BASIC ASSESSMENT REPORT

Basic Assessment for the Proposed Construction and Operation of Electrical Grid Infrastructure to support the Sutherland, Sutherland 2 and Rietrug Wind Energy Facilities (WEFs), Northern and Western Cape Provinces

APPENDIX D.4: Heritage Impact Assessment (Archaeology, Palaeontology and Cultural Landscape)

HERITAGE IMPACT ASSESSMENT: PROPOSED CONSTRUCTION OF A MAJOR TRANSMISSION SUBSTATION, 400 KV TRANSMISSION LINE AND 132 KV DISTRIBUTION LINE TO SUPPORT THE PROPOSED RIETRUG, SUTHERLAND AND SUTHERLAND 2 WEFs, SUTHERLAND AND LAINGSBURG MAGISTERIAL DISTRICTS, NORTHERN AND WESTERN CAPE

SAHRA Case ID: 14379
HWC Case No.: 19042402AS0521E

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

Report for:

CSIR – Environmental Management Services
P.O. Box 320, Stellenbosch, 7599
Tel: 021 888 2495/2661
Email: mlevendal@csir.co.za

On behalf of:

South Africa Mainstream Renewable Power Developments (Pty) Ltd

Dr Jayson Orton
ASHA Consulting (Pty) Ltd
40 Brassie Street, Lakeside, 7945
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Email: jayson@asha-consulting.co.za

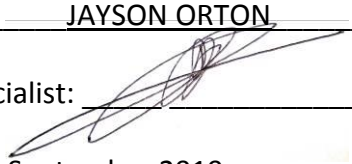
1st draft: 13 August 2019
Revised: 11 September 2019

Specialist declaration

I, Jayson Orton, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Name of Specialist: JAYSON ORTON

Signature of the specialist: 

Date: 26 September 2019

EXECUTIVE SUMMARY

1. Site Name

Electrical grid infrastructure to support three Wind Energy Facilities (WEFs) (namely the Rietrug, Sutherland and Sutherland 2 WEFs).

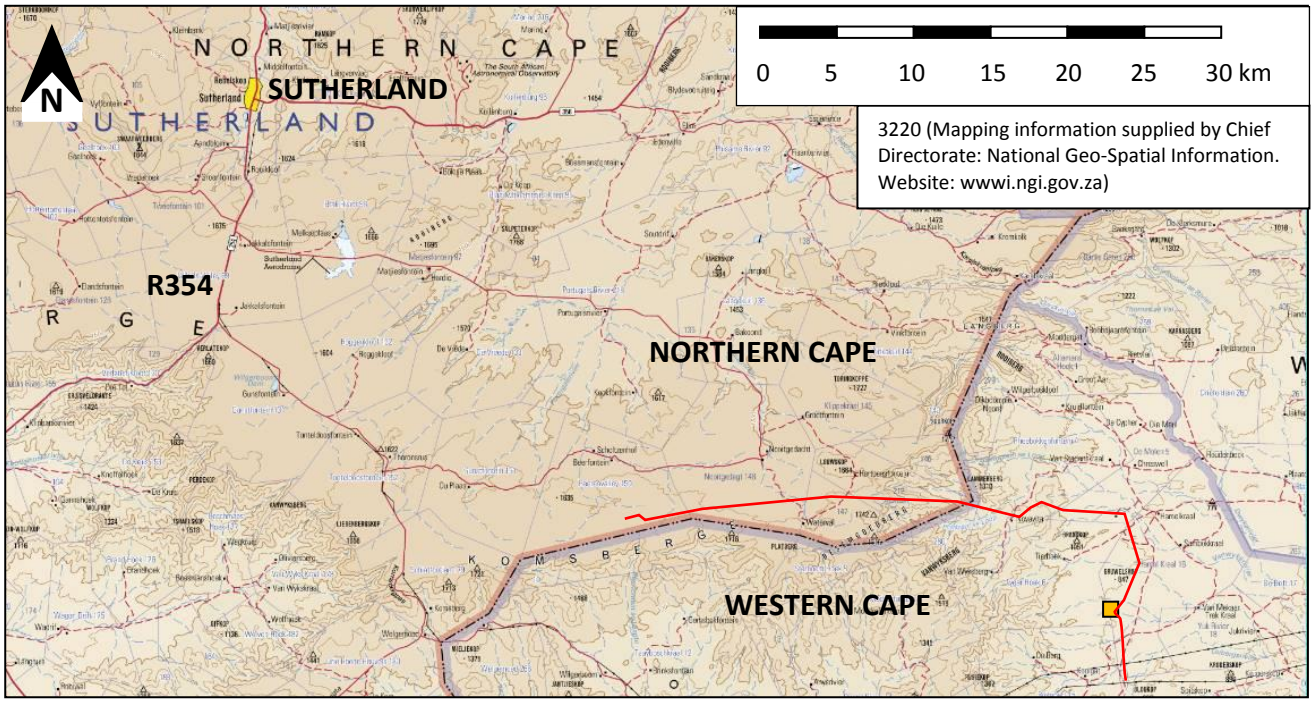
2. Location

The proposed power line would traverse the following properties (listed from west to east):

- Northern Cape: Remaining Extent of Beeren Valley 150, Remaining Extent of Nooitgedacht 148, Remaining Extent of Hartbeesfontein 147, Portion 1 and Remaining Extent of Farm 219; and
- Western Cape: Farm 280, Portion 1 of Rheebokkfontein 4, Portion 2 of Rheebokkfontein 4, Portion 2 of De Molen 5, Portion 6 of Hamelkraal 16, Portion 7 of Hamelkraal 16, and Remaining Extent of Spitskop Farm 20.

The proposed distribution line would run from an on-site substation for the already authorised Sutherland Wind Energy Facility (WEF) at S32° 38' 41.1" E20° 55' 02.5" (36 km southeast of Sutherland, Northern Cape) down the escarpment to a new Main Transmission Substation (MTS) at S32° 42' 00.2" E21° 15' 21.3" (24 km west of Merweville, Western Cape). A 400 kV power line would then extend for some 4.0 km further south to join an existing transmission line.

3. Locality Plan



Map showing the location of the study area. The proposed power line route is marked in red and the proposed substation location is at the orange square.

4. Description of Proposed Development

The project applicant is proposing the development of a 132 kV transmission line, a major transmission substation and 400 kV line and associated service roads, within the Renewable Energy Development Zone (REDZ): 2 Komsberg and the Central Power Corridor that was gazetted in February 2018.

The 132 kV line routing proposed as part of this application was considered in a previous assessment, but with a slightly different alignment in one place and ending at the proposed substation. A different alternative was authorised at that stage and the proponent now seeks to have a separate environmental authorisation for this alignment and a connection to the transmission lines to the south of the substation to allow for more flexibility.

Project components include:

- Major Transmission Substation;
- Overhead 132 kV line ~ 41 km;
- 400 kV ~ 4 km overhead transmission line connecting to an existing Eskom line; and
- Service roads will be constructed below the power lines (jeep track).

5. Heritage Resources Identified

Archaeological remains are generally scarce but are found throughout the area. Stone Age material was rare with a precolonial kraal complex (Northern Cape) and a geometric rock art site (Western Cape) being the most significant sites recorded. Isolated stone artefacts were remarkably rare, especially above the escarpment, but a few small scatters were recorded on the plains below the escarpment (Western Cape). The vast majority of archaeological remains found were historical and ranged from a ruined farm complex to small, isolated ruined structures and isolated individual artefacts. Several sites lie close to the alignment but the eastern part of it was devised by the present author to avoid these sites.

Although palaeontological resources were found throughout much of the study area, the vast majority were of low significance. Two important fossil sites were found in the broader area but both were located away from the proposed power line footprint and impacts are not expected.

Some graveyards and buildings are present in the wider area but all are located well away from the proposed power line alignments and no impacts are expected.

The rural cultural landscape extends throughout the study area but, aside from fences and farm tracks, human interventions are generally very sparse. The site lies within the Komsberg REDZ and Central Power Corridor (that was gazetted in February 2018), which promotes Renewable Energy and Electricity Grid Infrastructure development within these strategic geographical areas. It is thus noted that a new electrical layer is due to be added to this landscape in the very near future. The escarpment, however, remains an aesthetically significant landscape for its remoteness, long views, rugged scenery and distinctive sense of place.

6. Anticipated Impacts on Heritage Resources

Although heritage resources occur fairly close to the route in places, significant direct impacts are not expected. However, a potentially sensitive part of the route could not be surveyed in the field. No heritage resources were found to lie directly within the proposed development footprint. It is noted that the Stone Age kraal complex (in Northern Cape) is bisected by an access road that might be used during development. The greater landscape, especially along the escarpment, is visually significant but because it lies within a REDZ, the area is very likely to be devoted to renewable energy developments and the proposed electrical grid infrastructure would thus not be out of place.

7. Recommendations

Because there are unlikely to be significant impacts to heritage resources that cannot be managed or mitigated, it is recommended that the proposed development be authorised. However, the following conditions should be incorporated into the Environmental Authorisation:

- Any areas of the power line route and substation footprint not yet surveyed should be examined by an archaeologist in order to identify any areas or sites that should be protected or mitigated prior to commencement of construction (this includes any alterations made after completion of the assessment);
- The Environmental Control Officer (ECO) should be aware of the potential for fossils to be uncovered during excavations. As many excavations as possible should be monitored by the ECO during construction and if any fossils are uncovered, they should be protected *in situ* and immediately reported to a palaeontologist in order to plan a way forward;
- The farm road passing through the kraal complex at waypoint 546 (Northern Cape) may not be widened towards the east and should preferably not be widened at all;
- No pylon should be placed within 30 m of waypoint 1785 (Western Cape) and the site should be fenced with a 30 m buffer during the construction phase;
- Significant palaeontological and archaeological sites as listed in this report should be identified on project maps and regarded as no-go zones with buffers of at least 30 m around all associated features (the exception is the service road diversion which comes within 20 m of the rock art site but uses an existing farm track);
- These no-go sites should be examined periodically by the ECO during the construction phase to ensure that they are being respected; and
- If any archaeological material, palaeontological 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 or palaeontologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

8. Author/s and Date

Heritage Impact Assessment: Dr Jayson Orton, ASHA Consulting (Pty) Ltd, 13 August 2019
Archaeological specialist study: Dr Jayson Orton, ASHA Consulting (Pty) Ltd, 13 August 2019
Palaeontological specialist study: Dr John Almond, Natura Viva cc, June 2019

Glossary

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

***Kraal*:** Afrikaans word for a livestock enclosure. The Afrikaans is popularly used throughout the area.

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

***Muurkas*:** Wall cupboard. A depression in the wall which would typically have a wooden box inside it with doors on the front.

***Trapvloer*:** Threshing floor. Circular 'floor' lined with stones for threshing wheat.

***Waterput*:** A hole excavated into the ground, often into rock, that functioned as a well.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BAR: Basic Assessment Report

CSIR: Council for Scientific and Industrial Research

CRM: Cultural Resources Management

DEA: National Department of Environmental Affairs

ECO: Environmental Control Officer

GPS: global positioning system

HIA: Heritage Impact Assessment

HWC: Heritage Western Cape

I&APs: Interested and Affected Parties.

LSA: Later Stone Age

NC: Northern Cape

NCW: Not Conservation Worthy

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

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

NID: Notification of Intent to Develop

PPP: Public Participation Process

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

WC: Western Cape

WEF: Wind Energy Facility

Compliance with Appendix 6 of the 2014 EIA Regulations

Requirements of Appendix 6 – GN R326 (7 April 2017)	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.4 Appendix 1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii (Preliminary Section of this report)
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 4, 5, 6 and 7
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 3
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying alternatives;	Section 1.1.1, 6, 9, Appendix 2
g) an identification of any areas to be avoided, including buffers;	Section 9
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 9
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.5
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 6
k) any mitigation measures for inclusion in the EMPr;	Section 9
l) any conditions for inclusion in the environmental authorisation;	Section 13
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9
n) a reasoned opinion- i. whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity and activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 12 and 13
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 11
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 11
q) any other information requested by the competent authority.	Not Applicable
2. Where a government notice gazetted by the Minister provides for any protocol of minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply	Not Applicable

Contents

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction of an electrical transmission and distribution line (hereafter referred to as 'the power line') and Major Transmission Substation (and associated infrastructure) to support three wind energy facilities (WEFs) that have already been authorised. These are referred to as the Rietrug, Sutherland and Sutherland 2 WEFs which are proposed by South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as 'Mainstream'). The distribution line would run from the on-site substation for the already authorised Sutherland WEF at S32° 38' 41.1" E20° 55' 02.5" (36 km southeast of Sutherland, Northern Cape) down the escarpment to a new Main Transmission Substation (MTS) at S32° 42' 00.2" E21° 15' 21.3" (24 km west of Merweville, Western Cape). A 400 kV power line would then extend for some 4.0 km further south to join an existing transmission line (Figure 1).

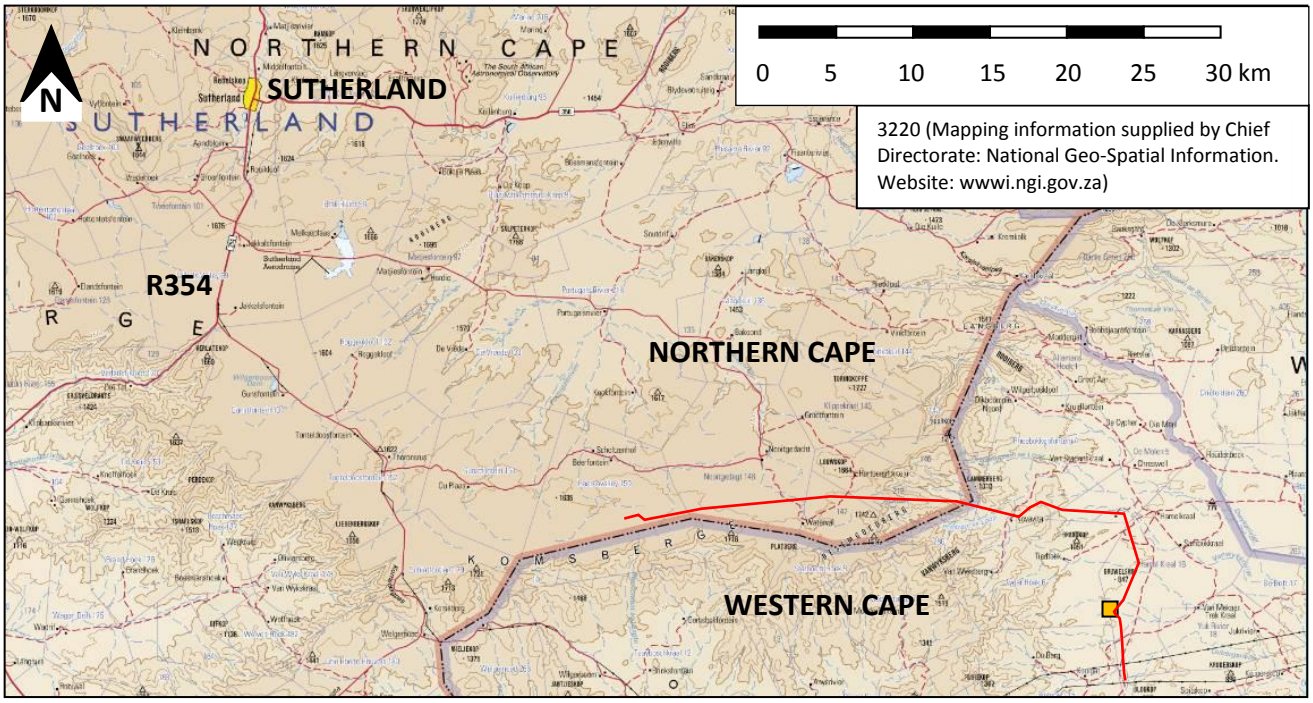


Figure 1: *Map showing the location of the study area. The red line shows the proposed distribution and transmission line route. The orange square represents the proposed MTS.*

From west to east, the proposed power line would traverse the following properties:

- Northern Cape
  - Remaining Extent of Beeren Valley Farm 150
  - Remaining Extent of Nooitgedacht Farm 148
  - Remaining Extent of Hartbeesfontein Farm 147
  - Portion 1 and Remaining Extent of Farm 219
- Western Cape
  - Farm 280
  - Portion 1 of Rheebokkfontein Farm 4

- Portion 2 of Rheebokkfontein Farm 4
- Portion 2 of De Molen Farm 5
- Portion 6 of Hamelkraal Farm 16
- Portion 7 of Hamelkraal Farm 16
- Remaining Extent of Spitskop Farm 20

Note that a very similar project was submitted to HWC and approved in 2017 under case 17020607AS0207E. The present alignment has been slightly altered and extended in length.

1.1. Project description

The project applicant, Mainstream, is proposing the development of a 132 kV transmission line, a major transmission substation and 400 kV line within the Renewable Energy Development Zone (REDZ) 2: Komsberg. The 132 kV line routing proposed as part of this application has been previously assessed as part of the proposed construction of the electrical grid infrastructure for the Sutherland WEF (14/12/16/3/3/1/1816), Rietrug WEF (14/12/16/3/3/1/1815) and Sutherland 2 WEF (14/12/16/3/3/1/1814/AM1). These projects received Environmental Authorisation in February 2018. Within the authorisations, the alternative line routing "1" was submitted as the preferred routing and subsequently approved.

The 132 kV line routing proposed as part of this application was considered in the previous assessment as alternative line routing "2", but with a slightly different alignment in one place and ending at the proposed substation. The line routing did not include any environmental fatal flaws and is a technically feasible option to enable the evacuation of the electricity generated by the abovementioned WEFs into the National Grid. The proponent now seeks to have a separate environmental authorisation for this alignment and a connection to the transmission lines to the south of the substation to allow for more flexibility.

Project components:
- Major Transmission Substation;
- Overhead 132 kV line ~ 41 km;
- 400 kV ~ 4 km overhead transmission line connecting to an existing Eskom line; and
- Service roads will be constructed below the lines (jeep track).

1.1.1. Aspects of the project relevant to the heritage study

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

1.2. Terms of reference

ASHA Consulting was asked to submit a Notification of Intent to Develop (NID) form to Heritage Western Cape (HWC) for the Western Cape component of the project and compile a Heritage Impact Assessment (HIA) that would meet the requirements of the relevant heritage authorities in both Northern Cape (SAHRA) and Western Cape (HWC).

