HERITAGE IMPACT ASSESSMENT: PROPOSED MARALLA 132KV TRANSMISSION INTEGRATION PROJECT, ON FARMS DRIE ROODE HEUWELS 180, ORANJIE FONTEIN 203, KENTUCKY 206 AND DE HOOP 202, NORTHERN CAPE

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

Prepared for

WSP Group Africa (Pty) Ltd

On behalf of

BioTherm Energy (Pty) Ltd

Revised draft for comment: May 2022

Final: June 2022

ACO Associates cc
Archaeology and Heritage Specialists

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CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Preface pages (Page 4) and Appendices 1 & 8
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 4
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 5: Terms of Reference
(cA) an indication of the quality and age of base data used for the specialist report;	Section 8: Methodology
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 15: Impact Assessment
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 8.3, and Appendix 1
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 8: Methodology
(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 site alternatives;	Sections 10-14: Heritage Assessments
(g) an identification of any areas to be avoided, including buffers;	Section 15: Impact Assessment
(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;	Figures 5, 6, 7 & 8
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 8.4: Restrictions and Assumptions
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Sections 10 - 18

(k) any mitigation measures for inclusion in the EMPr;	Section 15: Impact Assessment
(l) any conditions for inclusion in the environmental authorisation;	Section 15: Impact Assessment
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or 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 or Environmental Authorization, and where applicable, the closure plan;	Section 19: Conclusion
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(p) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	No such gazetted protocol exists for heritage resources. Heritage Western Cape and SAHRA minimum standards for Heritage Impact Assessments have been applied.

DETAILS OF THE SPECIALIST

This study has been undertaken by John Gribble BA Hons, MA (ASAPA) of ACO Associates CC, archaeologists and heritage consultants.

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CONSULTANT DECLARATION OF INDEPENDENCE

I, John Gribble, declare that – general declaration:

- I act as the independent specialist in this application;
- I will 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;
- 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 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;
- All the particulars furnished by me in this form 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.

Signature of the specialist:

Name of company (if applicable): ACO Associates CC

Date: 2 June 2022

EXECUTIVE SUMMARY

1.1 Site Name

Maralla 132 kV Transmission Integration Project.

1.2 Location

Proposed on the farms Drie Roode Heuwels 180, Annexe Drie Roode Heuwels 181, Oranjie Fontein 203, Annexe Oranjie Fontein 185, Zwanepoelshoek 184 and De Hoop 202, in the Karoo Hoogland Local Municipality, Northern Cape.

Co-ordinates of the beginning and end of the preferred overhead powerline options are approximately:

