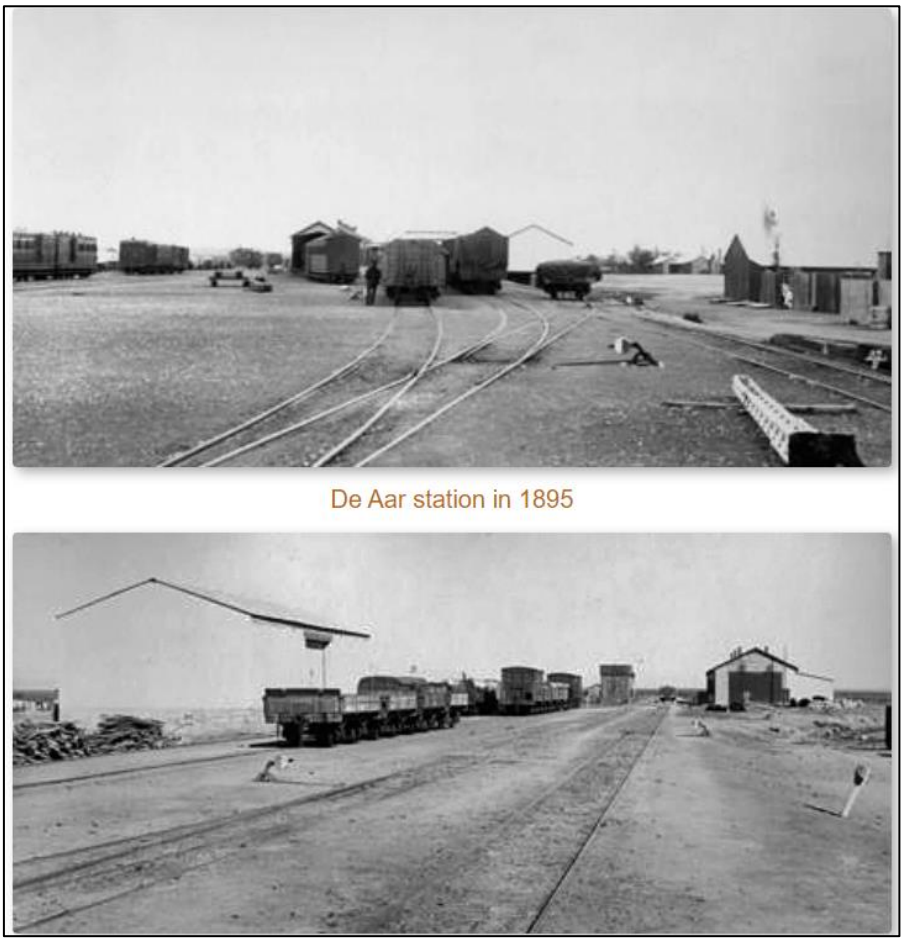

Figure 26: *Two views of the De Aar Junction in 1895. Source: Frandsen (2019).*

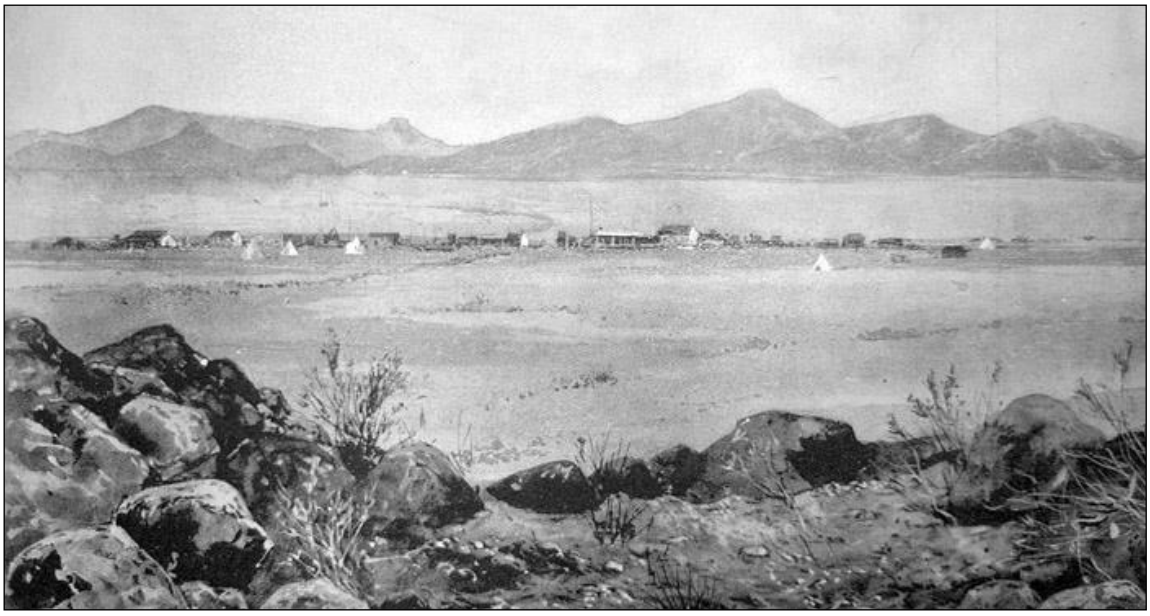

Figure 27: View of De Aar around the time of the Anglo-Boer War and showing the railway line and station hotel at De Aar (Source: AngloBoerWar.com 2011).

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 28). The other lies on the remainder of Vetlaagte 4 and, although not visited, looks like an early 20th century house (Figure 29). The latter was recorded by Kruger (2012) as HP01.

Figure 28: *Farmhouse at waypoint 932.*

Figure 29: *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 skylines 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.

It must be noted that because the heritage resources are the same for all alignments assessed, the impact assessments are identical for both alternatives for the PV1 powerline and for the PV2 powerline.

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 intensity are low which leads to a significance of **low negative** (Table 3). Because of the low cultural significance, no mitigation is suggested and the significance with mitigation is thus also **low negative**. 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.*

Impact Description

Potential damage to, or destruction of archaeological resources from this project.

Cumulative impact description
Potential damage to, or destruction of archaeological resources from all sources.

Mitigation
None suggested due to very low cultural significance of resources.

Impact Assessment

Name of Impact	Extent	Duration	Intensity	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
Impacts on archaeology	Site	Permanent	Low	Possible	Low	Low	Low

Impact on Irreplaceable Resources (*after* mitigation) If yes, please explain: Artefacts cannot be repaired or replaced but their loss is inconsequential in heritage terms.	YES	~~NO~~