HWC responded to the NID with a request for an HIA that included specialist assessments of impacts to archaeological and palaeontological resources and visual impacts to the cultural landscape as follows:

> You are hereby notified that, since there is reason to believe that the proposed development will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of section 38(3) of the NHRA be submitted. This HIA must have specific reference to the following:
>
> - Visual impact on the cultural landscape
> - Archaeological impacts
> - Palaeontological impacts
>
> The required HIA must have an integrated set of recommendations.
>
> The comments of relevant registered conservation bodies and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied.

It should also be noted, however, that following Section 38(3) of the National Heritage Resources Act (No. 25 of 1999), even though certain specialist studies may be specifically requested, all heritage resources should be identified and assessed.

It was required by CSIR that the reporting include a description and mapping of sensitive features based on a field survey, identification of legal requirements, assessment of impacts and recommendations for mitigation or management as might be appropriate.

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue 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 for consideration by the National Department of Environmental Affairs (DEA) who will review the Basic Assessment Report (BAR) and grant or withhold 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 HIAs and archaeological specialist studies in the western part of South Africa 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) 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.

2. HERITAGE LEGISLATION

The National Heritage Resources Act No. 25 of 1999 (NHRA)
protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: palaeontological, prehistoric and historical material (including ruins) more than 100 years old;
- 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, Section 3(3) describes the reasons a place or object may have cultural heritage value; some of these speak directly to cultural landscapes.

Section 38 (2a) states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted. This report fulfils that requirement.

Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BA. HWC (for all heritage in Western Cape), Ngwao-Boswa Ya Kapa Bokoni (NBKB) (Heritage Northern Cape; for built environment and cultural landscapes in Northern Cape) and the SAHRA (for archaeology and palaeontology in Northern Cape) are required to provide comment on the proposed project in order to facilitate final decision making by the DEA.

3. APPROACH AND METHODOLOGY

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the proposed development would be set. This literature included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). The 1:250 000 map sourced from the Chief Directorate: National Geo-Spatial Information was also used. Data were also collected via field surveys.

3.2. Field survey

During the earlier assessment five days were spent covering various parts of the proposed alignment. These were 15, 17 and 18 November 2016 and 2 and 3 February 2017. Two further days were spent on site on 10 and 11 May 2019 working on both this and another project. These surveys were in different seasons but in this relatively dry environment the season makes little difference to the degree of vegetation cover and hence the visibility of heritage resources. During the surveys the positions of finds were recorded on a hand-held GPS receiver set to the WGS84 datum. Track paths were also recorded on the GPS (Figure 2). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

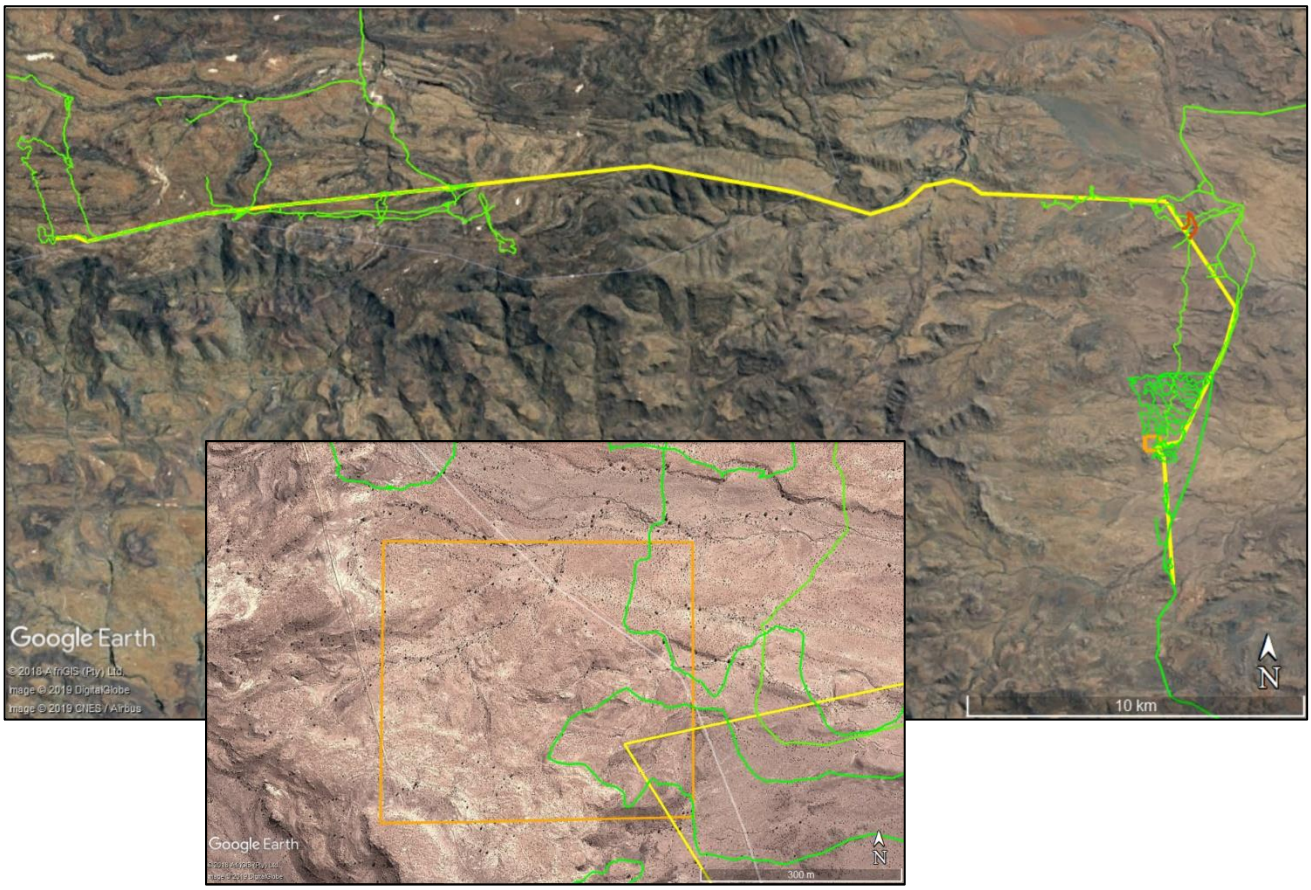


Figure 2: *Aerial view of the study area showing the proposed power line route (yellow line), substation location (orange polygon) and walk and drivepaths (green lines). The central portion was not surveyed. The inset shows the revised substation footprint.*

3.3. Impact assessment

For consistency, the impact assessment was conducted through application of a scale supplied by the CSIR.

3.4. Grading

Section 7 of the NHRA provides for the grading of heritage resources into those of National (Grade 1), Provincial (Grade 2) and Local (Grade 3) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade 1 and 2 resources are intended to be managed by the national and provincial heritage resources authorities, while Grade 3 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 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. HWC (2012), however, uses a system in which resources of local significance are divided into Grade 3A, 3B and 3C. These approximately equate to high, medium and low local significance, while sites of very low or no significance (and generally not requiring mitigation or other interventions) are referred to as Not Conservation Worthy (NCW).

NBKB has no grading system in place but 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 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' and rated with an A (high/medium significance, requires mitigation), B (medium significance, requires recording) or C (low significance, requires no further action).

3.5. Assumptions and limitations

The study is carried out at the surface only and hence any completely buried archaeological sites or palaeontological occurrences will not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Generally, however, archaeological material in the Karoo tends to be restricted largely to the surface.

For various reasons some parts of the project were not examined in the field:

- A 4.3 km long section above the escarpment (in Northern Cape) was not examined because it was remote and from aerial photography and the topography it seemed that the likelihood of significant finds would be extremely low;
- A 12 km long section on and running down to the base of the escarpment (in Northern Cape and Western Cape) could not be examined because the landowner did not provide consent for specialist site visits. Although much of this area is likely to be of very low archaeological sensitivity, the valley section may be more sensitive. The farm buildings are located in the valley and have not been seen and assessed by this author. This does limit the conclusions regarding visual impacts to heritage resources but archaeological impacts can be easily dealt with in the pre-construction phase; and
- A few short sections in the eastern part of the power line route and part of the substation footprint were not examined. The latter was because the footprint was altered due to environmental constraints after the specialist site visits. However, the amount of land seen in the surveys gives a good general understanding of the heritage environment.

Cumulative impacts can be difficult to assess accurately because of uncertainties as to what may or may not be constructed. A map of renewable energy projects was made available for the purpose of cumulative assessment and it is assumed here that each will have associated power lines and substations.

3.6. Consultation processes undertaken

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 for the Northern Cape component of the project. Interested and affected parties (I&APs) would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

However, in their response to the NID application, HWC did require comment from the relevant Western Cape municipality and the draft HIA was therefore submitted to the Laingsburg Municipality for comment. See Section 11 below.

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

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The site is located in a predominantly natural landscape, although pockets of land could better be described as rural where farming occurs. The area is used predominantly for livestock grazing, but does lie within a promulgated REDZ and Power Corridor and many renewable energy facilities have been proposed in the area.

4.2. Site description

Because the areas above and below the escarpment are so different, they are described separately.

Atop the escarpment the study area is comprised of gently undulating hills. The vast majority is undeveloped land, but some small areas of agricultural land do occur in the wider area (the nearest to the power line route is about 1 km away). Although the terrain is often very rocky, the rocks tend to be flat (Figure 3). Small ridges do protrude in places though (Figure 4). Vegetation cover is usually low but, because of the slightly higher rainfall on the escarpment, it is fairly continuously present. In the river valleys there is somewhat denser bush (Figure 5). Although the rock is largely quite solid sandstone, there are places where dark shale bands occur which are eroding heavily (Figure 6). These are generally present on slopes or on the sides of incised valleys.

The central part of the study area spanning the provincial boundary could not be accessed. However, it is noted that the proposed distribution line route runs down an exposed 6 km long ridgeline from the edge of the escarpment into a river valley and then on across the plains.

Figure 3: *Flat rock slabs in the central part of the Northern Cape section.*

Figure 4: *A low rocky ridge in the central part of the Northern Cape section.*

Figure 5: *View up a river valley in the central part of the Northern Cape section showing the denser bush in the actual stream bed.*

Figure 6: *Weathering and eroding shale band in the side of a small river channel near the eastern end of the power line route.*

The easternmost part of the study area that lies within Western Cape was mildly undulating with stream beds of varying size but was much less rocky than the escarpment area (Figure 7). Low scarps occurred in places with the largest of these being in the region of 20 m high (Figure 8). The southern part of the study area is very flat and dominated by river floodplains (Figures 9 & 10). The main relief is a slightly higher-lying area to the west of the line where the substation would be built. The bulk of the visible bedrock in the Western Cape portion of the study area was highly weathered shale but the remains of more resistant rocks were often lying on the surface as gravel (Figures 11 & 12). Fine gravel tended to be widespread on the surface.

Figure 7: *View towards the south in the far eastern part of the study area. A small drainage line is marked by denser vegetation.*

Figure 8: *View towards the southeast from the top of a rocky scarp with river beds visible in the distance.*

Figure 9: *View towards the south from near the substation location showing a river floodplain. The clump of trees lies alongside a reservoir and wind pump. The large power lines are visible in the distance.*

Figure 10: *View towards the north from the very southern end of the power line route showing stream beds and gravel. The main gravel road through the area is visible at far left.*

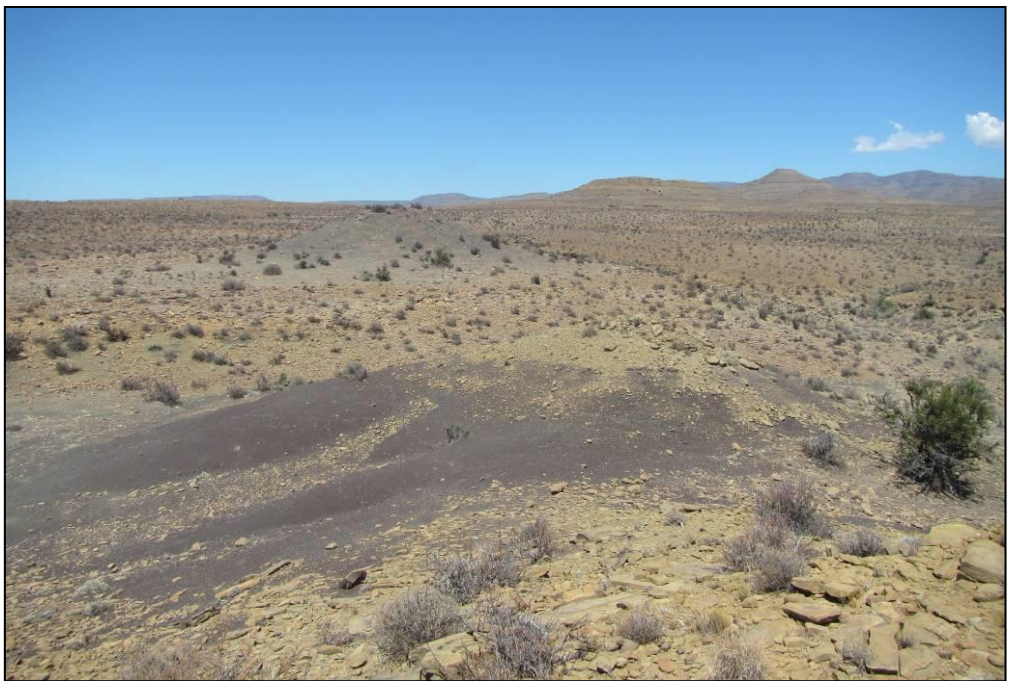


Figure 11: *View towards the southwest along a low rocky ridge in the eastern part of the study area showing the dark-coloured weathering shale overlain by the remnants of more resistant pale orange-coloured sandstone.*

Figure 12: *View towards the east across the original substation location. The new location is just to the northwest of this position (i.e. behind the camera and to the left).*

5. HERITAGE CONTEXT

This section of the report contains the desktop study and establishes what is already known about heritage resources in the vicinity of the study area. What was found during the field survey as presented below may then be compared with what is already known in order to gain an improved understanding of the significance of the newly reported resources. Findings from the 2017 surveys of this power line route (Orton 2017) are briefly mentioned but described more fully in Section 6 of the present report.

5.1. Archaeological aspects

Prior to the colonial incursion into the interior of southern Africa the Bushmen and, more recently, the Khoekhoen occupied the area. Very little archaeological research has been undertaken in the area, although a number of impact assessments have been carried out, especially in connection with proposed renewable energy facilities. Most surveys show that Stone Age material is generally quite sparse on the landscape, although scatters of Early (ESA), Middle (MSA) and Late Stone Age (LSA) material have been reported (Hart *et al.* 2010; Halkett & Webley 2011). Occasional small rock shelters have been recorded closer to Sutherland and well northwest of the present study area (e.g. Evans *et al.* (1985), Hart (2005), Orton & Halkett (2011)) with one having been excavated. This one yielded a typical LSA assemblage with small scrapers, thin-walled potsherds, ostrich eggshell beads and some *Nassarius kraussianus* beads. The latter are estuarine shells that must have been obtained from the coast.

A very important aspect of the pre-colonial archaeology of the area is the many stone-built *kraals* (livestock enclosures) that have been recorded in various areas. The vast majority are in the Seacow River valley to the east (Hart 1989; Sampson 1985, 2008), but two excellent examples of complex kraals have also been reported from the southern edge of Sutherland (Hart 2005) and from about 450 m south of the power line route in Northern Cape (Hart *et al.* 2010; Orton 2017). The first was a complex of 13 interlocking enclosures and the second had about 28 enclosures. A number of other examples are on record, largely from above the escarpment (Hart *et al.* 2010). Some had stone artefacts, red burnished, thin-walled pottery, and ostrich eggshell associated with them. Stone Age *kraals* are important sites and are as yet poorly understood.

Along the dry river beds at the base of the escarpment Hart *et al.* (2010) also identified sites which they thought were large Khoekhoe encampments situated among the Kameeldoring trees in the bottom of valleys. The sites contained thin-walled, burnished pottery, stone features, stone artefacts, grinding surfaces and graves, some of which have broken grinding stones on them. Also evident were discreet ash middens and animal bone. Hart *et al.* (2010) noted colonial period artefacts (19th century glass and ceramics) on some of the sites, possibly indicating continuous use of the area by Khoekhoe herders into the colonial period.

Although geometric rock art has been mapped by researchers across large swathes of South Africa, there is a gap in the distribution surrounding the study area (Orton 2013; Russell 2012; Smith & Ouzman 2004). Nevertheless, geometric rock art has been documented in the area. One site lies along the subject road near its western end (Orton & Halkett 2011) and the others are some 23 km and 29 km south of the road, just below the escarpment edge (Halkett & Webley 2011). Two sites contain geometric paintings, while the third is not discernible but may be a human figure.

Historical archaeology abounds in the area with many ruined stone-built structures being present (e.g. Hart *et al.* 2010; Halkett & Webley 2011; Kaplan 2009; Orton 2017). These include kraals, houses and other domestic features and often have artefactual material (broken ceramics and glass, metal items, etc) scattered about them. Occasionally a refuse midden is found alongside an old farmstead. These middens reflect the material remains of domestic life on the early frontier farms during the 18th and 19th centuries. Various other historical stone-built features include boundary walls, markers, cairns and beacons (e.g. Hart *et al.* 2010; Orton & Halkett 2011) as well as ruined military structures, such as those on Jakkalsvalley to the south of Sutherland (Orton & Halkett 2011).

5.2. Built environment and historical aspects

Various historical structures have been recorded in the area. Because many are ruined and in a state of disuse, they would generally fall into the category of archaeological resources rather than built environment heritage resources. The types of structures included here include:

- Farmhouses, outbuildings and farm workers dwellings occur widely in the region but, because of the size of the farms, are sparsely distributed. Some are built from dressed stone; and
- Dry stone *kraals* and boundary walls where these are well maintained/intact.

Hart *et al.* (2010) and Halkett & Webley (2011) recorded numerous graveyards, generally associated with homesteads and with abandoned settlements.

There are also many tracks which are likely to have their origins in the 19th century wagon routes between farms, although these are perhaps better regarded as elements of the cultural landscape.