-32.735247°S / 20.731777°E and -32.809912°S / 20.623885°E

1.3 Locality Plan

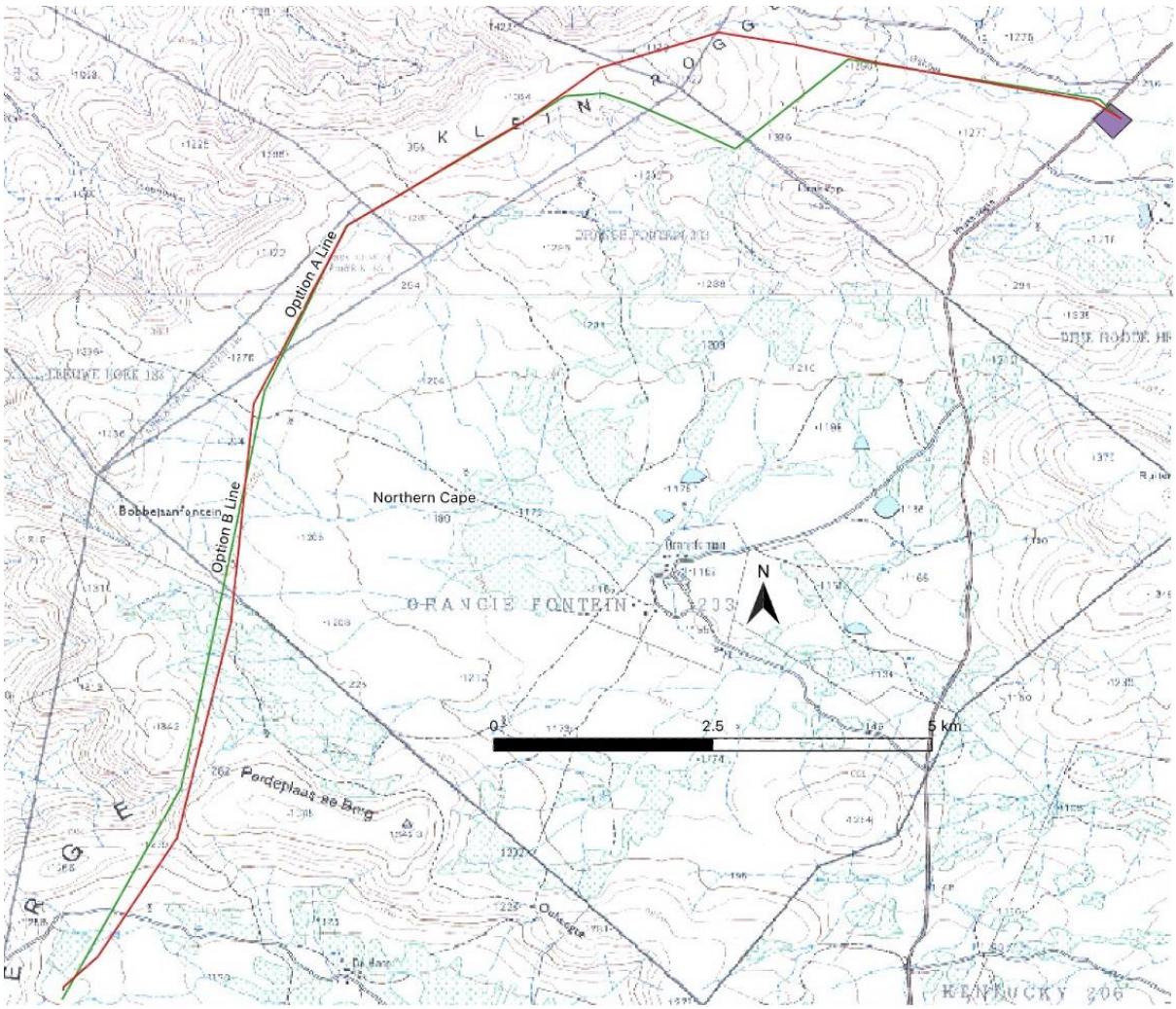

Figure 1: Location of the preferred Option A Line (red) and Option B Line (green) overhead line routes between the Maralla East and West and the Karusa substations (Source: 1:50 000 charts 3220DC and 3220DA, National Geo-spatial Information, http://www.ngi.gov.za).

1.4 Description of Proposed Development

The proposed project comprises the construction of a 132kV overhead power line to connect the authorised Maralla East and West Wind Energy Facilities to the national grid via the new Karusa substation. Six OHL route options are under consideration, comprising three routes initially proposed (Options 1(A), 1(B) and 2(A)), a fourth option (Option 4) and the most recent, preferred routes (Option A Line, Option B Line) the negotiated and agreed with the landowners of the affected properties. The proposed powerlines are between approximately 15 km and 19 km long.

The OHL will be a 132kV steel single or double structure with kingbird conductor with a height of between 15 and 20m above ground level. Standard overhead line construction methodology will be employed and will included drill holes (typically 2 – 3m in depth), plant poles and a string conductor. It is not envisaged that any large excavations and stabilized backfill will be required, however this will only be verified on site as part of construction works, once the geotechnical assessment has been undertaken at each pole position.

1.5 Heritage Resources Identified

Palaeontology: – The palaeontological impact assessments for the authorised and proposed Maralla OHLs by Almond (2016; 2021) note that the project area is underlain by potentially fossiliferous sedimentary rocks of Late Palaeozoic and younger, Late Tertiary or Quaternary age. The Middle Permian sedimentary bedrocks of the Abrahamskraal Formation (Lower Beaufort Group) in the region have yielded scientifically important fossils, but well-preserved fossils are very sparsely distributed, and the majority of the fossils recorded in the area comprise widely occurring forms that are not considered to be of exceptional scientific or conservation value.

The level of bedrock exposure in the study region is also highly constrained by extensive superficial deposits (scree, surface gravels, alluvium, gravelly soils) that are not usually fossiliferous.

The overall palaeontological sensitivity of the study area is rated as low, although the potential for rare fossil sites of high palaeontological interest cannot be entirely discounted.

Archaeology: – The recent survey of the portions of the proposed routes options 1(A), 1(B) and 2(A) undertaken by ACO Associates in 2021 and earlier surveys for the Maralla East and West WEFs identified a handful of archaeological stone scatters and isolated artefacts, variously graded as being of medium significance (3B) or not conservation-worthy (NCW). This included a widespread scatter of LSA lithics eroding out of a thin coversand on a flat outcropping rocky platform (J052 & J053) adjacent to the small stream valley.

Built Environment: - A number of stone-built structures, ranging from kraals to a substantial stone-built farm werf complex comprising a ruined house and barn, a large kraal and two smaller kraals, a sheep dip and a stone lined well, which reflect the historical farming land use of the area have been recorded in proximity to the OHL options. These historical structures have been graded 3B.

Graves and Cemeteries: - With the exception of a stone cairn near the Maralla WEF substation which could be a grave (although this is assessed to be unlikely) no graves or cemeteries have been recorded along the overhead powerline routes.