Cumulative impact rating (*after* mitigation) If high, please explain	Low	~~Medium~~	~~High~~

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 (hence high intensity impacts are possible), the chances of impacts occurring are minimal (almost zero) which leads to a significance of **low negative** (Table 4). Because the locations of graves are not known, no mitigation is suggested and the significance with mitigation is thus also **low negative**.

Table 4: *Assessment of impacts to graves.*

Impact Description
Potential damage to, or destruction of graves from this project.

Cumulative impact description
Potential damage to, or destruction of graves from all sources.

Mitigation
None suggested due to no known graves on site.

Impact Assessment

Name of Impact	Extent	Duration	Intensity	Probability	Reversibility	Significance	Significance

					of impact	without mitigation	after mitigation
Impacts on graves	Site	Permanent	High	Unlikely	Low	Low	Low

Impact on Irreplaceable Resources (*after* mitigation) If yes, please explain: Damage to graves cannot be repaired and every grave is unique in heritage terms and thus irreplaceable. Mitigation (i.e. protection followed by exhumation) in the event of a grave being found will reduce the intensity of the impact.	YES	~~NO~~

Cumulative impact rating (*after* mitigation) If high, please explain	Low	~~Medium~~	~~High~~

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 widened access road would not present any further impacts. The extent and intensity are thus local and low with a significance of **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 **low negative**. There are no fatal flaws in terms of construction phase impacts to the cultural landscape.