5.3. Historical background

Schoeman (1986) has described the early settlement of the Roggeveld and Sutherland area from about 1750 onwards. The escarpment area, with its higher rainfall, was found to be good for small stock farming in summer but the extreme winter cold forced people down into the valleys and plains to the south. Initially, the European population remained small because many early loan farms were used merely as “stock posts” – the owners lived elsewhere and often had more than one loan farm. The early days of colonial settlement were conflict-ridden because indigenous groups, called “Boschiesman Hottentoten” (Khoekhoen and San/Bushmen) were unhappy about losing their traditional lands and attempted to force the Europeans to flee what can best be described as

'guerrilla warfare'. Livestock theft was rife and attacks on farmers and indigenous populations were commonplace. From the late 18th century commando groups (comprised of local farmers) were called up to attack the *kraals* of local Khoekhoe and Bushmen groups. Although they defended their positions with bow and arrow, the firearms of the framers generally resulted in many indigenes being killed (Schoeman 1986). These commandos were initiated in response to the so-called "Roggeveld Rebellion" of 1772 when many Khoekhoe labourers left their farms and banded together in response to a rumour that all Khoekhoen living in kraals would be killed (Penn 2005). They were defeated and the San and Khoekhoen were gradually driven northwards from the Roggeveld. By 1809 there was reported to have been only one Bushman *kraal* left in the area. Penn (2005:21) notes that "Without access to the resources on both sides of the escarpment, and the water of the escarpment itself, both pastoralists and hunter-gatherers were doomed; hence the desperate fighting of the 1770s, 1780s and 1790s. These were years of intense commando activity and Khoisan resistance."

The early 19th century saw an increase in permanent European settlement, although the farmers' main source of income was still small stock – wheat could only be grown with great difficulty in isolated and protected valleys and there was very little standing water and grazing suitable for cattle. The early settlers were responsible for the construction of the well-known stone corbeled houses on the Northern Cape (Kramer 2012). Three known corbeled houses occur between 8 km and 11 km from the proposed power line route.

Schoeman (1986) notes that during the early years of settlement in the Roggeveld, many of the Trekboers lived in grass huts or Matjies houses, or even in tents. The use of Matjies houses was reported as late as 1839. Attempts at constructing more permanent structures were inhibited by the lack of wood suitable for building. One technique that was often used to overcome this difficulty was to use drystone walling to half height and then construct a wooden framework to support a reed roof on top of it. These were tiny houses and were known as *Hartebeeshuise*. Sometimes they were made without the stone courses and looked like a tent made of vegetation. Examples were reported to the southwest of the study area below the escarpment by Almond (pers. comm. 2016 in Orton 2016).

During the South African War (a.k.a. Anglo-Boer War), the British forces built fortifications at a number of strategic passes through the Roggeveld. Two stone blockhouses guard a pass on the farm Gunsfontein (Discover Sutherland 2017). With the Boer leader Manie Maritz active in the Calvinia District, many young men from the Roggeveld joined the Boer cause. In 1901 there appear to have been some skirmishes in the vicinity of Skietfontein, a farm through which the Komsberg Pass runs.

6. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project. The finds are mapped in Appendix 2. Table 1 provides a comprehensive list of the survey findings, but only selected examples are discussed in the text that follows. Note that the earlier surveys covered a wider area (Orton 2017) and only sites located within a 1 km wide corridor spanning the alignment have been recorded in the present report. In Western Cape, waypoints recorded for another project which has been discontinued have been included in the table. These lie to the north of the substation location and, because the revised substation site was not surveyed, they give a good indication of the heritage features expected to occur.

Table 1: *List of heritage resources recorded during the field surveys. Grades follow the system in use for each province as relevant. Note that in addition to the finds relevant to the present application area, finds for an abandoned second application in the same area are also included for the record.*

Waypoint	Co-ordinates	Description	Grade	Cultural significance
NORTHERN CAPE				
521	S32 38 23.2 E20 58 16.5	Small round stone structure overlooking a dam on high ground near the edge of the escarpment.	GP B	Low-Medium
522	S32 38 24.1 E20 58 16.4	Small rectangular stone structure overlooking a dam on high ground near the edge of the escarpment. There is also a small oven alongside it.	GP B	Low-Medium
523	S32 38 06.3 E21 01 02.4	Half an isolated lower grindstone found face up alongside a small tributary stream above a larger stream bed.	---	---
524	S32 38 10.1 E21 01 03.7	Small stone structure in a small, steep-sided river valley. Almost certainly a shepherd's hut. More intact than many other historical finds.	GP A	Medium
546	S32 38 09.9 E21 02 11.8	Pre-colonial kraal complex with numerous enclosures and stone-walled features (about 27 or 29 in total) scattered around and on top of a low rocky outcrop. A few Stone Age artefacts were found as well as a number of fragments of ostrich eggshell. A few recent items (liquor bottle and a shoe fragment) testify to more recent use of the area. Note that waypoints 528 to 553 inclusive were all at this kraal complex but that 546 is taken as an approximately central location for the site.	III A	High
554	S32 38 10.5 E21 02 19.8	Small stone structure perched on the edge of a scarp. Unknown function but perhaps a lookout point?	GP C	Low
555	S32 38 09.2 E21 02 21.1	Small semi-circular stone structure with entrance to the east. There are also a few other stone features close by.	GP B	Low-Medium
576	S32 38 42.8 E20 54 53.4	Small piled stone structure of about 1.5 m by 3 m. Two unburnt and one burnt bone fragments were only associated materials present.	GP C	Low
580	S32 37 57.6 E21 02 11.6	An isolated flake. Seems fairly fresh and is likely LSA.	---	---
581	S32 37 56.4 E21 01 54.5	Point along old fence line which employed long, thin rock slabs as fence poles accompanied by small, locally-sourced sticks. Fence is parallel to proposed power line.	GP C	Low
582	S32 37 58.1 E21 01 35.9	Point along old fence line which employed long, thin rock slabs as fence poles accompanied by small, locally-sourced sticks. Fence is parallel to proposed power line.	GP C	Low
583	S32 37 59.4 E21 01 15.9	Point along old fence line which employed long, thin rock slabs as fence poles accompanied by small, locally-sourced sticks. Fence is at 90 degrees to proposed power line.	GP C	Low
584	S32 38 22.0 E20 59 32.5	Isolated 19th century refined white earthenware fragment. Note that Halkett & Webley (2010) reported three graves here but none were seen – there are loose clusters of natural stones overlying weathered bedrock.	---	---

Waypoint	Co-ordinates	Description	Grade	Cultural significance
585	S32 38 23.3 E20 59 32.7	Loosely-packed stone cairn downslope from overhang with stone-walled structure inside it.	GP C	Low
586	S32 38 24.6 E20 59 30.8	Stone-packed structure underneath a rock overhang. The rock was sourced from the roof collapse and subsequent collapse has damaged part of the site.	GP B	Low-Medium
587	S32 38 10.6 E21 02 06.2	Small, rectangular structure built against a rock outcrop. From its construction (of flat slabs) and preservation is must be historical.	GP B	Low-Medium
588	S32 38 10.6 E21 02 07.0	Semi-circular stone walling along the edge of and extending partly away from a rock scarp. Very close to the small structure at 587. It is made from rounded rocks and piled in a manner more similar to pre-colonial walling. It may be historical or it may relate to the pre-colonial kraal cluster located 50 m to the east.	GP C	Low
Site 51	S32 37 52.3 E21 04 23.1	Historical circular kraal with associated glass and ceramics recorded by Hart *et al.* (2010). Given Grade IIIA (on WC system) by them.	IIIA	High
WESTERN CAPE				
485	S32 41 02.5 E21 15 45.0	A very tiny "dam" created by placing a single line of about 15 stones across the lowest point of a tiny pan. Mud was probably placed along the stones to trap the water in the pan.	NCW	Very low
486	S32 41 47.3 E21 15 51.1	A stone feature that may be either a circle or a semi-circle. No obvious associated material in the vicinity.	NCW	Very low
488	S32 40 15.2 E21 16 42.2	A section of historical road alignment left behind after the main road was straightened.	NCW	Very low
489	S32 39 17.7 E21 17 02.4	Isolated (probable) lower grindstone in a pan.	NCW	Very low
492	S32 38 16.5 E21 15 59.4	Rock art site with eight finger-painted vertical stripes applied to three different 'canvases' (small faces on a very irregular surface). No associated artefacts seen and there is no proper rock shelter. The site overlooks a river valley.	IIIA	High
493	S32 38 19.2 E21 16 00.7	A small stone structure measuring 1.2 x 1.6 m and about 0.8 m high. It lies on the top of a scarp, very close to the edge. Slabs create a roof with an interior far too small for human use.	IIIC	Low
		Waypoints 497-500 & 601-608 are all part of a single historical farm complex, while the track marked by 609-612 is no doubt directly related to it. The entire complex is graded as a whole and mapped as waypoint 497.		
497	S32 38 08.8 E21 15 21.5	Elongated stone feature.	IIIA	High
498	S32 38 09.2 E21 15 21.1	Small one-roomed stone house with a pitched roof and four rooms (roofs all missing) added to it on the west and south. Two of the rooms on the west have curved walls – an extremely unusual feature. Also two paved surfaces on the north and east sides of the house. Main house has had roof trusses and metal roof sheets added in more recent times (perhaps early-mid-20th century) to allow the structure to continue to be used. Internal plaster was probably also added at this time but is peeling off. Unworked / minimally worked wooden		

Waypoint	Co-ordinates	Description	Grade	Cultural significance
		beams used on roofs of added rooms. It is notable that there is no dump in the vicinity of the house and outbuildings. However, there are many fragments of glass, ceramics and metal (including many car parts) scattered in low density over the general area. Much of this material is mid-20th century in age but there is definitely some 19th century material. A fragment of a cobalt blue bottle has "Cape Town" embossed on it. There are also many stone-dressing flakes in the area and many of the blocks in the structures are dressed stones.		
499	S32 38 09.4 E21 15 19.1	A circular '*trapvloer*' of about 7 m diameter with standing stones around its margin.		
500	S32 38 07.8 E21 15 19.8	A second dwelling house with two rooms, both of which have curved walls. Each room has a very small '*muurkas'* (more of a shelf) built into it. A low stone wall encloses a stoep area on the east side and a small stone pillar stands on one side of the entrance to this stoep area. Unworked / minimally worked wooden beams used on roof. Also a scattering of glass, ceramics and metal (again including a few presumed car parts) around the general area.		
601	S32 38 07.4 E21 15 20.1	A small, circular stone feature of about 2 m diameter.		
602	S32 38 08.0 E21 15 20.1	A packed stone feature of about 2 x 4 m.		
603	S32 38 09.1 E21 15 20.5	A small, circular stone feature of about 2 m diameter but slightly taller than 501.		
604	S32 38 09.1 E21 15 22.5	The remains of a fenced kraal that has several standing stone fence posts but no sign of any wire fencing. Approximately 15 x 17 m in size.		
605	S32 38 11.2 E21 15 21.8	An assortment of scattered slabs, rocks and one standing stone fence post on the river floodplain across the river from the house.		
606	S32 38 12.5 E21 15 21.3	A small, low stone-lined dam with a line of stones of indeterminate function very nearby. The dam is under thorn trees so size not determined.		
607	S32 38 13.1 E21 15 24.5	A rectangular stone foundation of about 4 x 8 m. Running towards the north is a series of U-shaped (worked) slabs planted on edge. Their function is unknown.		
608	S32 38 11.6 E21 15 25.9	A probable grave which has been partially excavated by an animal. This has resulted in collapse of some of the stones making it difficult to be certain of whether it is a grave. But it seems very likely.		
609	S32 38 11.9 E21 15 26.2	These points lie along an ephemeral track that runs along the base of the hill past 509 then turns eastwards past 510 and 511 then fading out at 512. It appears from aerial photography to continue towards the north east.	IIIC	Low
610	S32 38 07.4 E21 15 30.6			
611	S32 38 06.4 E21 15 34.2			
612	S32 38 05.9 E21 15 36.8			
613	S32 38 29.7 E21 15 50.1	Small stone cairn.	NCW	Very low
		Waypoints 614-618 are all part of a single historical farm complex. The entire complex is graded as a whole and mapped by waypoint 614.		

Waypoint	Co-ordinates	Description	Grade	Cultural significance
614	S32 37 50.2 E21 14 08.8	A small, rectangular stone one-roomed house of beautifully dressed blocks. It has a door facing east, a window facing west and a small '*muurkas*' (more of a shelf) in each end wall. It is 2.5 x 2 m. There is a cleared area around the house with stones pushed loosely to the edge. There are various loose piles of stones or 'features' around the edge of the cleared area.	IIIA	High
615	S32 37 49.3 E21 14 08.7	A rectangular stone foundation of about 2 x 3 m.		
616	S32 37 49.0 E21 14 07.6	A 2.5 x 2.5 m possible grave or a collapsed structure. One standing stone 'post' might be a headstone and would be in position for one burial in a double grave but it's position would mean the grave is facing north instead of east. The stones are not well-ordered suggesting it to more likely be a collapsed structure. It also lies on a rocky slope which would not be suited to the excavation of a grave. The stones are not deep enough for a stone-packed surface grave. There is a second stone feature some 10 m to the southwest.		
617	S32 37 50.8 E21 14 07.1	A '*waterput*' excavated into the bedrock. It is 2.5 m in diameter and about 4 m deep.		
618	S32 37 51.1 E21 14 07.6	A small, low stone-lined dam of about 9 x 10 m.		
619	S32 38 05.6 E21 13 15.0	A dam across a small river valley with a stone-packed wall of about 1 m high.	IIIC	Low
620	S32 39 14.0 E21 16 31.8	A pile of stones, possibly a cairn of sorts.	NCW	Very low
1771	S32 40 49.9 E21 14 52.9	A light scatter of MSA artefacts located on a small flat-topped koppie and overlooking stream beds. The artefacts are made on an orange-patinated rock that is assumed to be a hornfels.	NCW	Very low
1772	S32 40 52.5 E21 14 52.7	A light scatter of MSA artefacts located on the north-western edge of a larger, flat, raised area overlooking stream beds. The artefacts are made on an orange-patinated rock that is assumed to be a hornfels.	NCW	Very low
1773	S32 40 52.2 E21 14 53.2	An isolated lower grindstone found face-up along the northern edge of the same raised area as waypoint 1772.	NCW	Very low
1774	S32 40 52.6 E21 14 58.5	A light scatter of MSA artefacts located on the eastern side of the elevated area mentioned in waypoint 1772. The artefacts are made on a grey rock.	NCW	Very low
1775	S32 41 03.3 E21 15 00.3	A light scatter of MSA artefacts located on the south-eastern edge of a elevated area overlooking stream beds. The artefacts are made on a grey rock.	NCW	Very low
1776	S32 41 16.3 E21 15 08.5	A small scatter of dark brown wine bottle fragments, likely all from a single bottle but probably not the whole bottle present. It is located just east of a small pan. There are also rare MSA artefacts in this general area.	NCW	Very low
1777	S32 41 31.3 E21 15 29.2	A small, collapsed cairn of small stones gathered in a silty area. Seems highly unlikely to be a grave covering considering the small pile.	NCW	Very low

Waypoint	Co-ordinates	Description	Grade	Cultural significance
1778	S32 40 53.8 E21 15 14.5	A light scatter of MSA artefacts located on an elevated area overlooking a large river bed. The artefacts are made on a grey rock.	NCW	Very low
1779	S32 40 57.4 E21 15 15.1	A light scatter of MSA artefacts located on an elevated area overlooking a large river bed. The artefacts are made on a grey rock.	NCW	Very low
1780	S32 41 07.2 E21 15 48.6	An isolated enamel pot with a handle. It is squashed and rusted.	NCW	Very low
1782	S32 43 00.0 E21 15 39.4	A small stone-walled dam located alongside a wind pump. Has been superseded by a small concrete reservoir.	IIIC	Low
1783	S32 42 43.1 E21 15 30.5	A dolomite slab with several marks on it indicating someone chopping something on it. Age presumed to be historical.	NCW	Very low
1784	S32 42 43.0 E21 15 31.8	A dolerite slab with some very light scratches on it. Impossible to tell what the scratches represent but presumably some sort of composition. Age presumed to be historical.	NCW	Very low
1785	S32 42 43.5 E21 15 34.1	A dolomite slab with a historical engraving featuring a circle with dots in it, a “Q” and an “H”. Age presumed to be historical.	IIIB	Medium
1786	S32 42 28.9 E21 15 33.3	An ephemeral scatter of quartzite artefacts on high ground overlooking a wide, sandy floodplain.	NCW	Very low
1787	S32 40 48.9 E21 15 53.6	A stone cairn (now more like a cluster of rocks) that sites above weathered bedrock (i.e. definitely not a grave).	NCW	Very low
1788	S32 40 48.0 E21 15 38.0	A small stone-walled dam built in a small stream bed against a hill. There is what looks like an old borehole next to it which may have once had a wind pump above it.	IIIC	Low
1789	S32 41 05.2 E21 15 58.3	An isolated fossil bone. Looks like a rib of a large animal.	See palaeo report	
1790	S32 40 57.4 E21 16 15.7	Two green wine bottle fragments.	NCW.	Very low

6.1. Archaeology

Stone Age archaeological resources were found to be rare throughout the study area. Occasional isolated stone artefacts attributable to the background scatter were found in places including three lower grindstones. Two of the latter were found above the escarpment close to streams with one of them being very large and featuring a prominent groove indicative of extensive use (Figure 13). None of the grindstones was accompanied by any other visible artefacts. Other isolated artefacts, generally flakes, were found to be more common on the plains below the escarpment, although even so, only a handful were seen during four days of survey there (Figure 14). A small, ephemeral scatter of stone artefacts was located along the power line route at waypoint 786 to the south of the proposed substation (Figure 15). It was on a raised area overlooking a stream. Other similar scatters were found in similar locations in a nearby area examined for the discontinued project showing that there is a pattern of small sites on higher-lying land between streams. The apparent absence of prepared platforms and the generally very limited patination suggests that they are more likely to date to the LSA than the MSA.