Cultural Landscape and Visual: - The project will be constructed in an area with a largely natural, untransformed rural visual character and it's construction will, alter the visual character of this landscape and contrast with the typical land use and historical form of human elements that are present. This level of contrast will, however, be reduced by the presence in the immediate surroundings of the proposed Maralla 132 kV Transmission Integration Project of a number of other WEFs and their associated power line infrastructure that are under construction, most notably the surrounding and adjacent Karusa WEF.

These WEFs all form a part of the development of this area as the designated Komsberg Renewable Energy Development Zone and the Central Strategic Transmission Corridor. The character of the landscape is thus changing with the turbines and associated WEF infrastructure such as OHLs introducing a more modern character to the landscape which may dominate the immediate visual landscape and cause a change to the cultural landscape.

1.6 Anticipated Impacts on Heritage Resources

Palaeontology: – None of the fossil sites recorded during the field assessments for this and the surrounding renewable energy projects fall within the footprints of the OHL route options under consideration. Direct impacts on these known fossil sites are therefore not anticipated and no mitigation is recommended in regard to them.

The impact significance of the construction of the OHL is assessed as low in terms of palaeontological heritage resources. This is a consequence of the paucity of irreplaceable, unique or rare fossil remains within the project area and the extensive superficial sediment cover overlying most potentially-fossiliferous bedrocks. This assessment applies equally to all OHL route options to the Karusa substation which are each likely to have a lower impact significance than the considerably longer approved connection to the Komsberg Substation.

Impacts due to the construction of new powerline access roads will probably be greater than those attributable to excavations for pylon footings. Significant further impacts during the operational and de-commissioning phases of the electrical infrastructure are not anticipated.

There are no preferences on palaeontological heritage grounds for any particular powerline route option among those under consideration. The no-go alternative (*i.e.* no development) will probably have a low impact on palaeontological heritage.

Archaeology: - Very little archaeological material was identified on those portions of the OHL route options accessed in 2021. However, the results of the numerous archaeological assessments conducted in the Klein-Roggeveldberge serve as a good indicator of the distribution and type of archaeological sites and materials that can be expected on all OHL route options.

The nature of the local geology means that rock shelters with layered deposits are rare and archaeological material tends to be found in open contexts. Material is also generally not visible on the surface, except where exposed by the erosion of the colluvial coversands

which mantle the area. Sites are often associated with watercourses and do not tend to occur on the exposed mountaintops of the area.

The material identified by this and other nearby assessments tends to comprise mainly isolated artefacts or very thin scatters of lithics, most usually dating to the MSA, and of generally low to very low archaeological significance. Where more dense occurrences of material have been recorded, these have been assigned a medium archaeological significance and damage to or the destruction of such sites during the construction of the OHL will be more significant.

Based on the above, the impact significance of the construction phase of the project on archaeological resources is assessed as low.

Impacts due to the construction of OHL access roads will probably be greater than those attributable to excavations for pylon footings. Significant further impacts during the operational and de-commissioning phases of the electrical infrastructure are not anticipated.

There are therefore no preferences on archaeological grounds for any particular powerline route option among those under consideration. However, both Option 2(A) and the preferred Option A Line and Option B Line routes keep to relatively high ground where archaeological sites and material are less prevalent which suggest that these route option may have a lower potential for impact.

The no-go, no development alternative will result in a low impact on archaeological resources.

Built Environment: - The various surveys in the area have identified a number of historical stone structures in the vicinity of the OHL options. These features have all been assessed to have moderate local value as evidence of historical land use pattern in the region and have been graded 3B and the impact significance of the construction phase of the project on archaeological resources is assessed as moderate.

Cultural Landscape and Visual: - Although the no-go option is preferred from a visual perspective, the location of the OHLs within the designated Komsberg REDZ, means that the character of the landscape has and is changing with the turbines and associated WEF infrastructure such as OHLs introducing a more modern character to it which will dominate the immediate visual landscape and cause a change to the cultural landscape.

Cumulative Impacts: - In respect of potential cumulative impacts on palaeontological resources of the installation of the OHL, these are anticipated to be moderate. Provided that the proposed monitoring and mitigation recommendations made for all these various projects are followed through their significance would probably fall to low. These anticipated levels of change are *acceptable.*

Archaeological material and the historical built environment is potentially at greater risk from cumulative impacts, given its widespread occurrence and exposure across the region. Multiple human activities in the surrounding landscape, of which the construction of the OHL is the latest, can erode the integrity of these heritage resources through their physical damage or destruction. At an individual project level these impacts may not appear to be significant, but the cumulative effects of multiple developments on archaeological and built

environment heritage resources are expected to be moderate. The implementation of measures at individual project level can, however, do much to mitigate and reduce cumulative impacts to low.