Table 5: *Assessment of impacts to the cultural landscape.*

Impact Description
Visual intrusion into the cultural landscape from the proposed powerlines.

Cumulative impact description
Visual intrusion into the cultural landscape from all electrical infrastructure.

Mitigation
Keep construction duration as short as possible. Minimise surface disturbance and rehabilitate areas not needed during operation.

Impact Assessment

Name of Impact	Extent	Duration	Intensity	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
Impacts on cultural landscape	Local	Short term	Low	Definite	High	Low	Low

Impact on Irreplaceable Resources (*after* mitigation) If yes, please explain		~~YES~~	NO

Cumulative impact rating (*after* mitigation) If high, please explain	Low	~~Medium~~	~~High~~

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 impacts are very similar to those from the construction phase except that the duration is longer (being equal to the lifespan of the powerline). Because there are so many powerlines already present in the area the intensity is low and the significance will be **low negative** (Table 6). No mitigation is suggested, and the post-mitigation significance thus remains **low negative**. There are no fatal flaws in terms of operation phase impacts to the cultural landscape.

Table 6: *Assessment of impacts to the cultural landscape.*

Impact Description
Visual intrusion into the cultural landscape from the proposed powerlines.

Cumulative impact description
Visual intrusion into the cultural landscape from all electrical infrastructure.

Mitigation
None suggested.

Impact Assessment

Name of Impact	Extent	Duration	Intensity	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
Impacts on cultural landscape	Local	Long term	Low	Definite	High	Low	Low

Impact on Irreplaceable Resources (*after* mitigation) If yes, please explain		~~YES~~	NO

Cumulative impact rating (*after* mitigation) If high, please explain	Low	~~Medium~~	~~High~~

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. **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**. 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 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

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) or from continuing farming activities. These, however, are highly unlikely to happen (but are not impossible). Impacts are rated as **low negative** for archaeology and graves and, since no mitigation is proposed, they would remain at the **low negative** level.

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

The heritage impacts with implementation would be only marginally 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 projects. All entries apply equally to both alternatives for the PV1 powerline and to the PV2 powerline.

Table 7: *Heritage considerations for inclusion in the EMPr.*

<table>
<tr><th rowspan="2">Impact</th><th rowspan="2">Mitigation / management objectives & outcomes</th><th rowspan="2">Mitigation / management actions</th><th colspan="3">Monitoring</th></tr>
<tr><th>Methodology</th><th>Frequency</th><th>Responsibility</th></tr>
<tr><td colspan="6">Impacts to archaeology and graves</td></tr>
<tr><td rowspan="2">Damage or destruction of archaeological sites or graves</td><td rowspan="2">Rescue information, artefacts or burials before extensive damage occurs</td><td rowspan="2">Reporting chance finds as early as possible, protect in situ and stop work in immediate area</td><td rowspan="2">Inform staff to be vigilant and carry out inspections of new excavations</td><td>Ongoing basis</td><td>Construction Manager or Contractor</td></tr>
<tr><td>Whenever on site</td><td>ECO</td></tr>
<tr><td colspan="6">Impacts to the cultural landscape</td></tr>
<tr><td rowspan="2">Visible landscape scarring</td><td rowspan="2">Minimise landscape scarring</td><td rowspan="2">Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.</td><td rowspan="2">Monitoring of surface clearance relative to approved layout</td><td>Ongoing basis</td><td>Construction Manager or Contractor</td></tr>
<tr><td>As required</td><td>ECO</td></tr>
</table>

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 landscape feature initially identified as potentially sensitive (the 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 roads and switching stations are adjacent to already authorised SEFs and both powerlines (including either alternative for PV1) would be adjacent to existing powerlines which means the electrical land use is well-established and acceptable.