Figure 13: *Isolated grooved lower grindstone found alongside a stream at waypoint 515 in the western part of the study area. It is approximately 60 cm long and 37 cm wide.*

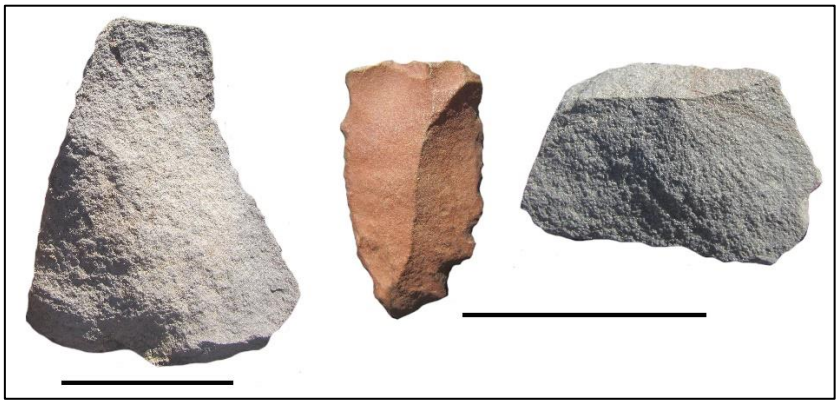


Figure 14: *Isolated flaked stone artefacts from below the escarpment. Scale bars are both 5 cm long. The central artefact is a notched MSA flake, while the other two are undiagnostic.*

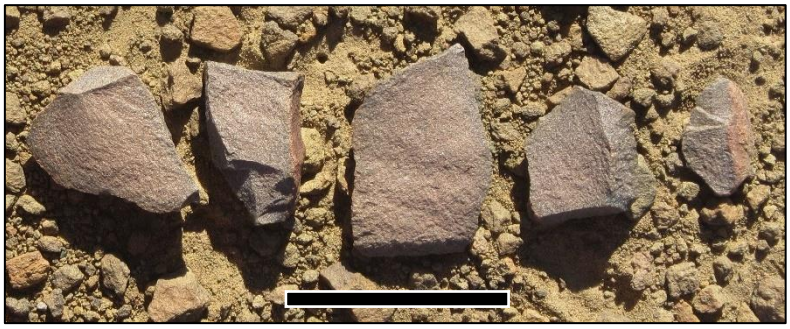


Figure 15: *Artefacts from an ephemeral scatter of quartzite flakes on high ground overlooking a steam bed.*

Only two significant Stone Age sites were found. The first, located in Northern Cape, was a complex of stone-walled kraals at waypoint 546. The complex does not lie along the power line alignment but, importantly, is bisected by one of the access roads in the area. Figures 16 to 19 show views of some of the individual enclosures. Altogether there were about 27 enclosures or stone-walled features. Because of its importance it was mapped carefully (Figure 20).

Figure 16: *View of a large enclosure on the east side of the rock outcrop.*

Figure 17: *A very small enclosure on the northeast side of the rock outcrop.*

Figure 18: *Two enclosures, one very large, on the north-western side of the outcrop.*

Figure 19: *An enclosure on the top of the rock outcrop.*

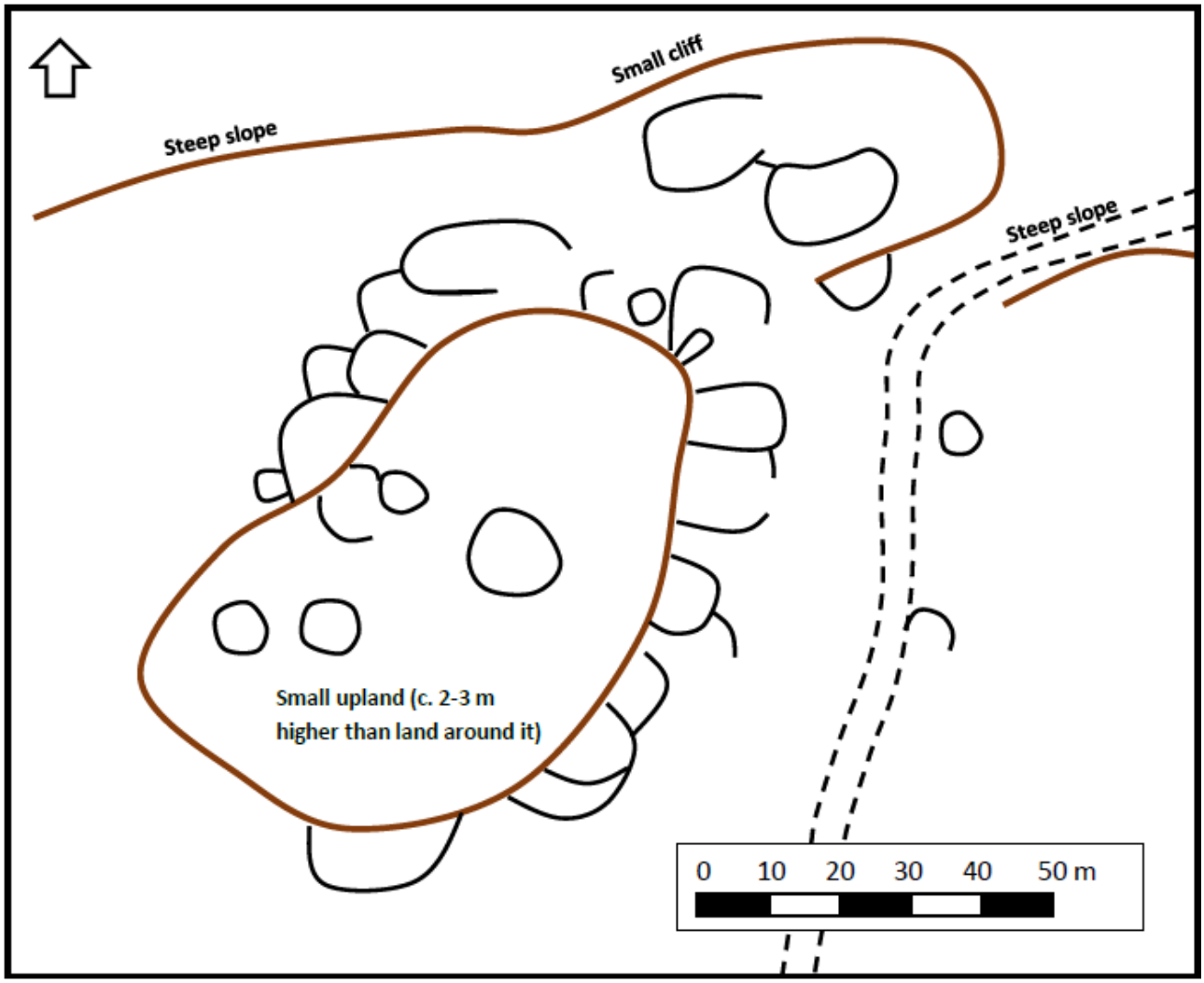


Figure 20: *Plan of the kraal complex at waypoint 546 showing topographic features in brown and stone walling in black. The double dashed lines indicate the position of the current access road which takes advantage of a break in the scarp.*

Careful examination of the substrate revealed very few cultural materials; eight ostrich eggshell fragments, five quartzite flakes, one quartzite core, one quartz flake and one quartz chunk were the only Stone Age items found. These sixteen items were found spread over a total of eight locations on the site. Also present, and located together on the eastern edge of the outcrop closest to the road, were the sole of an old shoe and a piece of a liquor bottle, signs that the area was used in more recent times as well. The walls of the complex are made from piled stone which is what differentiates them from historical kraals and stone features which are made from packed stone. It is positioned on the crest of a north-facing scarp in a prominent position overlooking the plains to the north (Figure 21).

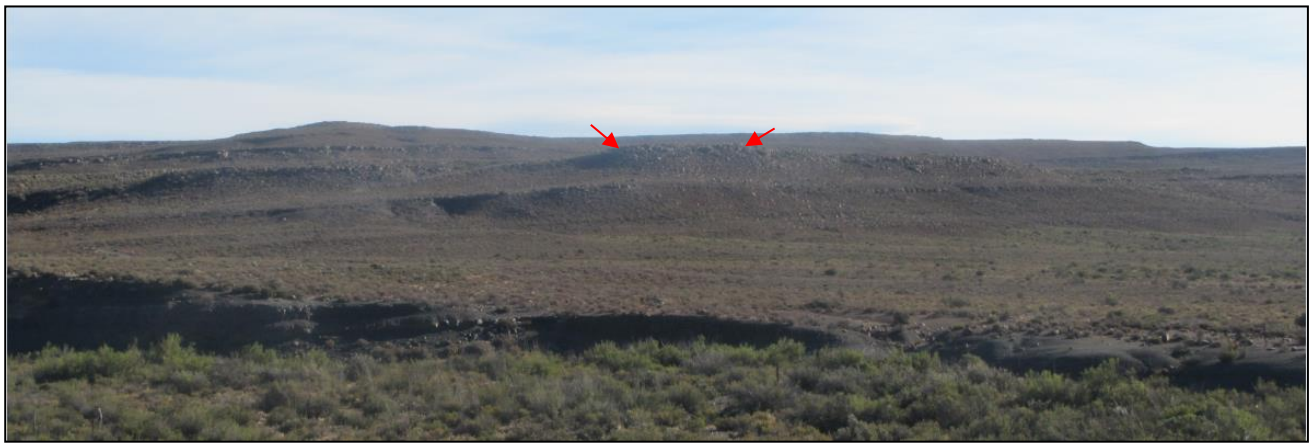


Figure 21: *View towards the south showing the location of the Stone Age kraal complex. The skyline in the background is the crest of the escarpment.*

The second important Stone Age site was a small rock art site located at the foot of the escarpment in Western Cape. Because the imagery is comprised of a series of finger-painted red lines, it is classed as a geometric rock art site (Figure 22). Finger-painted smear/lines are one of the categories of geometric art identified by Eastwood and Smith (2005). A key element of geometric art is that it tends to be found in non-inhabitable shelters overlooking water sources. The present site overlooks a riverbed and has neither a flat base that would allow occupation nor an overhang that would offer shelter from the elements (Figure 23).

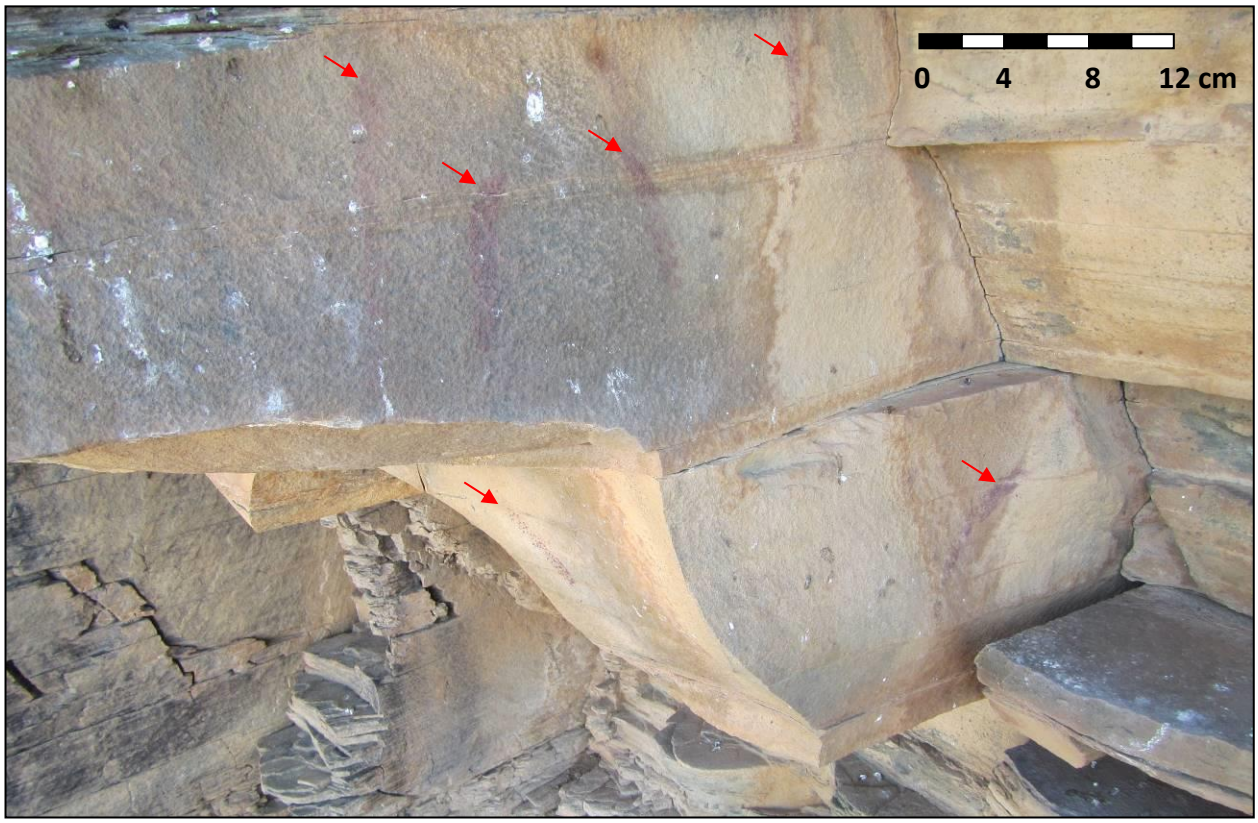


Figure 22: *View of the main painted area with the upper end of each finger smear identified by red arrows. Two further smears lie out of view to the right.*

Figure 23: *View towards the south of the low cliff line on which the geometric paintings were located (waypoint 492). The red arrows indicate the approximate positions of the finger-painted smears.*

Also in Western Cape and along the southernmost section of the power line route a small rock outcrop capping a low, 90 m long rise was found to have three marked stones on it. These included a rock that had been used as a chopping block at the western end of the rise (Figure 24), another with an engraving at the eastern end (Figures 25 & 26), and a third in between with very faint scratches on it (they made some sort of composition but this could not be discerned). All are historical.

Figure 24: *The chopped stone at waypoint 1783.*

Figure 25: *The engraved rock at waypoint 1785.*

Figure 26: *Close-up of the engraving at waypoint 1785.*

Historical archaeological features were fairly common in the broader study area with several found close to the power line route. These features included small, isolated stone features like cairns (Figures 27 & 28), small dams (Figure 29), and various ruined structures.

Figure 27: *A loosely-packed stone cairn on a rocky ridge at waypoint 613.*

Figure 28: *A loosely-packed stone cairn built on bedrock at waypoint 1787.*

Figure 29: *A small stone-walled in-stream dam at waypoint 1788.*

A number of small, usually isolated and very low structures were found above the escarpment in Northern Cape. These may well relate to shepherds constructing small shelters for themselves. At waypoint 576 a small, isolated stone structure with tumbled walling retained enough integrity to see that it had been packed in the traditional historical style (Figure 30). Three fragments of bone, one of them burnt, were found there. A more formal but still very small structure formal was a stone hut with a doorway that was located in a small but pronounced river valley close to a small waterfall which no doubt provided water during wetter times (Figure 31).

Figure 30: *A small oval structure standing in the open away from any landscape features at waypoint 576.*

Figure 31: *View of the south face and entrance of the small stone hut at waypoint 524.*

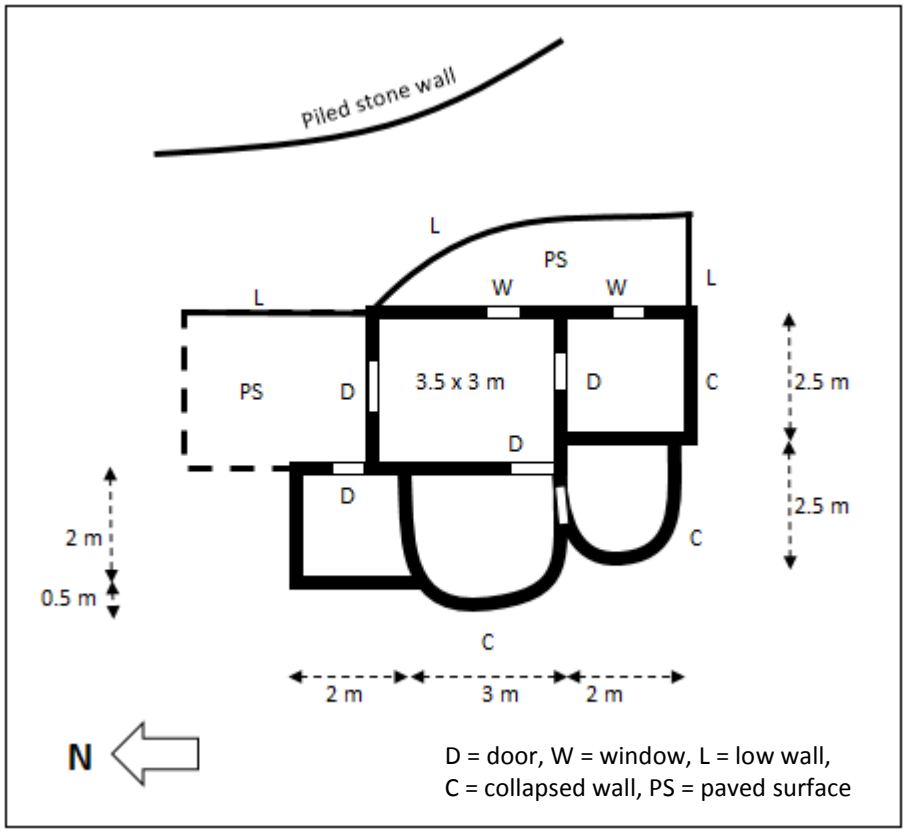
The most impressive historical archaeological sites were located on the farm De Molen 5/2 below the escarpment in Western Cape. Here there was a small historic farmstead as well as a smaller outpost. The main farmstead was built on the edge of a stream bed and had a number of features. There were two houses that no doubt had their roots deep in the 19th century (Figures 32 & 33). Survey diagram 1589/1861 indicates that farm De Molen 5 was first surveyed in 1860, but no structures are indicated (this does not mean there were none as they are only sometimes marked). Portion 2, then named 'Chreswell', was subdivided off in 1930 but again no structures were marked. These ruins are unusual because of the use of curved stone walling in them, one exclusively and the other in conjunction with straight walls. The main house has an iron roof on it that was a later addition as evidenced by its supporting joinery. The remaining rooms of both structures have a number of rough beams present which have largely collapsed with time. These beams are really just unworked tree trunks.

The main house has a paved stoep area to the east that overlooks a small track leading down to the river bed below. The north side of the house where the entrance lies also has a paved area. Both paved areas are supported by a low stone retaining wall. The house is comprised of a main rectangular structure with four added rooms. The smaller house had two linked rooms and a small enclosed courtyard on its east side where the entrance lay. Interestingly, this structure had two small '*muurkaste'* built into its walls.

Artefactual material was thinly spread over much of the surrounding area but nowhere was there anything resembling a dump. What material there was seemed typical of the late 19th and early 20th centuries and included blue glass, small clear medicine bottles, sponge printed refined white earthenware, a fragment of a cast iron *'potjie'*, the handle of a (probably) nickel silver fork and a spoked motor car wheel. The fork handle was inscribed with "WT&S" which denotes the company

“William Tay and Sons” who seem to have been in operation during the first third of the 20th century (Dognose n.d.).

Nearby and above the stream was a fairly well-preserved threshing floor (Figure 34), while within the stream floodplain a few stone features were noted. These latter included loose clusters of rocks that no doubt were once arranged differently, a set of upright elongated rocks that once formed fence posts for a stock enclosure, a stone-lined reservoir, a foundation, and a set of rocks that may have held a pipe (Figure 35).