1.7 Recommendations

The following heritage-related recommendation are made in respect of the Maralla 132 kV transmission integration project:

Palaeontology: Pending the potential discovery of significant new fossil remains during construction, specialist palaeontological mitigation is not recommended for this project. Almond (2021) makes the following general recommendations concerning conservation and management of palaeontological heritage resources apply. These recommendations are captured in tabular form in Chance Fossil Finds Protocol in Appendix 1).

The Environmental Control Officer / Environmental Site Officer responsible for the Maralla 132 kV Transmission Integration Project should be made aware of the potential occurrence of scientifically important fossil remains within the development footprint. During the construction phase all major clearance operations and excavations deeper than 1 m should be monitored for fossil remains on an on-going basis by the ECO / ESO. Should significant fossil material such as vertebrate bones and teeth, or petrified logs of fossil wood be encountered at surface or exposed during construction, the ECO / ESO should safeguard these, preferably *in situ*. They should then alert SAHRA as soon as possible, (Contact: Dr Ragna Redelstorff, SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: rredelstorff@sahra.org.za). This is to ensure that appropriate action (i.e. recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the developer's expense. These mitigation recommendations should be incorporated into the Environmental Management Programme for the project.

Please note that:

- All South African fossil heritage is protected by law and fossils cannot be collected, damaged or disturbed without a permit from SAHRA or the relevant Provincial Heritage Resources Agency (in this case SAHRA);
- The palaeontologist concerned with potential mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection);
- All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) and should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013).

If these mitigation measures are successfully implemented, the residual impact of the project on palaeontological resources will low.

Archaeology, the Built Environment and Cemeteries and Burials: Once the final OHL option has been selected, it is recommended that a walk-down of the route is undertaken to verify that the pylons and access road will not damage archaeological sites, element of the historical built environment or any identifiable cemeteries or graves. Micro-siting of pylons

and the service road alignment may be required to ensure that significant heritage resources are not damaged.

Should any human remains be encountered at any stage during the construction or earthworks associated with the project, work in the vicinity must cease immediately, the remains must be left in situ but made secure and the project archaeologist and the archaeologist at SAHRA (Contact: Mr Phillip Hine SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: phine@sahra.org.za), must be notified immediately so that a decision can be made on how best to deal with the remains.

If these mitigation measures are successfully implemented, the residual impact of the project on these categories of heritage resources will be low.

Visual: According to the VIA, although there will be visual impacts during the construction and operational life of the OHL, these can be completely reversed after decommissioning, if all the structures are removed and the land suitably rehabilitated.

No specific mitigation measures in respect of the OHL are proposed by Gebhardt (2017) beyond the general recommendations that non-reflective paints and coatings are used on all new structures to minimise visibility and avoid reflectivity and glare, that the construction footprint is kept as small as possible to avoid unnecessary disruption to the existing vegetation and that the Establishment of vegetative screens /shelterbelts around affected homesteads should be considered in consultation with the owners.

If these mitigation measures are implemented, the residual visual impact of the project will be reduced, but according to Gebhardt will remain moderate.

1.8 Conclusion

This assessment has found that the area identified for proposed Maralla 132 kV Transmission Integration Project is a moderately sensitive heritage environment, and that, impacts on heritage resources arising from the construction of the project can be expected.

The preferred landowner routes (Option A Line / Option B Line) or Option 2(A) are the preferred OHL alignments in respect of heritage resources.

It is our considered opinion that provided the mitigation measures set out above are implemented, the overall impact and significance of the proposed OHL on heritage resources will range from low to moderate, and the proposed activity is acceptable.

1.9 Author/s and Date

Heritage Impact Assessment: John Gribble, ACO Associates, 2022

Archaeological Impact Assessment: Lita Webley and David Halkett, ACO Associates, 2017

Palaeontological specialist studies: John Almond, Natura Viva, 2016 and 2021

Visual Impact Assessment: Belinda Gebhardt, 2017

GLOSSARY

Archaeology: 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.

Cultural landscape: The combined works of people and natural processes as manifested in the form of a landscape

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2 500 000 years ago**.**

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999.

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between 20 000-300 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation.

Palaeontology: 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.

Pleistocene: A geological time period (of 3 million – 10 000 years ago).

Quaternary: The geologic time period that encompasses the most recent 2.6 million years. It comprises the Pleistocene (2.6 Ma – 10,000 years ago) and the Holocene (10,000 years ago to the present) and is characterised by a series of global glacial cycles.

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage.

Structure (historic): 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. Protected structures are those which are over 60 years old.

ACRONYMS

DFFE	Department of Forestry, Fisheries and the Environment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
NID	Notice of Intent to Develop
OHL	Overhead powerline
REDZ	Renewable Energy Development Zone
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
WEF	Wind Energy Facility

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2 INTRODUCTION

ACO Associates cc (ACO) was appointed by WSP Group Africa (Pty) Ltd, on behalf of Biotherm Energy (Pty) Ltd (BioTherm), to carry out a heritage impact assessment (HIA) as part of the Basic Assessment (BA) for the proposed Maralla 132 kV Transmission Integration Project.