Finally, with respect to the Du Plessis Dam PV1 powerline, there is no preference from a heritage point of view for either of the alternatives. Both are equally 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 Du Plessis Dam PV1 powerline using either alternative and the Du Plessis Dam PV2 powerline, along with their switching stations and access roads, may be authorised in full.

9. RECOMMENDATIONS

It is recommended that the proposed powerlines, switching stations and access roads be authorised (using either alternative in the case of PV1), 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.

[2] It appears from the photographs 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.

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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 –
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:

Date of Site Visit	19 & 20 April 2022
Specialist Name	Dr Jayson Orton
Professional Registration Number	ASAPA: 233; APHP: 043
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd

Method of the Site Sensitivity Verification

Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. This was used to determine areas of potential sensitivity that should be focused on during the fieldwork. One such area was identified; this was the low, rocky dolerite hill in the south. The various corridors were 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 maps below are extracted from the screening tool reports for the two projects and show 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 both study areas (i.e. the corridors under assessment) are entirely of low sensitivity with only heritage resources of very low cultural significance being found. It is not known what the high sensitivity spots marked on the screening tool maps are, but one of them located on the northern edge of both project corridors is likely to be a potential grave that has subsequently been revisited and is no longer considered to be a grave (Orton 2021). A photographic record and description of the relevant heritage is contained within the impact assessment report.

The specialist thus disputes the screening tool findings and considers the entirety of both study areas to be of low sensitivity.