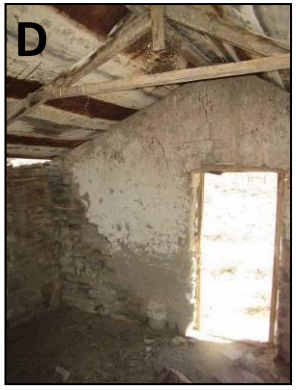


Figure 32: *Plan of the ruined stone-walled house at waypoint 498 with (A) a view of the entrance and north-eastern corner, (B) View of the south-western corner of the site showing the curved walling, (C) the east-facing window in the central structure, and (D) the north-facing doorway in the central structure. Not to scale but approximate measurements are indicated.*

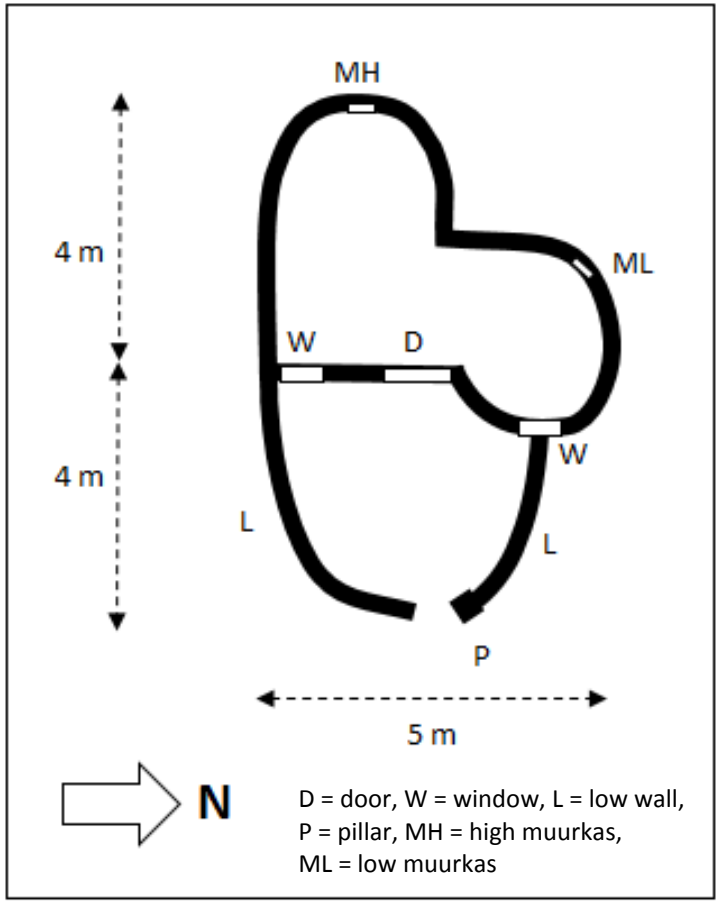


Figure 33: *Plan of the ruined stone-walled house at waypoint 500 with (A) a view towards the west of the entrance, (B) a view towards the south of the northern lobe showing remaining roof 'beams', (C) a view of the high 'muurkas' in the western lobe and (D) a view of the east-facing window with wooden planks and sticks in the southern lobe. Not to scale but approximate measurements are indicated.*

Figure 34: *View towards the north of the threshing floor with the lobed structure (from Figure 33) visible in the background.*

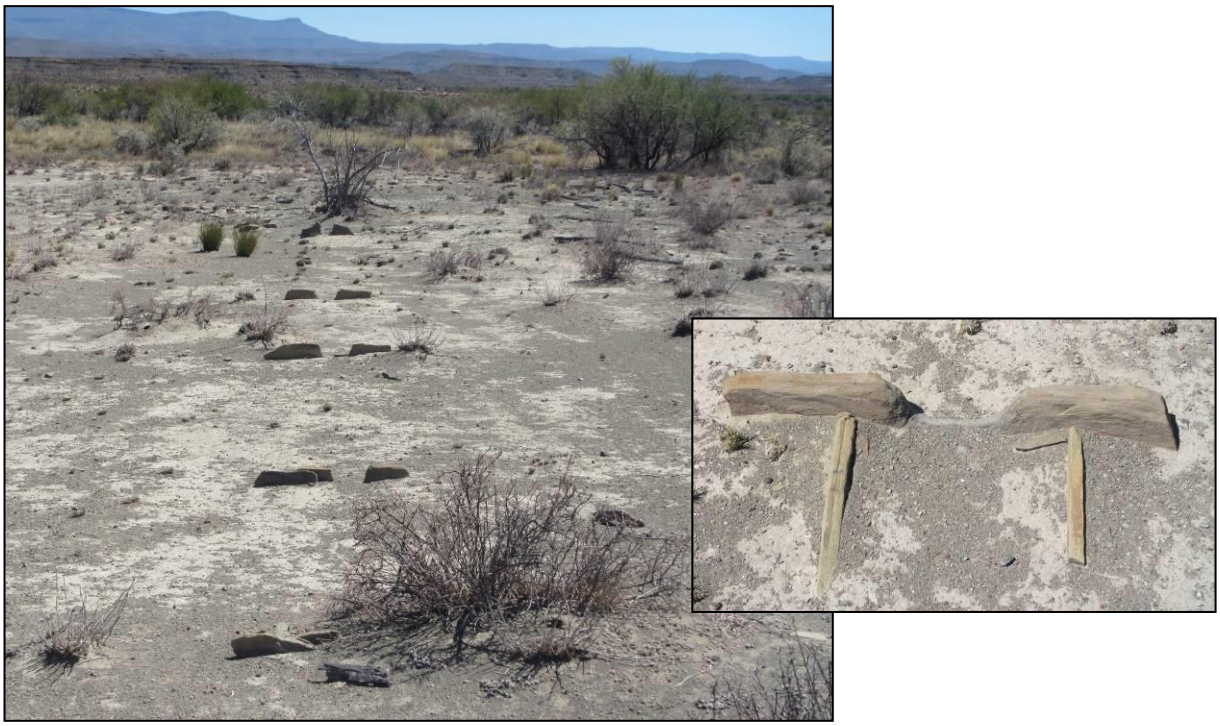


Figure 35: *A set of stones that may have held a pipe or similar.*

Further to the west lay a smaller ruined complex, perhaps an outpost of the one just described. It had a single-roomed rectangular structure with similar unworked roof beams. There was a cleared area and various piles of rocks around the structure and, further away, a large grave-like feature (but almost certainly not a grave due to its size and location over bedrock), a stone-lined reservoir and a '*waterput'* (Figure 36).

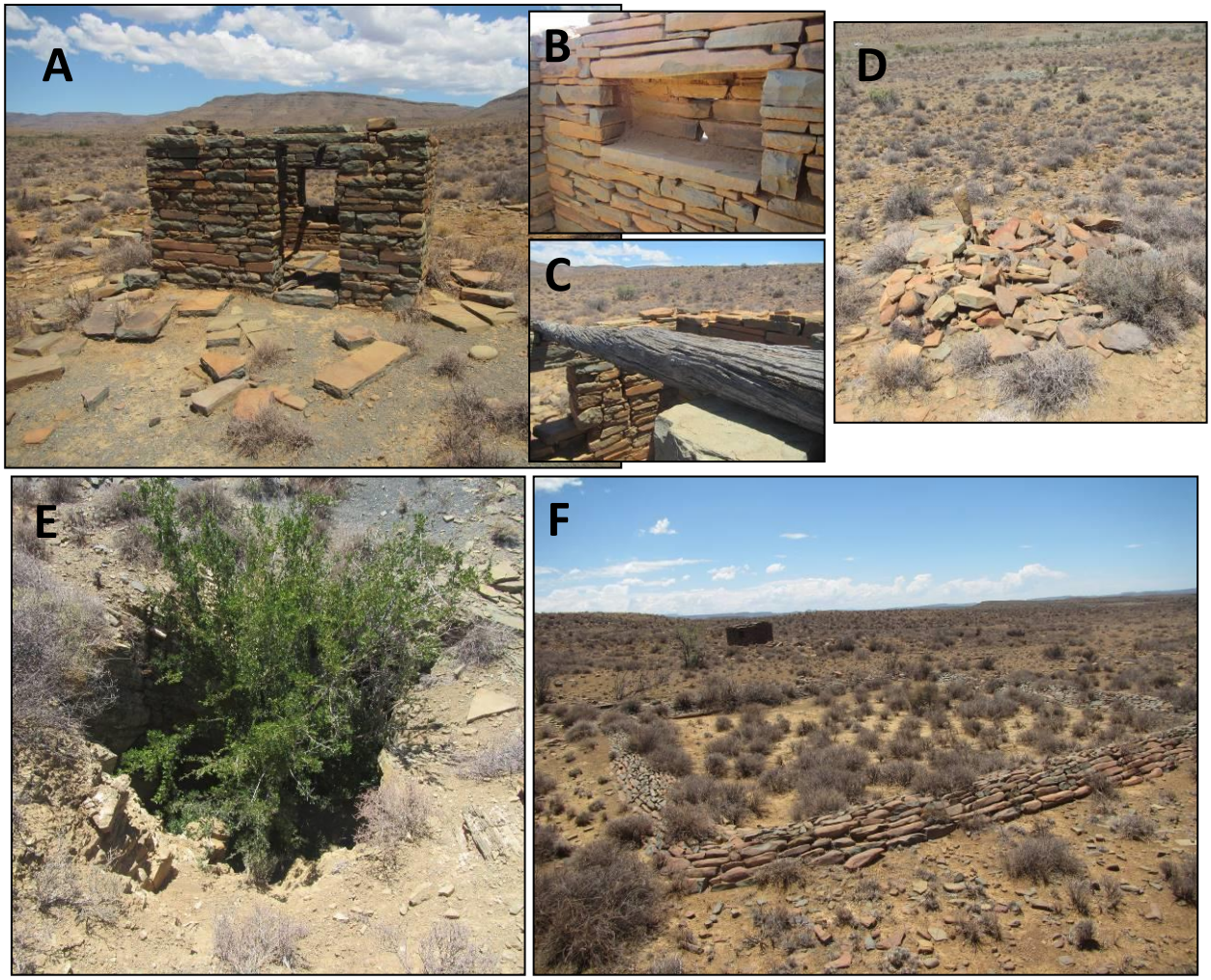


Figure 36: *The complex at waypoint 614; (A) shows the house, (B) a muurkas, (C) a roof beam, (D) the stone pile at waypoint 616, (E) the waterput at waypoint 617 and (F) the stone-lined reservoir.*

6.2. Palaeontology

A specialist palaeontological study was carried out by Dr John Almond (2019) and is included as Appendix 3 of the present report.

Almond (2019:1) reports that the study area "is entirely underlain by continental sediments of the Abrahamskraal Formation (Lower Beaufort Group) of Middle Permian age. This fluvial and lacustrine succession is generally assigned a high palaeontological sensitivity due to its rich fossil biota including pareiasaur reptiles, a wide range of therapsids, fish, amphibians, petrified wood and other remains of the *Glossopteris* Flora as well as trace fossils and microfossils. The Palaeozoic sedimentary bedrocks are extensively covered by Late Caenozoic superficial sediments (*e.g.* scree, gravelly soils) that are usually unfossiliferous."

Despite finding a few interesting fossils, including some blocks of petrified wood, a number of tetrapod burrows, and an articulated post-cranial skeleton, Almond (2019) has considered the study area to be of generally low sensitivity because he located no important fossils along the route and in many areas the surface (and any potentially fossiliferous bedrock) is covered by a large amount of superficial sediment.

6.3. Graves

No graves were found close to the power line route.

6.4. Built environment

A number of farm buildings were seen in the general vicinity of the study area, generally while driving into the study area, but most lie well away (generally more than 1 km) from the proposed routes (see Orton 2017). There are two exceptions. At Waterval, above the escarpment, the farmhouse is 1.03 km from the powerline. It is a humble vernacular structure older than 60 years and in reasonable condition (Figure 37). The second exception is the farm buildings on Rheebokkenfontein at the base of the escarpment. The owner would not allow access and, as such, no assessment of the structures is possible.

Figure 37: *The Waterval farmhouse.*

6.5. Cultural landscape

Winter and Oberholzer (2013) regard the escarpment as a significant natural landscape at the local level. It is a very extensive landscape extending for many hundreds of kilometres through central South Africa, often providing very long and aesthetically pleasing views which afford a cultural aspect to its significance. Figures 38 and 39 show two contrasting views from the top and bottom of the escarpment respectively. It can also be regarded as a cultural landscape, perhaps not so much in the regular sense of a 'landscape shaped by man' but in the opposite way where we find a landscape that has determined how and where human settlement and activities have taken place. Farmsteads are relatively few and far between, often tied to natural water sources and the landscape, although best described as a rural one, frequently has a strong feeling of emptiness and remoteness. It is used almost exclusively for small stock grazing and the many small historic stone features scattered across the landscape are indicative of this use in times gone by. In some remote areas the only indicators of human intervention for many kilometres are occasional fences and vehicle tracks.

Figure 38: *View from the crest of the escarpment towards the south into Western Cape. The edge of the escarpment and the provincial boundary are at the fence line in view. The power line would pass about 200 m north of this point (i.e. behind the camera).*

Figure 39: *View towards the southeast in the eastern part of the study area showing the typical landscape below the escarpment. It is comprised largely of plains and low hills.*

It is pertinent to note, however, that this landscape will not be pristine for much longer because the present study area falls within a declared REDZ (Komsberg) and many other renewable energy facilities have been proposed here. In addition, the study area falls within the Central Power Corridor that was gazetted in February 2018 following the completion of the Electricity Grid Infrastructure Strategic Environmental Assessment commissioned by the DEA. This will mean that wind turbines and power lines will comprise a new layer on this landscape, the strongest anthropogenic layer yet.

6.6. Visual impact assessment

Holland (2017) has assessed the visual impacts to the landscape from the slightly shorter original power line route. Due to his unavailability to update the assessment, an addendum considering the

addition 4 km length of powerline and the substation has been prepared by Masson (2019). Both reports are considered here but the new viewshed prepared by Masson (2019) is used. Figure 40 shows the visual exposure map (viewshed) for the proposed power line. Note that because the powerline will be taller than the substation, it is visible over a larger area and the substation viewshed would be within that for the powerline (a viewshed specific to the substation can be consulted in Masson (2019: fig. 4-4).

Holland (2017: table 1-2) notes that "the landscape has a rural-agricultural character with a strong sense of remoteness and potential for views valued for their scenic qualities. It is moderately sensitive to the proposed electrical infrastructure which may reduce the sense of remoteness and the potential for scenic views." Sensitive visual receptors are largely farm houses and outbuildings but the majority are below the escarpment and viewers would generally not see the powerline in silhouette due to the escarpment being a backdrop. From a heritage point of view, the Waterval homestead (above the escarpment in NC) is a heritage structure but Masson (2019) shows that it lies within an area of low-medium visibility. It is also relevant to note that, due to its east-facing aspect, views of the power line from the front door would be far longer than 1 km. Due to access restrictions, it is unknown whether heritage structures occur at Rheebokkenfontein (in WC). Citing Holland (2017), Masson (2019) notes that the power line would pass within 600 m of the farmhouse and 320 m from other structures. The present author, however, using Google Earth, finds no structures within 500 m of the line with the main farm house being some 720 m from it[2].

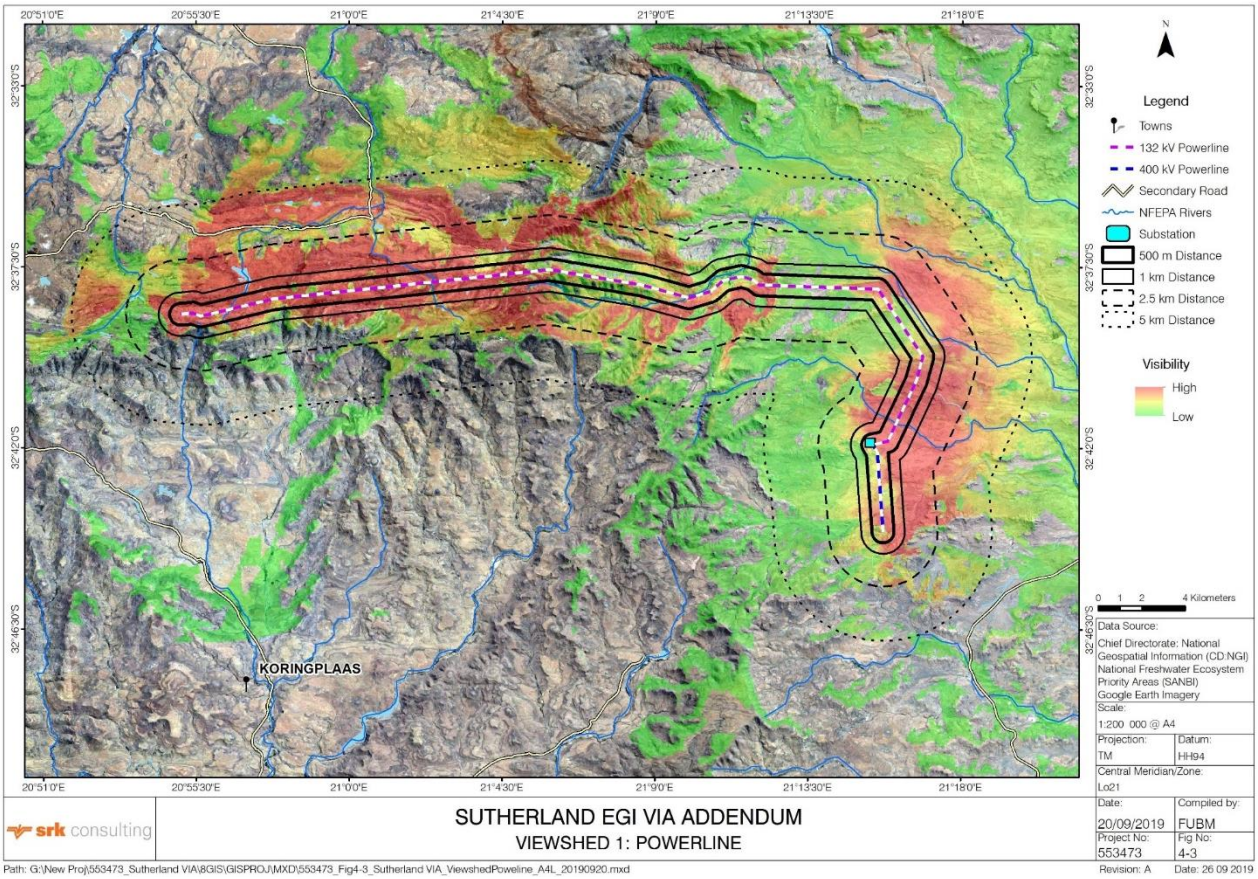


Figure 40: *Map showing the visual exposure of the proposed power line. Note that the map considers the authorised alignment with the new extension indicated by the bold black line.*

[2] Masson (2019) sourced the distances from Holland (2017) and it appears as though Holland's distance were based on an earlier alignment that was revised during the 2017 assessment.