The OHL option under consideration in this assessment crosses the farms Drie Roode Heuwels 180, Annexe Drie Roode Heuwels 181, Oranjie Fontein 203, Annexe Oranjie Fontein 185, Zwanepoelshoek 184 and De Hoop 202, all located in the Karoo Hoogland Local Municipality in the Northern Cape, approximately 38 km south of Sutherland (Figure 1).

3 PROJECT HISTORY

On 14 November 2017, the Department of Environmental Affairs issued an Environmental Authorisation (EA) (DEA reference number: 14/12/16/3/3/1/1774) for the construction of a 132 kV overhead powerline (OHL) for the authorised Maralla East and West Wind Energy Facilities (WEF). The authorised OHL crosses the farms Drie Roode Heuwels 180, Oranjie Fontein 203, Kentucky 206, De Hoop 202, Rheebokkefontein 209 and Standvastigheid 210, south of Sutherland in the Northern Cape (Figure 2).

This authorised OHL was subject to heritage assessment during a BA process conducted in 2015 and 2016. Dr John Almond conducted a palaeontological impact assessment (PIA) (Almond 2017) as part of that study, which was included in an integrated HIA produced by ACO Associates (Webley & Halkett 2017). In addition, and to fulfil the requirements of heritage impact assessments as defined in Section 38 of the NHRA, ACO Associates provided brief comments on the built environment.

The 2017 HIA considered two OHL route options - Eastern and Western - between the proposed substation that would serve both WEFs and the Komsberg substation to the south. The Eastern OHL route received environmental authorisation (Figure 2).

4 CURRENT PROPOSAL

BioTherm wishes to amend the authorised route of the 132 kV OHL to terminate at the new Karusa WEF substation, rather than at the Komsberg substation and must conduct a BA for approval by the Department of Forestry, Fisheries and the Environment (DFFE).

Three 132 kV OHL route options (Options 1(A) and (B) and Option 2(A)) ranging in length between approximately 15 km and 19 km between the Karusa and Komsberg substations were initially proposed (Figure 3). Two of the proposed route options (Options 1(A) and 1(B)) follow a similar alignment to the authorised OHL for a portion of their lengths, before turning westward toward the Karusa substation. Option 2(A) follows an easterly route, aligned for a portion of its length with an existing OHL to the Karusa substation recently constructed for the Soetwater WEF.

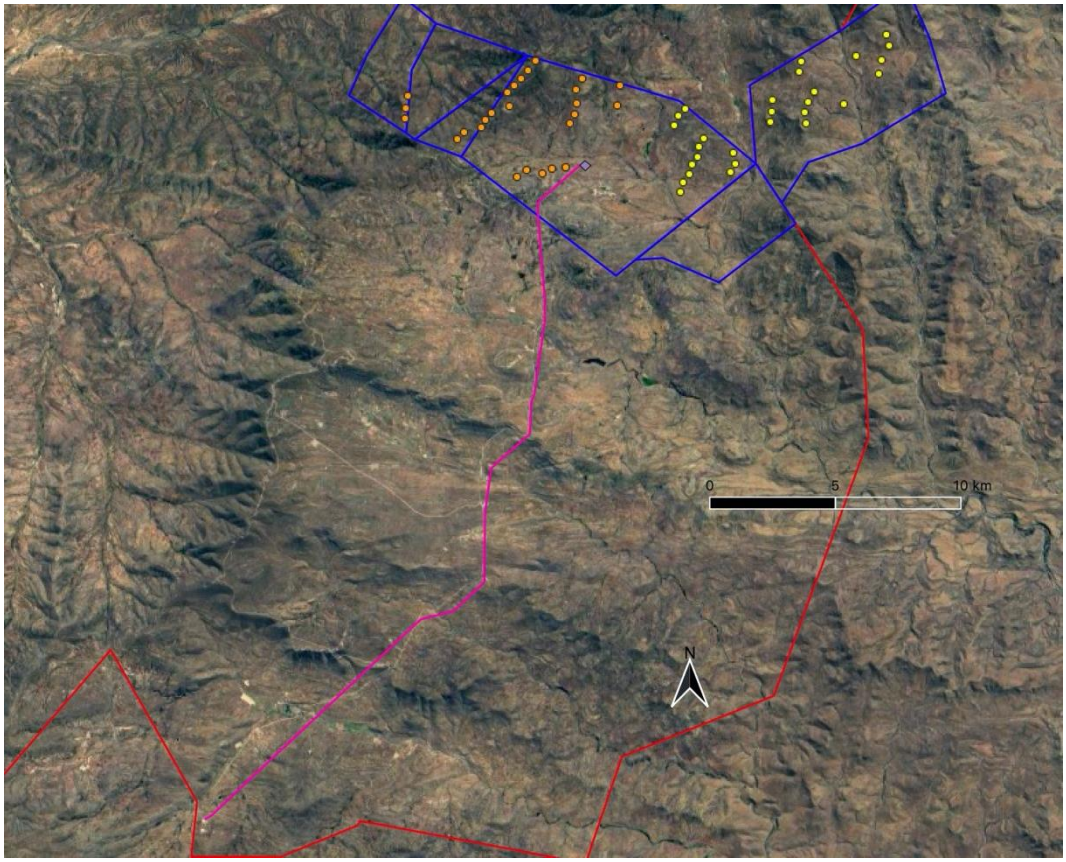

Figure 2: Location and authorised layout of the Maralla East and West WEFs and OHL (pink line) to the Komsberg substation (Source: Google Earth).