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

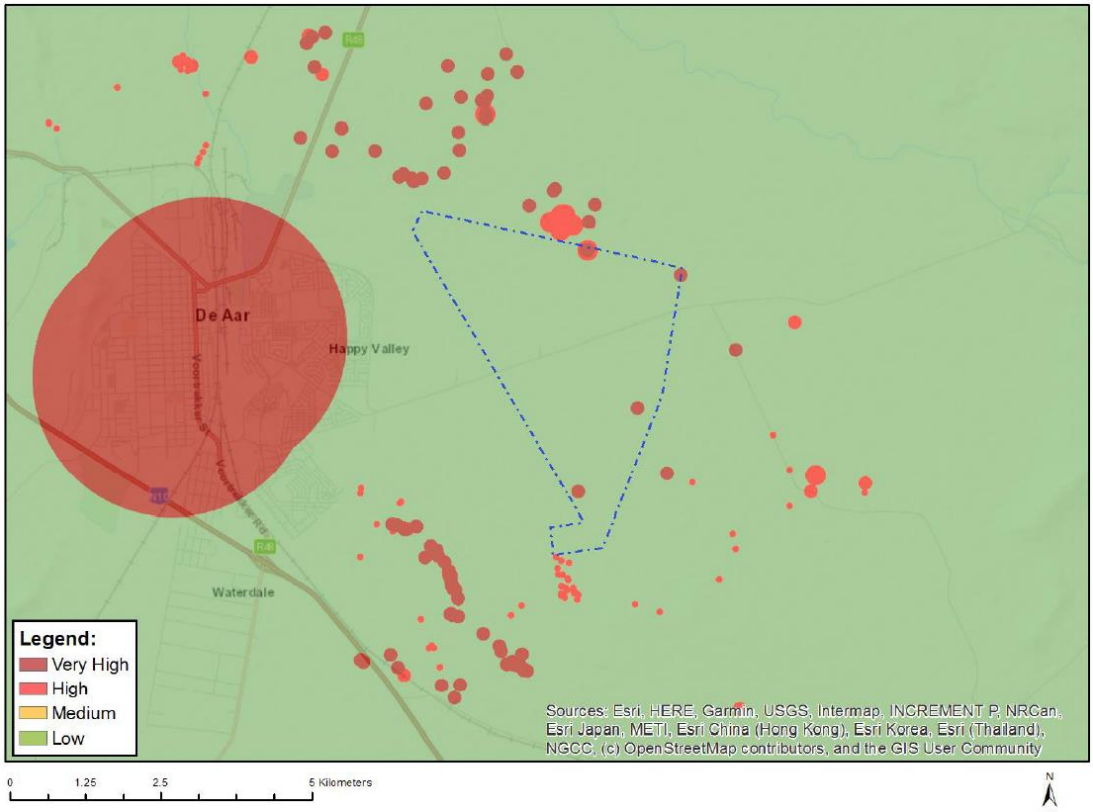

Figure A2.1: *Du Plessis Dam PV1 powerline screening tool map for archaeology and cultural heritage.*

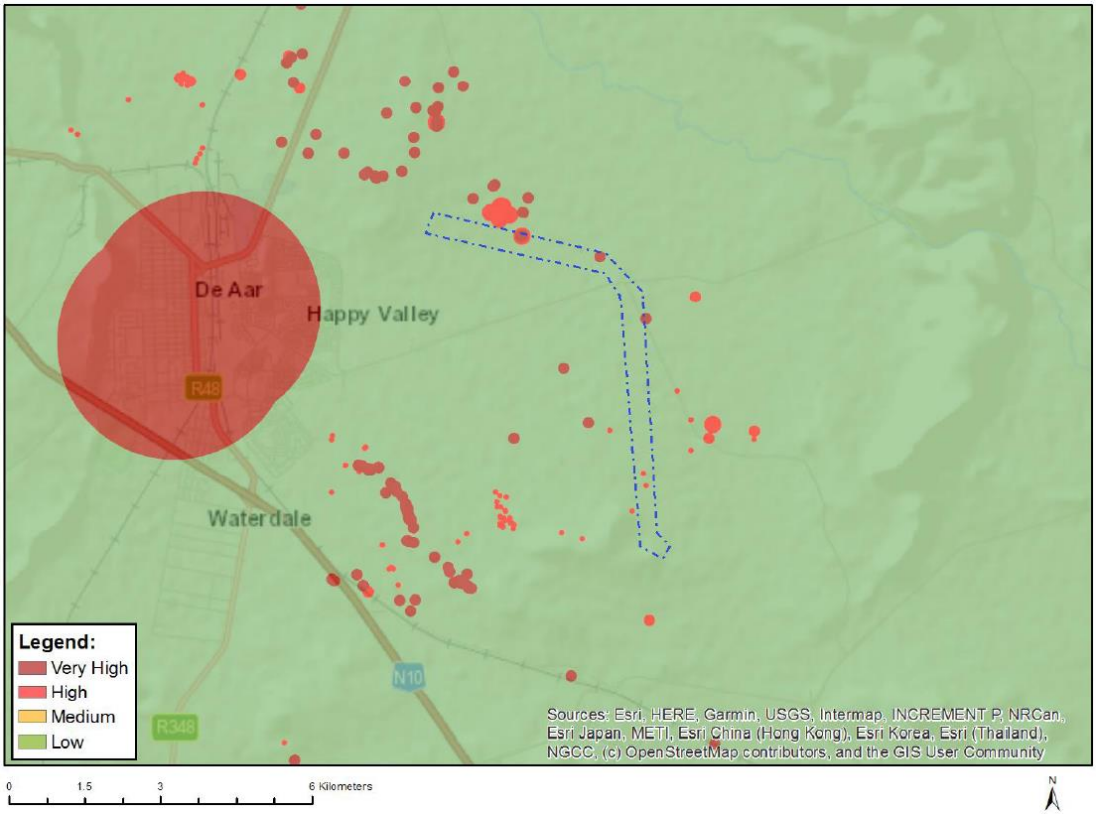

Figure A2.2: *Du Plessis Dam PV2 powerline screening tool map for archaeology and cultural heritage.*