The scenic Rooiberg Pass is the nearest pass up the escarpment. It is located 14 km west of the western end of the route in Northern Cape and will not be affected. The Komsberg Pass to Sutherland lies even further to the west.

6.7. Summary of heritage indicators

Archaeological remains are generally scarce but are found throughout the area. Very little significant Stone Age material was found with the most important sites being a kraal complex (waypoint 546 in Northern Cape) and a geometric rock art site (waypoint 492 in Western Cape). Isolated stone artefacts were almost non-existent above the escarpment and rare below it, although ephemeral scatters did occur near water courses. The vast majority of archaeological remains found were historical and ranged from a ruined farm complex to small, isolated ruined structures and isolated individual artefacts. The eastern part of the power line route has more significant sites in close proximity to it but, because the alignment was devised by the present author to avoid these sites, direct impacts are not expected.

- Indicator: Significant archaeological sites should be avoided or mitigated.

Although palaeontological resources were found throughout much of the study area, the vast majority were of very limited significance. Two important fossil sites were found but both were located away from the proposed power line footprint and impacts are not expected.

- Indicator: Significant palaeontological sites should be avoided or mitigated.

While graveyards are present in the wider area, all are located well away from the proposed power line alignment. No impacts are expected and no further consideration is needed.

One heritage structure is located about 1 km from the route in Northern Cape and other structures of unknown heritage significance occur within about 500 to 700 m of the line in Western Cape.

- Indicator: The powerline should not visually dominate the landscape in close proximity to heritage structures.

The rural cultural landscape extends throughout the study area but, aside from fences and farm tracks, human interventions are generally very sparse. The site lies within the Komsberg REDZ and Central Power Corridor (that was gazetted in February 2018), which promotes Renewable Energy and Electricity Grid Infrastructure development within these strategic geographical areas. It is thus noted that a new electrical layer is due to be added to this landscape in the very near future. The escarpment, however, remains an aesthetically significant landscape for its remoteness, long views, rugged scenery and distinctive sense of place.

- Indicator: The proposed development should not strongly dominate the landscape from multiple viewpoints and especially not from scenic routes.

6.8. 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 vast majority of archaeological resources are deemed to have low cultural significance ('IIIC' or 'NCW' in the HWC grading system and 'GP B' or 'GP C' in the SAHRA system) for their scientific value. There are, however, a few more important sites in the study area that are worthy of a IIIA grading (both systems). These include the kraal for it scientific value, the rock art site for its scientific and spiritual values and the ruined historical farm complexes for their architectural, historical, scientific, social and technological values.

The cultural and natural landscape in its current form (i.e. with no renewable energy facilities and very few power lines) has high significance and should be allocated a grade of 'IIIA' (in the HWC system). However, considering the renewable energy facilities planned for the area this grading may require revision in areas within easy sight of these facilities; it should still not drop below 'IIIB' (again the SAHRA system does not apply to landscapes).

7. IMPACT ASSESSMENT

The majority of impacts will be felt during the construction phase when land is cleared and excavations are made for the purposes of erecting the power line pylons. The impact assessments are summarised in Tables 2 to 5.

Only impacts to archaeology, palaeontology and the cultural landscape are specifically assessed. This is because impacts to graves are not expected to occur and the impact to the heritage value of the Waterval homestead (in NC) is considered to be negligible (note that the Rheebokkenfontein farm buildings (in WC) could not be assessed for their heritage value). Those sites found were located too far away from the proposed alignments to be of any concern.

The no-go alternative is not specifically assessed here because no new impacts would occur through continued use of the landscape according to the status quo (i.e. small stock farming). Impacts would thus be seen as of **very low** significance.

7.1. Construction Phase Impacts

Potential impact to archaeological resources
Direct impacts to archaeological resources may occur when construction vehicles move through the area, when service tracks are created, and when foundation excavations are made. Because of the very sparse distribution of archaeological resources (significant or otherwise) and the very few that were located in or close to the proposed footprint (only one of any significance is on the alignment), the impact significance is regarded as being **moderate** before mitigation. Potential mitigation measures include avoiding and protecting all sites that are not within the actual footprint and adequately recording and/or sampling any sites that cannot be avoided (No sites requiring mitigation have thus far been found within the project footprint with photography of the engraving at waypoint 1785 being a sufficient record). The farm road passing through the kraal complex (waypoint 546 in Northern Cape) may not be widened towards the east and preferably should not be widened at all. Although not a site of high significance, the engraving at waypoint 1785 should be avoided (the lines may span over the site). The mid-section of the alignment that has not been surveyed, as well as any realigned sections, should be subjected to a pre-construction walk-down survey to locate any sites that need to be avoided or mitigated. With mitigation the impact significance is likely to be reduced to **very low**.

Aspect/activity	All construction works (substation, pylons and service tracks)
Type of impact	Direct
Potential Impact	Damage or destruction of archaeological resources
Impact Significance (Pre-Mitigation)	Moderate
Mitigation required	• Avoid and protect all nearby sites if possible • No widening of road at waypoint 546 • No pylon placement within 30 m of waypoint 1785 • Pre-construction survey of any as yet unsurveyed sections to identify no-go areas or further mitigation requirements • Record/sample any sites to be impacted
Impact Significance (Post-Mitigation)	Very low

Potential impact to palaeontological resources

Direct impacts to palaeontological resources may occur when construction vehicles move through the area, when land is cleared for development, and when foundation excavations are made. Because of the very sparse visible distribution of palaeontological resources and the fact that no significant finds were made in or close to the proposed footprint, the impact significance is regarded as being **very low** before the implementation of mitigation measures. Potential mitigation measures include avoiding and protecting known fossil occurrences that are not within the actual footprint and adequately recording and/or sampling any localities that cannot be avoided (none have been found to date). Because of the low likelihood of finding fossils during construction, the impact significance with mitigation is likely to also be **very low**.

Aspect/activity	All construction works (substation, pylons and service tracks)
Type of impact	Direct
Potential Impact	Damage or destruction of fossils
Impact Significance (Pre-Mitigation)	Very low
Mitigation required	• Avoid and protect fossils if possible. • Monitoring by the Environmental Control Officer (ECO) and rescue of isolated finds.
Impact Significance (Post-Mitigation)	Very low

Potential impacts to the cultural landscape

The cultural landscape will be impacted indirectly through the presence of incompatible structures (the proposed power line and its pylons) and the construction vehicles in the rural landscape. Direct impacts would result from landscape scarring. Although the construction phase is quite short, the direct impacts caused would be long-lasting due to the length of time required for full rehabilitation to occur. Because the area is within a proposed REDZ and many other renewable energy facilities and power lines are proposed (some are due for construction soon), the impact significance is assessed as being **low** without the implementation of mitigation measures (it would otherwise have been moderate). Mitigation measures for the proposed power line are generally impossible because one cannot hide them, but a measure applicable to the proposed service road is to avoid steep slopes which would require much cut-and-fill and which would be visible from longer distances. This is mainly applicable to the long ridge down the escarpment and to the scarp within the eastern part of the alignment. With respect to the latter, the detour route around the east side of the scarp as proposed previously has now been included as part of the project design. Rehabilitation of any areas disturbed during construction and that would not be required during operation (e.g. laydown areas) should be carried out to reduce landscape scarring. Mitigation measures will not alter the impact significance which remains **low** after mitigation.

Aspect/activity	All construction works (substation, pylons and service tracks)
Type of impact	Direct and Indirect
Potential Impact	Scarring of the landscape and visual/contextual impacts to the rural/natural landscape
Impact Significance (Pre-Mitigation)	Low
Mitigation required	• Avoid steep slopes and cut-and-fill activities. • Rehabilitate any areas not required during operation.
Impact Significance (Post-Mitigation)	Low

7.2. Operation Phase Impacts

Potential impact to archaeological resources

Direct impacts to archaeological resources are highly unlikely to occur during this phase because vehicles will use the already established service road. The impact significance would be **very low** without the implementation of mitigation measures. The only suggested mitigation measure is to ensure that all vehicles remain on the service road at all times. With mitigation the impact significance would remain **very low**.

Aspect/activity	All operational works (substation, pylons and service tracks (including maintenance activities))
Type of impact	Direct
Potential Impact	Damage or destruction of archaeological resources
Impact Significance (Pre-Mitigation)	Very low
Mitigation required	• No driving off the established service tracks.
Impact Significance (Post-Mitigation)	Very low

Potential impact to palaeontological resources

Direct impacts to palaeontological resources are highly unlikely to occur during this phase because vehicles will use the already established service road. Accelerated erosion of steep sections could expose fossils that would then degrade but the likelihood is very low. The impact significance would be **very low** without the implementation of mitigation measures. The only suggested mitigation measure is to ensure that all vehicles remain on the established service road at all times. With mitigation the impact significance would remain **very low**.

Aspect/activity	All operational works (substation, pylons and service tracks (including maintenance activities))
Type of impact	Direct
Potential Impact	Damage or destruction of fossils.
Impact Significance (Pre-Mitigation)	Very low
Mitigation required	• No driving off the established service tracks.
Impact Significance (Post-Mitigation)	Very low

Potential impacts to the cultural landscape

The cultural landscape will be indirectly impacted through the presence of incompatible structures (the proposed power line and its pylons) in the rural landscape and directly by landscape scarring. These impacts would commence during the construction phase and remain constant throughout the lifetime of the project. Because the area is within a proposed REDZ and many other renewable energy facilities and power lines are proposed (some are due for construction soon), the impact significance is again assessed as being **low** without the implementation of mitigation measures. The only mitigation measure would be to ensure that vehicles remain on the established service tracks. The impact significance remains **low**.

Aspect/activity	All operational works (substation, pylons and service tracks (including maintenance activities))
Type of impact	Direct and Indirect
Potential Impact	Scarring of the landscape and visual/contextual impacts to the rural/natural landscape
Impact Significance (Pre-Mitigation)	Low
Mitigation required	• No driving off the established service tracks.
Impact Significance (Post-Mitigation)	Low

7.3. Decommissioning Phase Impacts

Potential impact to archaeological resources

Direct impacts to archaeological resources are highly unlikely to occur during this phase because vehicles will use the already established service road. The impact significance would be **very low** without the implementation of mitigation measures. The only suggested mitigation measure is to ensure that all vehicles remain on the service road at all times. With mitigation the impact significance would remain **very low**.

Aspect/activity	All decommissioning works (removal of infrastructure, including substation components, pylons and associated structures)
Type of impact	Direct
Potential Impact	Damage or destruction of archaeological resources
Impact Significance (Pre-Mitigation)	Very low
Mitigation required	• No driving off the established service tracks.
Impact Significance (Post-Mitigation)	Very low

Potential impact to palaeontological resources

Direct impacts to palaeontological resources are highly unlikely to occur during this phase because vehicles will use the already established service road. The impact significance would be **very low** without the implementation of mitigation measures. The only suggested mitigation measure is to ensure that all vehicles remain on the service road at all times. With mitigation the impact significance would remain **very low**.

Aspect/activity	All decommissioning works (removal of infrastructure, including substation components, pylons and service tracks)
Type of impact	Direct
Potential Impact	Damage or destruction of fossils.
Impact Significance (Pre-Mitigation)	Very low
Mitigation required	• No driving off the established service tracks.
Impact Significance (Post-Mitigation)	Very low

Potential impacts to the cultural landscape

The cultural landscape will be impacted through the presence of construction vehicles in the rural landscape when the power lines are removed. Because the impact will be of short term duration and the power lines would be removed, the impact significance is assessed as being **very low** without the implementation of mitigation measures. Mitigation measures would be to ensure that vehicles remain on the established tracks and that rehabilitation is effective with no landscape scarring remaining visible from long distances. The impact significance will remain **very low**.

Aspect/activity	All decommissioning works (removal of infrastructure, including substation components, pylons and service tracks)
Type of impact	Direct and Indirect
Potential Impact	Scarring of the landscape and visual/contextual impacts to the rural/natural landscape
Impact Significance (Pre-Mitigation)	Very low
Mitigation required	• No driving off the established service tracks. • Ensure effective rehabilitation of the landscape
Impact Significance (Post-Mitigation)	Very low

7.4. Cumulative Impacts

Potential cumulative impact to archaeological resources

Cumulative impacts to archaeological resources are the same as the construction phase impacts except that they may occur over a larger area. Because of the very sparse distribution of archaeological resources (significant or otherwise) and the very few that were located in or close to the proposed footprint, the cumulative impact significance is regarded as being **low** without the implementation of mitigation measures. Potential mitigation measures include avoiding and protecting all sites that are not within the actual footprint and adequately recording and/or sampling any sites that cannot be avoided (none have been found to date). Those sections of the final alignment that have not been surveyed should be subjected to a pre-construction walk-down survey to locate any sites that need to be avoided or mitigated. With mitigation the impact significance is likely to be reduced to **very low**.

Aspect/activity	All construction works (pylons and service tracks)
Type of impact	Direct
Potential Impact	Damage or destruction of archaeological resources
Impact Significance (Pre-Mitigation)	Low
Mitigation required	• Avoid and protect all nearby sites if possible • No widening of road at waypoint 546 • Pre-construction survey of any as yet unsurveyed sections to identify no-go areas or further mitigation requirements • Record/sample any sites to be impacted
Impact Significance (Post-Mitigation)	Very low

Potential impact to palaeontological resources

Direct impacts to palaeontological resources are similar to the construction phase impacts except that they may occur over a larger area. Despite the very sparse distribution of palaeontological resources and the fact that most are not visible on the surface, there is a very real chance that significant fossils may be impacted during the very many excavations that would be required for all the proposed turbine and power line foundations that would need to be constructed in the area. The cumulative impact significance is therefore regarded as being **moderate** without the implementation of mitigation measures. This is elevated partly by the high degree of uncertainty because several renewable energy facilities in the area have yet to be studied in the field. Potential mitigation measures include avoiding and protecting known fossil occurrences that are not within the actual footprint and adequately recording and/or sampling any localities that cannot be avoided (none have been found to date). Because of the relatively low likelihood of finding fossils within the present development area, the cumulative impact significance with mitigation is likely to be **very low**.

Aspect/activity	All construction works (pylons and service tracks)
Type of impact	Direct
Potential Impact	Damage or destruction of fossils
Impact Significance (Pre-Mitigation)	Moderate
Mitigation required	• Avoid and protect fossils if possible. • Monitoring by the Environmental Control Officer (ECO) and rescue of isolated finds.
Impact Significance (Post-Mitigation)	Very low

Potential impacts to the cultural landscape

The cultural landscape will be impacted indirectly through the presence of incompatible structures (the proposed power line and its pylons) and the construction vehicles in the rural landscape. Direct impacts would result from landscape scarring. Although the construction phase is quite short, the direct impacts caused would be long-lasting due to the length of time required for full rehabilitation to occur. Because the area is within a proposed REDZ and many other renewable energy facilities and power lines are proposed (some are due for construction soon), the cumulative impact significance is assessed as being **moderate** without the implementation of mitigation measures (it would otherwise have been moderate). Mitigation measures for the proposed power line are generally impossible because one cannot hide them, but a measure applicable to the proposed service road is to avoid steep slopes which would require much cut-and-fill and which would be visible from longer distances. This is mainly applicable to the long ridge down the escarpment and to the scarp within the eastern part of the alignment. With respect to the latter, the detour route around the east side of the scarp as proposed previously has now been included as part of the project design. Rehabilitation of any areas disturbed during construction and that would not be required during operation (e.g. laydown areas) should be carried out to reduce landscape scarring. Mitigation measures will not alter the impact significance and given that the power line would likely be viewed against a backdrop of wind turbines in places, the significance remains **moderate** after mitigation.

Aspect/activity	All construction works (pylons and service tracks)
Type of impact	Direct and Indirect
Potential Impact	Scarring of the landscape and visual/contextual impacts to the rural/natural landscape
Impact Significance (Pre-Mitigation)	Moderate
Mitigation required	• Avoid steep slopes and cut-and-fill activities. • Rehabilitate any areas not required during operation.
Impact Significance (Post-Mitigation)	Moderate

Table 2: *Impact assessment summary table – Construction Phase direct impacts (though cultural landscapes experience indirect impacts as well).*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Can impact be avoided?	Can impact be managed/mitigated?	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of impact/risk	Confidence level
												Without mitigation /management	With mitigation /management (residual		
Construction of proposed power lines, substation and service road	**Destruction of archaeological remains**	Negative	Site	Permanent	Substantial	Very likely	Non-reversible	High	Yes	Yes	• Avoid and protect all nearby sites if possible • No widening of road at waypoint 546 • No pylon placement within 30 m of waypoint 1785 • Pre-construction survey of any as yet unsurveyed sections to identify no-go areas or further mitigation requirements • Record/sample any sites to be impacted	Moderate	Very low	5	High
	Destruction of palaeontological material	Negative	Site	Permanent	Slight	Unlikely	Non-reversible	Moderate	No	Yes	• Avoid and protect fossils if possible. • Monitoring by the Environmental Control Officer (ECO) and rescue of isolated finds.	Very low	Very low	5	Medium
	Alteration of the cultural landscape	Negative	Local	Long term	Moderate	Very likely	High	Moderate	No	Yes (slightly)	• Avoid steep slopes and cut-and-fill activities. • Rehabilitate any areas not required during operation.	Low	Low	4	High

Table 3: *Impact assessment summary table – Operation Phase direct impacts (though cultural landscapes experience indirect impacts as well).*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Can impact be avoided?	Can impact be managed/mitigated?	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of impact/risk	Confidence level
												Without mitigation /management	With mitigation /management (residual risk/impact)		
Existence and maintenance of power lines, substation and service road	**Destruction of archaeological remains**	Negative	Site	Permanent	Slight	Extremely unlikely	Non-reversible	High	Yes	Yes	• No driving off the established service tracks.	Very low	Very low	5	High
	Destruction of palaeontological material	Negative	Site	Permanent	Slight	Extremely unlikely	Non-reversible	Moderate	Yes	Yes	• No driving off the established service tracks.	Very low	Very low	5	High
	Alteration of the cultural landscape	Negative	Local	Long term	Moderate	Very likely	High	Moderate	No	Yes (slightly)	• No driving off the established service tracks.	Low	Low	4	High

Table 4: *Impact assessment summary table – Decommissioning Phase direct impacts (though cultural landscapes experience indirect impacts as well).*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Can impact be avoided?	Can impact be managed/mitigated?	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of impact/risk	Confidence level
												Without mitigation /management	With mitigation /management (residual risk/impact)		
Removal of power lines and substation and rehabilitation of service road	**Destruction of archaeological remains**	Negative	Site	Permanent	Slight	Extremely unlikely	Non-reversible	High	Yes	Yes	• Stay on service road at all times.	Very low	Very low	5	High
	Destruction of palaeontological material	Negative	Site	Permanent	Slight	Extremely unlikely	Non-reversible	Moderate	Yes	Yes	• Stay on service road at all times.	Very low	Very low	5	High

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Can impact be avoided?	Can impact be managed/mitigated?	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of impact/risk	Confidence level
												Without mitigation /management	With mitigation /management (residual risk/impact)		
	Alteration of the cultural landscape	Negative	Local	Short term	Slight	Very likely	High	Moderate	No	Yes (slightly)	• Stay on service road at all times. • Ensure rehabilitation is effective and that no landscape scarring remains visible from long distances.	Very low	Very low	4	High

Table 5: *Impact assessment summary table – Cumulative direct impacts (though cultural landscapes experience indirect impacts as well) (Construction Phase).*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Can impact be avoided?	Can impact be managed/mitigated?	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of impact/risk	Confidence level
												Without mitigation /management	With mitigation /management (residual risk/impact)		
Construction of proposed power lines, substation and service road	**Destruction of archaeological remains**	Negative	Local	Permanent	Moderate	Very likely	Non-reversible	High	Yes	Yes	• Avoid and protect sites if possible. • No widening of road at waypoint 546 • Pre-construction survey of any as yet unsurveyed sections to identify no-go areas or further mitigation requirements • Record significant sites in footprint to be impacted.	Low	Very low	5	Medium
	Destruction of palaeontological material	Negative	Local	Permanent	Substantial	Unlikely	Non-reversible	Moderate	Yes	Yes	• Avoid and protect fossils if possible. • Monitoring by ECO and rescue of isolated finds.	Moderate	Very low	5	Medium
	Alteration of the cultural landscape	Negative	Local	Long term	Substantial	Very likely	High	Moderate	No	Yes	• Avoid creating roads up steep slopes. • Follow suggested service road detour. • Rehabilitate any areas not required during operation	Moderate	Moderate	3	High

8. LEGISLATIVE AND PERMIT REQUIREMENTS

Because the project spans two provinces with three heritage resources authorities, there are slightly different requirements.