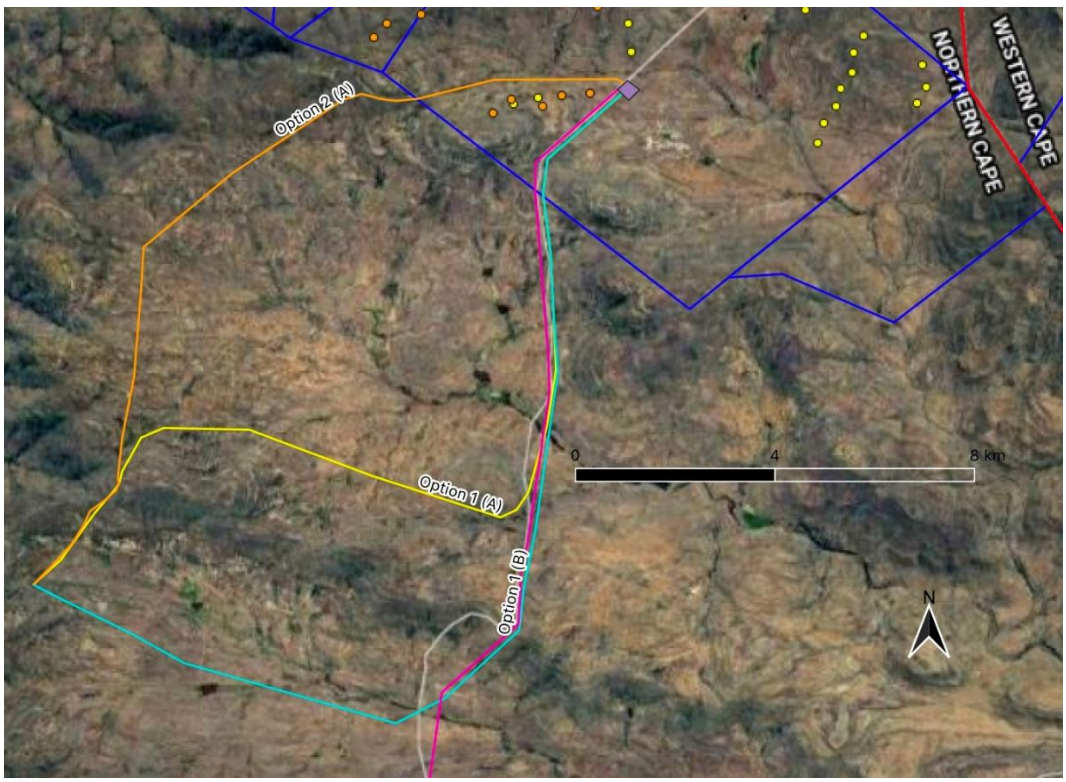

Figure 3: Comparison of the authorised (pink line) and Options 1(A), 1(B) and 2(A) OHL route alignments (yellow, pale blue and orange lines) for the Maralla WEFs (Source: Google Earth).

A fourth alternative route (Option 4) was subsequently proposed (see Figure 4). This route roughly parallels the Option 1(A) and (B) routes in the east, and the Option 2(A) route in the west for substantial portions of its length. Where it diverges from these three latter OHL routes is in the alignment of its west-east crossing of the farm Oranjie Fontein, following as it does a 132 kV powerline that is currently under construction for the Soetwater WEF between the new Soetwater WEF substation and the road over the Komsberg Pass to Sutherland. A written opinion by ACO Associates on the viability of Option 4 was provided as an addendum to the draft HIA on 16 November 2021. This opinion is attached to this report as Appendix 1.

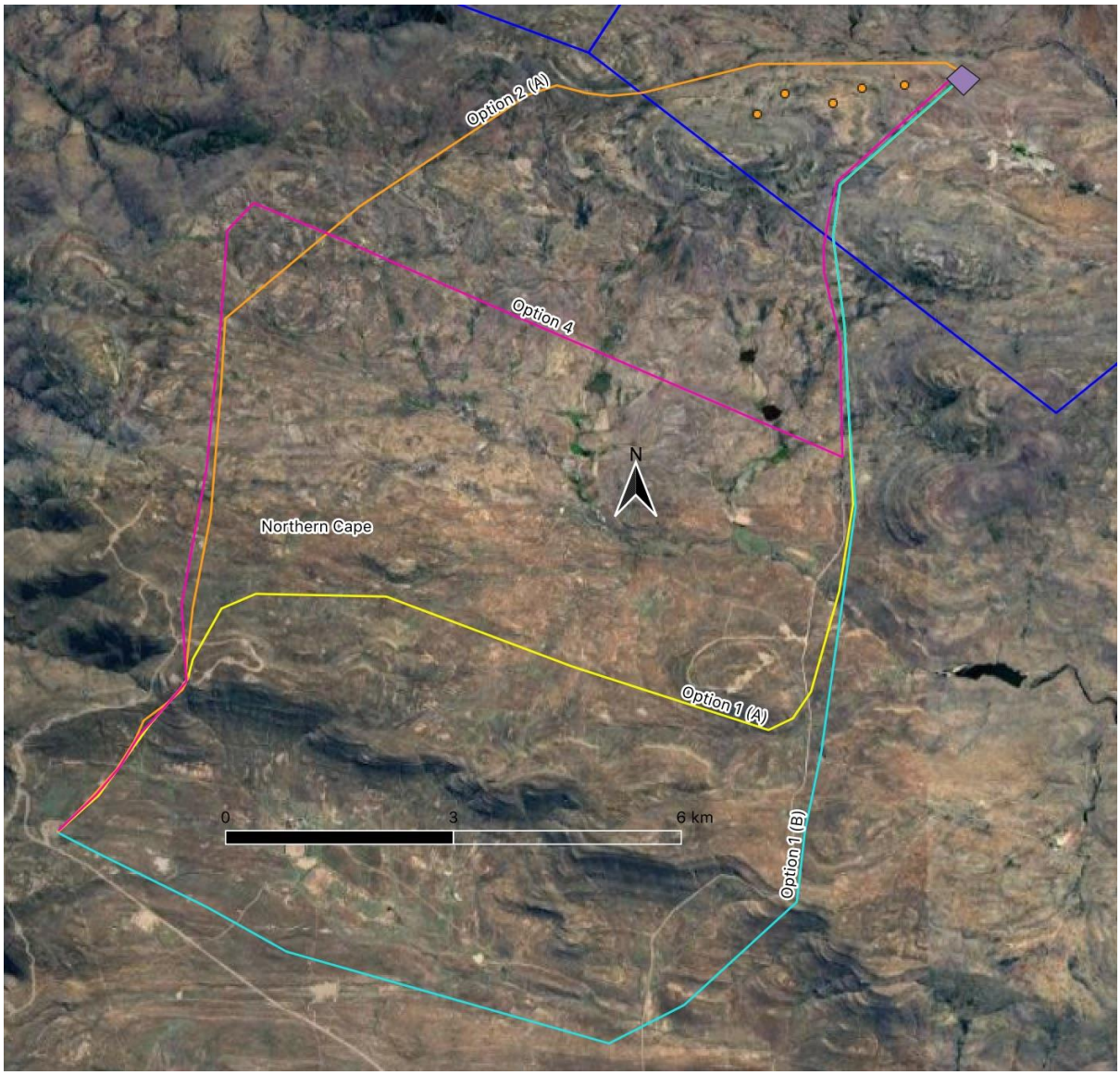

Figure 4: OHL Option 4 (pink line) shown in relation to the other revised options originally considered (Source: Google Earth).

Consultations with the various affected landowners as part of the current BA process have since resulted in the negotiation and agreement of two further, preferred route alignments which will form part of the assessment carried out in this HIA. These preferred routes (Option A Line and Option B Line) roughly parallel the Option 2(A) OHL alignment previously assessed and is shown in Figure 5.