In Northern Cape:

There are no permits required of the developer – the final comment acts as the approval (with conditions). Should there be a need to conduct archaeological or palaeontological mitigation this would need to be done under a permit applied for by and issued in the name of the person doing the mitigation work. This would need to be an appropriately qualified person.

In Western Cape:

There are no permits required of the developer – the final comment acts as the approval (with conditions). Should there be a need to conduct archaeological or palaeontological mitigation this would need to be done under a workplan applied for by and issued in the name of the person doing the mitigation work. This would need to be an appropriately qualified person.

9. ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS

Points for inclusion in the Environmental Management Programme (EMPr) are as follows:

- Ensure that all areas not already surveyed are examined by an archaeologist in order to identify any areas or sites that should be protected or mitigated prior to commencement of development. Note that this requirement pertains to unsurveyed parts of the proposed route as well as to any alterations made after completion of this report;
- The ECO should be aware of the potential for fossils to be uncovered during excavations. Excavations should be monitored by the ECO during construction and if any fossils are uncovered they should be protected *in situ* and immediately reported to a palaeontologist in order to plan a way forward. It is understood that the ECO would not be able to watch the excavation team full time, but as many holes as possible should be examined along with their spoil heaps;
- Significant palaeontological and archaeological sites (see list and mapping below) should be identified on project maps and regarded as no-go zones with buffers of at least 30 m around all associated features. There are two buffer exceptions. One is the rock art site (waypoint 492 in Western Cape) which is within 20 m of the service track, while the other is the kraal complex (waypoint 546 in Northern Cape) that has an existing farm road passing through it. In both instances, vehicles and activity must be confined to the existing roads, preferably with no widening.
- The engraving at waypoint 1785 in Western Cape should be fenced off during construction with a 30 m buffer but fencing of the other sites is not necessary since, with the exception of the rock art site, none are very close to the route. The rock art is not easily discernible by a non-specialist and it is better not to draw attention to it. However, no entry signs should be placed at regular intervals around the two historical complexes in Western Cape.
- These no-go sites should be examined periodically by the ECO during the construction phase to ensure that they are being respected;

- If any archaeological or palaeontological material is encountered during any phase of the project it should be protected *in situ* and reported to an appropriate specialist and/or to the relevant heritage resources authority so that a decision can be made as to how to proceed.

The relevant waypoints to be avoided with buffers of at least 30 m around all associated features are as follows (from west to east): 524, 546, Site 51, 614 (whole complex included), 498 (whole complex included), 492 and 1785. Note that this list includes only those sites located within 500 m of the footprint area. They are mapped in Figures 41 to 44.

Figure 41: *Overview of the heritage sites within 500 m of the power line route that should be protected and avoided.*

10. EVALUATION OF IMPACTS RELATIVE TO SUSTAINABLE SOCIAL AND ECONOMIC BENEFITS

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

This project will enable electricity produced by a renewable energy facility to enter the national grid. As such, it will be of economic benefit to the people of South Africa in that it will play a part in the stabilisation of the grid and the provision of electricity to all. Although the project would not create long term employment, it will likely provide jobs during the construction phase and would support other projects that will provide long term employment.

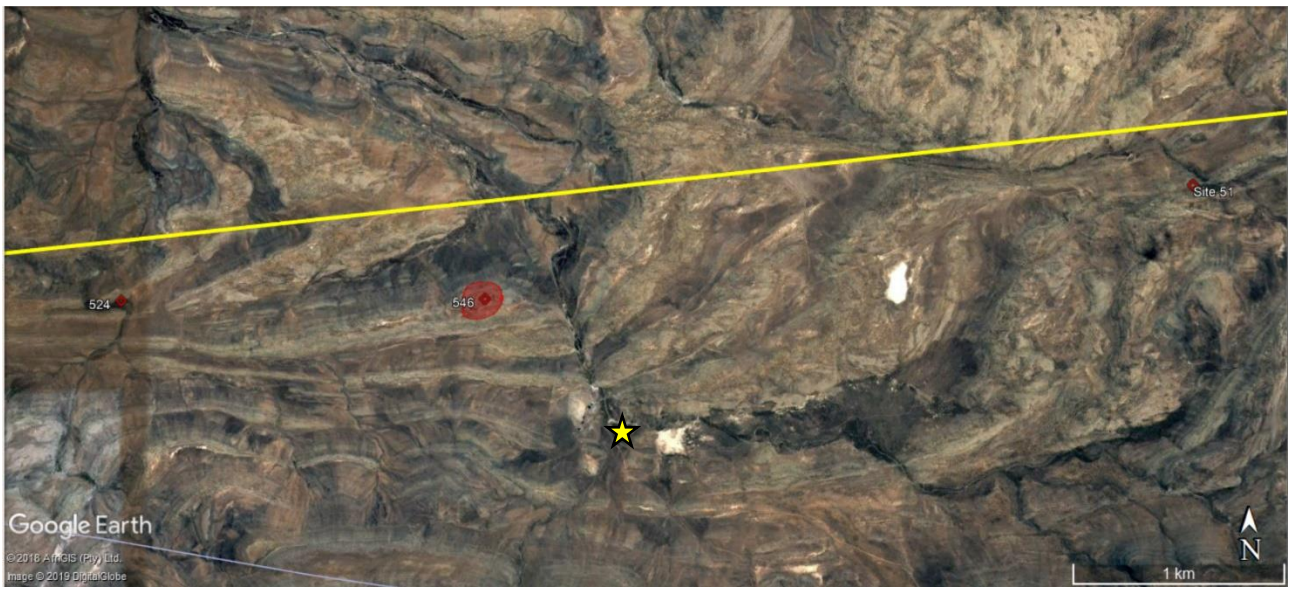


Figure 42: *Three archaeological sites that should be avoided in Northern Cape. The 30 m buffer is only shown on the one that may need active monitoring by the ECO. Also shown is the location of the Waterval farmstead, just over 1 km from the powerline route (yellow star).*

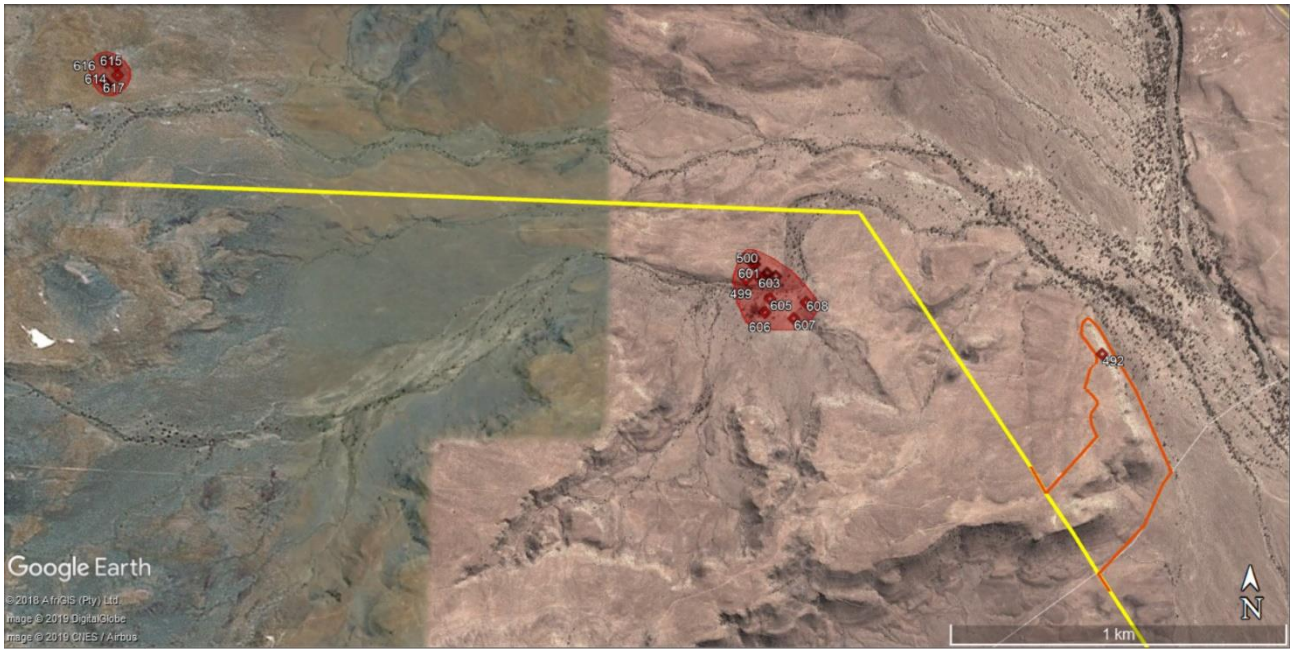


Figure 43: *Three archaeological sites that must be avoided in the north-eastern part of the Western Cape section of the route. 30 m buffers are shown on the two ruined historical complexes. The brown line shows the route that will be followed by the service road in that area.*

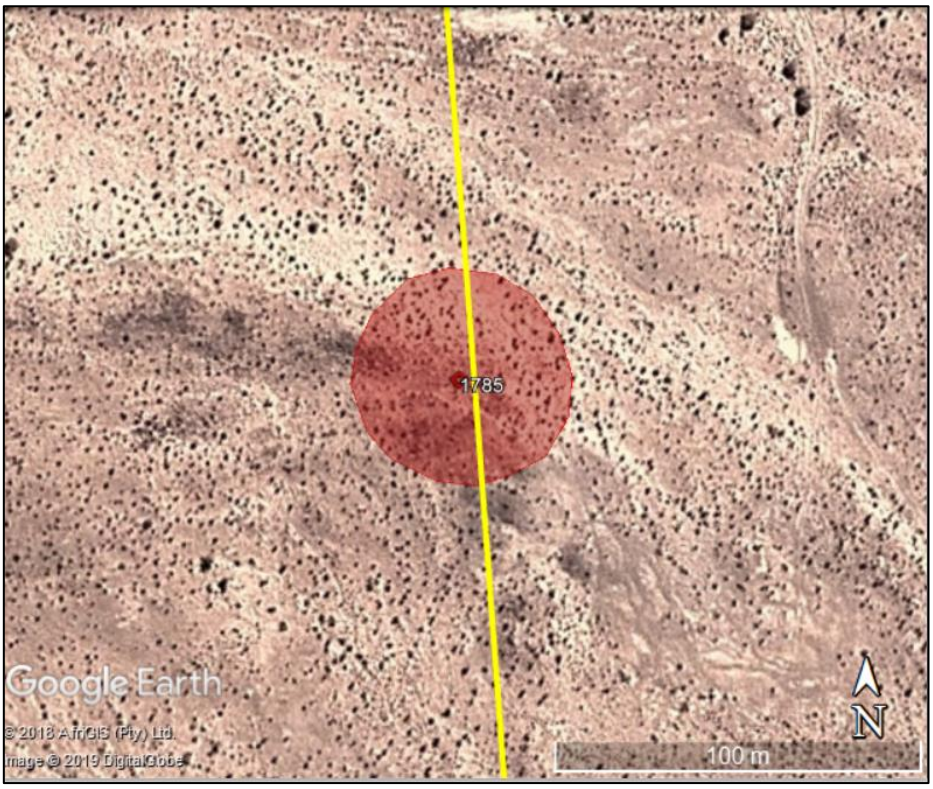


Figure 44: *The engraving site that must be avoided in the southern part of the Western Cape section of the route. The power line may span over the site but pylons and the service track must avoid it.*

11. CONSULTATION WITH HERITAGE CONSERVATION BODIES

This assessment is part of a Basic Assessment Process which will undergo the full legislated PPP. During this PPP, I&APs will have the opportunity to comment on aspects of the project, including the heritage assessment. HWC requires that the relevant municipality within the Western Cape Province be requested to provide comment on the HIA – there are no heritage conservation organisations registered in the area. The municipality will have opportunity to comment during the PPP.

12. CONCLUSIONS

This assessment has found that the study area around the proposed power line routes and associated electrical infrastructure does contain some significant heritage resources. These include prehistoric and historical archaeological sites, palaeontological occurrences and the escarpment landscape. The north-eastern part of the power line route was routed by the heritage specialist especially to avoid significant heritage sites, but one small historical engraving lies along the southernmost part of the route. Because the line here will be 400 kV it should be easy to span this site and avoid physical damage. The central part of this route could not be surveyed in the field and will need to be covered pre-construction. It is noted that the Stone Age kraal complex (at waypoint 546 in Northern Cape) is bisected by an access road that might be used during the proposed development. The greater landscape, especially along the escarpment, is visually significant, but

because it lies within the Komsberg REDZ, the area is very likely to be devoted to renewable energy developments and the proposed power line and associated electrical infrastructure would thus not be out of place. Importantly, the proposed power line would not be built if the renewable energy facilities it is meant to support do not go ahead.

The proposed heritage indicators are expected to be largely complied with. Outstanding issues (e.g. archaeological sites in unsurveyed areas) will be dealt with before construction starts. Although the powerline would dominate the landscape from close to its alignment, the route is generally in very remote areas with little opportunity to spoil views of the landscape.

12.1. Reasoned opinion of the specialist

There are no fatal flaws and because there are few heritage sites located within close proximity of the alignments, the potential impacts to all types of heritage resources are of generally moderate-low significance before mitigation and very low significance after mitigation. From a heritage point of view it is therefore suggested that the proposed power line development may be authorised.

13. RECOMMENDATIONS

Because there are unlikely to be significant impacts to heritage resources that cannot be managed or mitigated, it is recommended that the proposed development be authorised. However, the following conditions should be incorporated into the Environmental Authorisation:

- Any areas of the power line route and substation footprint not yet surveyed should be examined by an archaeologist in order to identify any areas or sites that should be protected or mitigated prior to commencement of construction (this includes any alterations made after completion of the assessment);
- The ECO should be aware of the potential for fossils to be uncovered during excavations. As many excavations as possible should be monitored by the ECO during construction and if any fossils are uncovered, they should be protected *in situ* and immediately reported to a palaeontologist in order to plan a way forward;
- The farm road passing through the kraal complex at waypoint 546 (Northern Cape) may not be widened towards the east and should preferably not be widened at all;
- No pylon should be placed within 30 m of waypoint 1785 (Western Cape) and the site should be fenced with a 30 m buffer during the construction phase;
- Significant palaeontological and archaeological sites as listed in this report should be identified on project maps and regarded as no-go zones with buffers of at least 30 m around all associated features (the exception is the service road diversion which comes within 20 m of the rock art site but uses an existing farm track);
- These no-go sites should be examined periodically by the ECO during the construction phase to ensure that they are being respected; and
- If any archaeological material, palaeontological 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 or palaeontologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

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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 –

Memberships and affiliations:

South African Archaeological Society Council member	2004 –
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
ASAPA Cultural Resources Management Section member	2007 –
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 –

Professional Accreditation:

ASAPA membership number: 233, CRM Section member

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)

Fieldwork and project experience:

Extensive fieldwork 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:

Phase 1 surveys and impact assessments:

- Project types
  - Notification of Intent to Develop applications (for Heritage Western Cape)
  - 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 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
- 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

APPENDIX 2 – Mapping

Symbols coloured as follows:

Colour	NC	WC
Red	IIIA	IIIA
Orange	GPA	IIIB
Yellow	GPB, GPC	IIIC
White	other waypoints	NCW

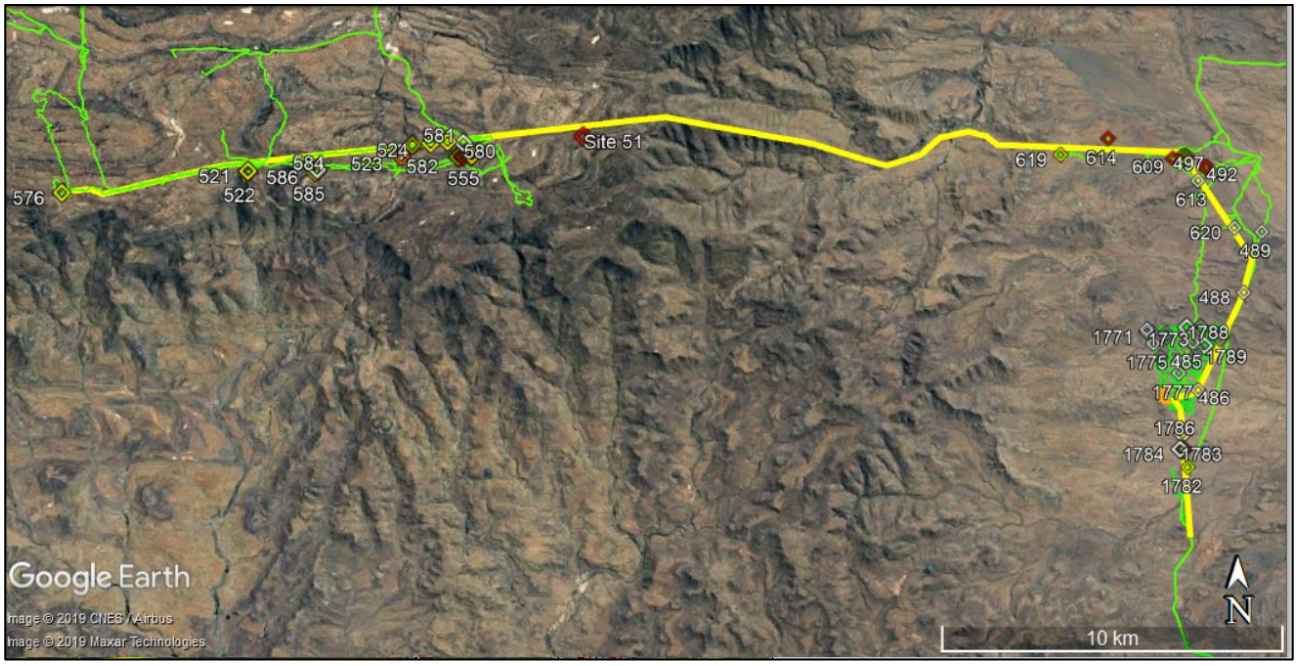

Figure A2.1: *Aerial view of the study area showing the recorded waypoints along the power line route. The yellow line indicates the power line routing and the numbered symbols are waypoints. The green lines are survey tracks.*

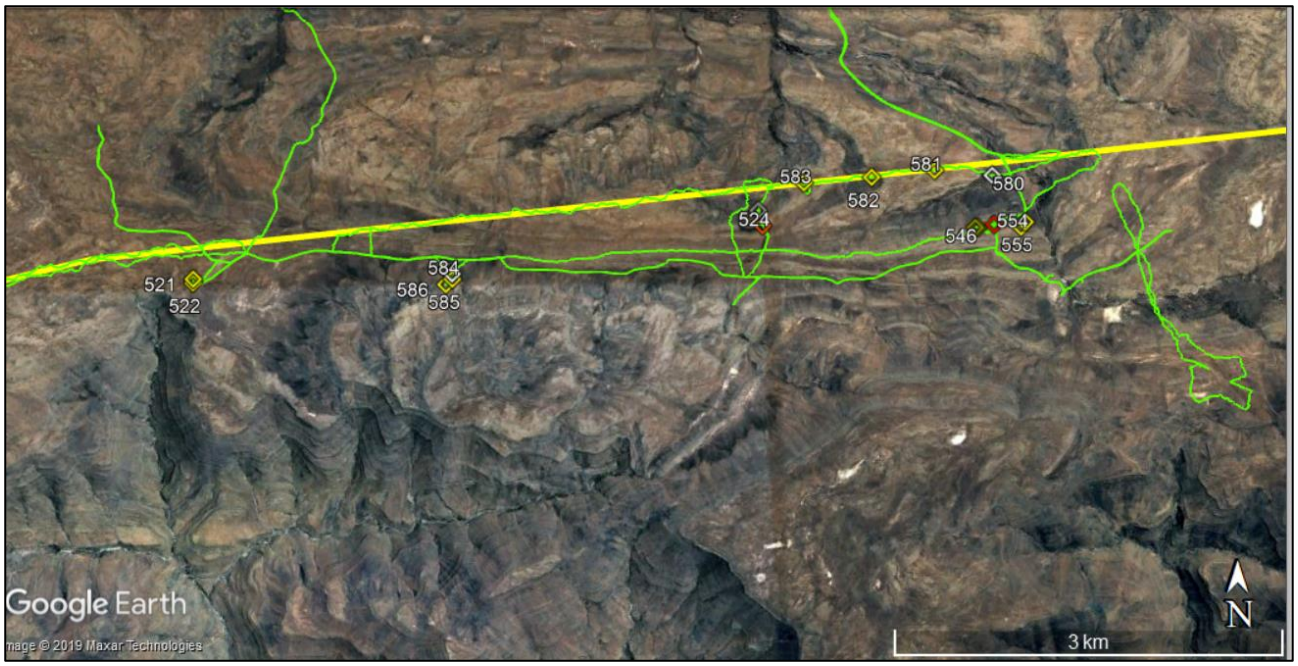

Figure A2.2: *Aerial view of the western part of the power line route. The yellow line indicates the power line routing and the numbered symbols are waypoints. The green lines are survey tracks.*

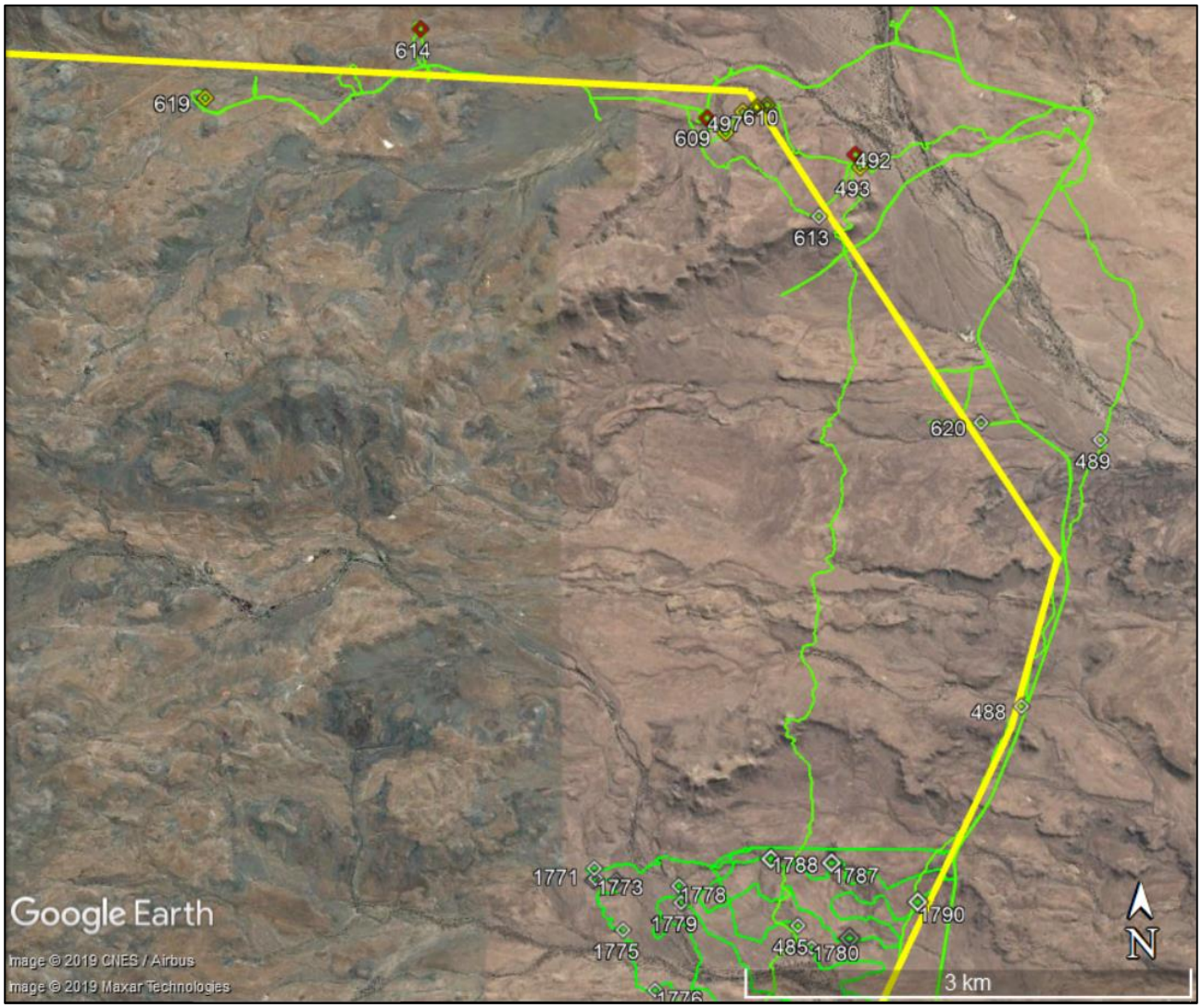

Figure A2.3: *Aerial view of the north-eastern part of the power line route. The yellow line indicates the power line routing and the numbered symbols are waypoints. The green lines are survey tracks.*

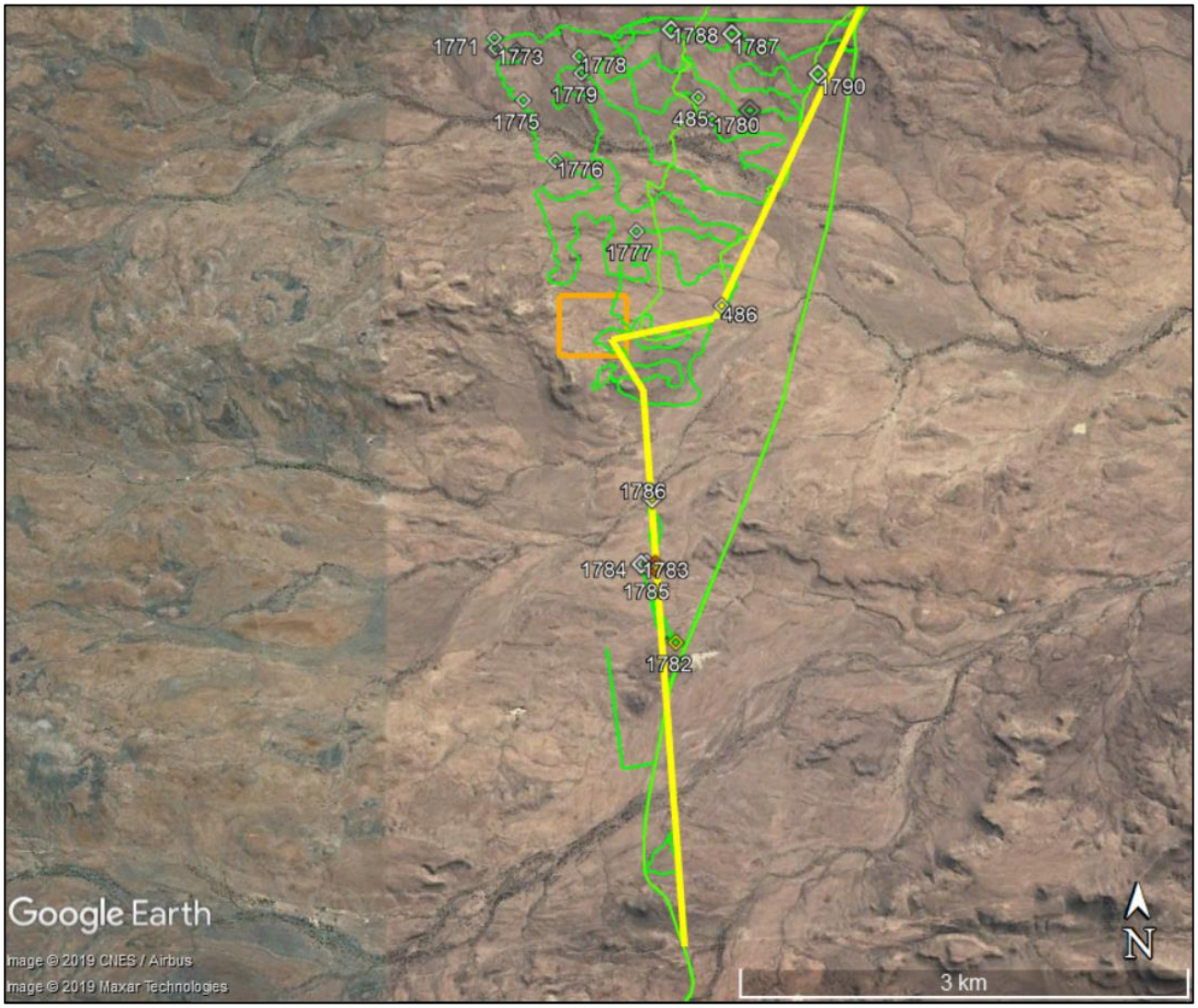

Figure A2.4: *Aerial view of the north-eastern part of the power line route. The yellow line indicates the power line routing and the numbered symbols are waypoints. The green lines are survey tracks.*

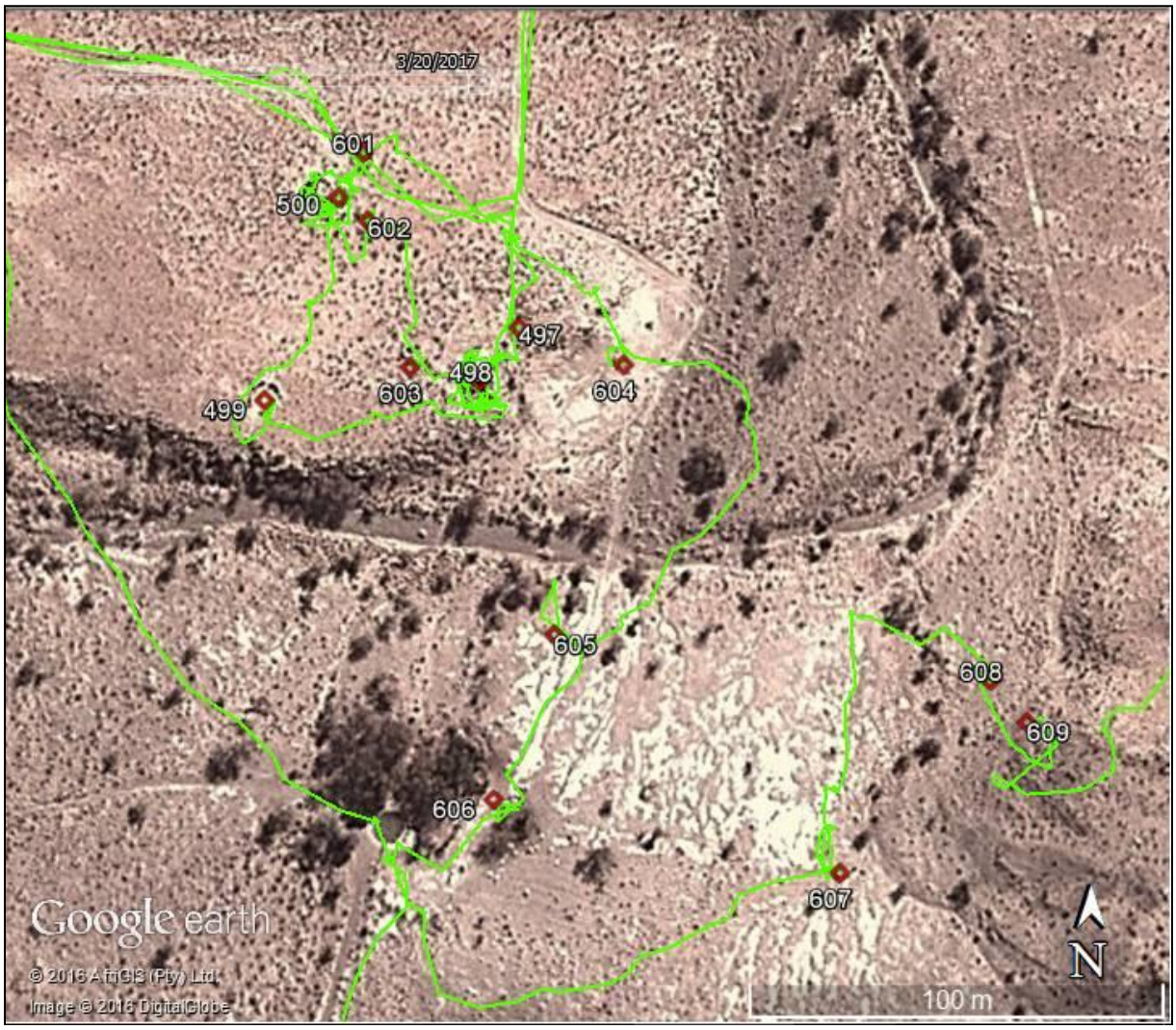

Figure A2.5: *Aerial view of the historic farm complex around waypoint 497.*

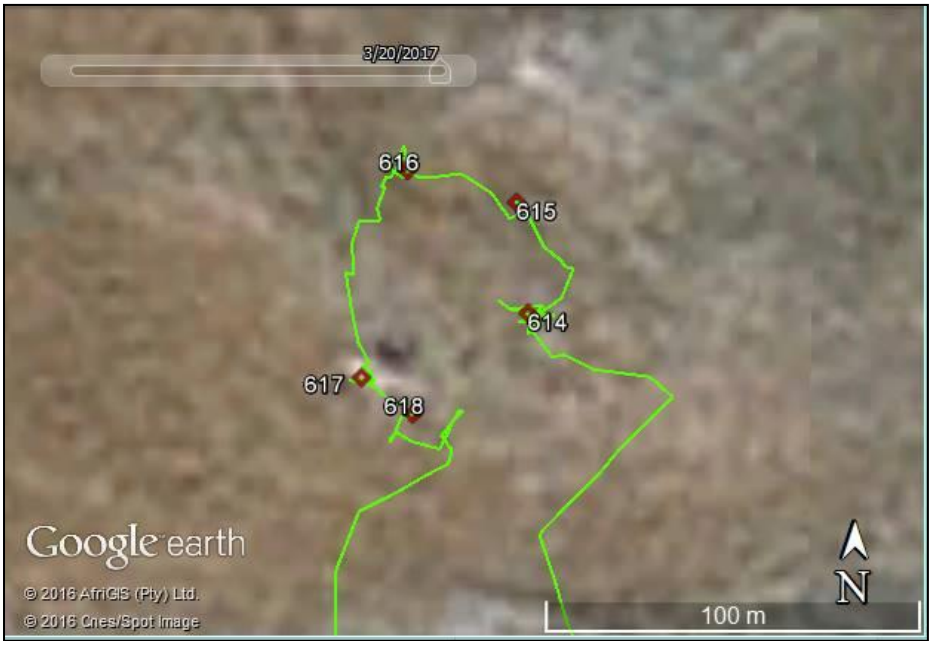

Figure A2.6: *Aerial view of the historic farm outpost around waypoint 614.*

APPENDIX 3 – Palaeontological study

Refer to overleaf.