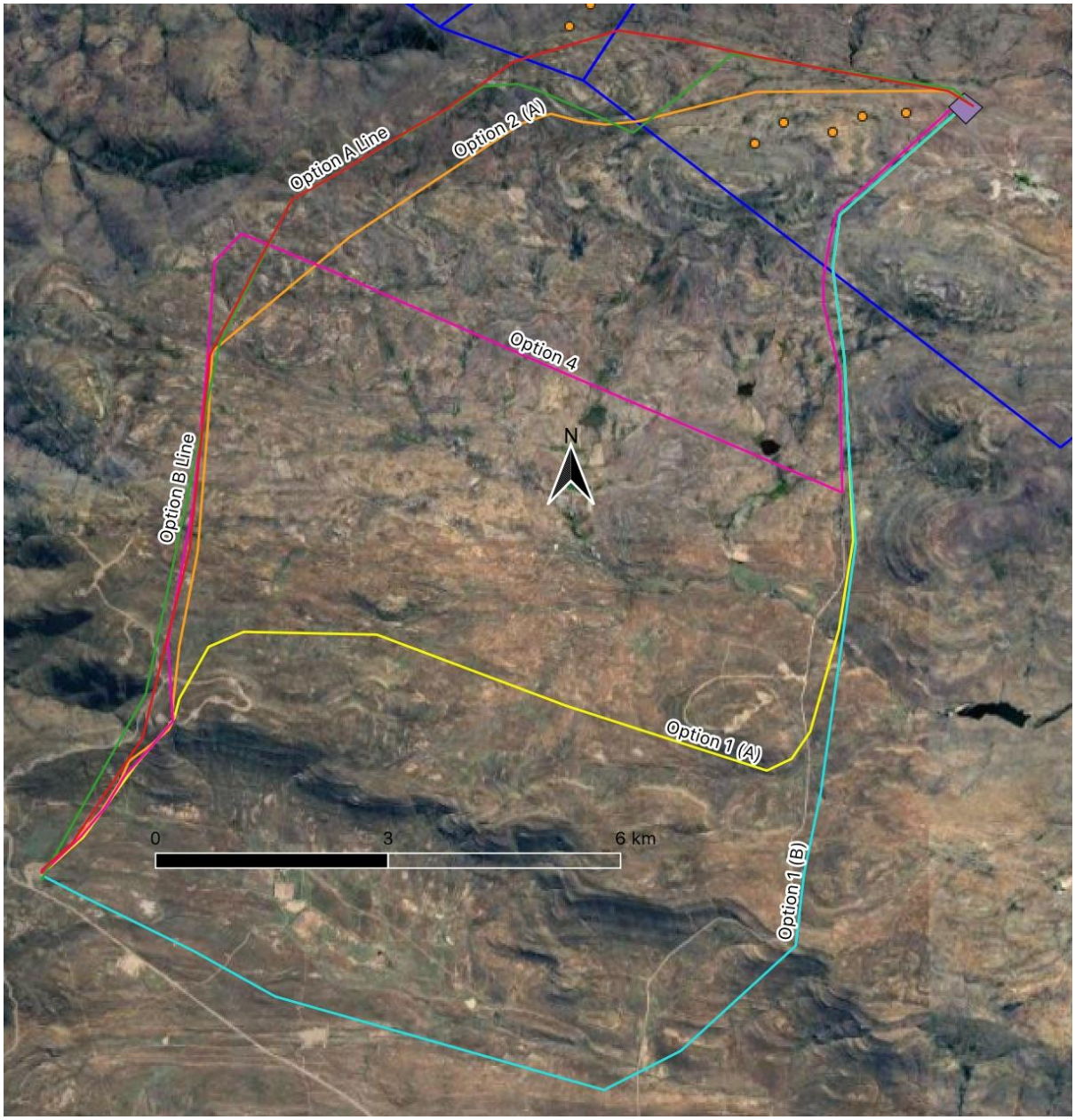

Figure 5: Alignment of the preferred, landowner agreed Option A Line (red) and Option B Line (green) routes, shown in comparison to the other options previously assessed (Source: Google Earth).

The OHL will consist of steel single or double structures with kingbird conductor, between 15 and 20m above ground level. Standard overhead line construction methodology will be employed and will included drill holes (typically 2 – 3m in depth), plant poles and a string conductor. It is not envisage that any large excavations and stabilized backfill will be required, however this will only be verified on site part of construction works once the geotechnical assessment has been undertaken at each pole position.

5 TERMS OF REFERENCE

ACO Associates was commissioned to produce a HIA as part of the BA process for this project.

The report includes the following:

- A desk-top literature review to assess the potential for archaeological, cultural and historic sites on the proposed OHL route options;
- The results of a heritage field assessment to identify and document (collect GPS coordinates and photograph) heritage resources that may be affected by the project; and
- A palaeontological impact assessment to assess the potential for the occurrence of fossil material on the proposed OHL routes.

The results of these studies are integrated in this HIA report along with an assessment of the sensitivity and significance of any identified heritage resources, an evaluation of the potential impacts on these resources of the OHL options, and recommendations for measures to mitigate any negative impacts of the project on them.

This HIA will form part of the BA Report and must be submitted for comment to the South African Heritage Resources Agency (SAHRA), as the statutory heritage commenting bodies under the National Environmental Management Act (NEMA) for the Northern Cape.

6 RELEVANT LEGISLATION

6.1 National Heritage Resources Act (No 25 of 1999)

The National Heritage Resources Act (NHRA) came into force in 2000 with the establishment of the SAHRA, replacing the National Monuments Act (No. 28 of 1969 as amended) and the National Monuments Council as the national agency responsible for the management of South Africa's cultural heritage resources.

The NHRA reflects the tripartite (national/provincial/local) nature of public administration under the South African Constitution and makes provision for the devolution of cultural heritage management to the appropriate, competent level of government. In the Northern Cape, SAHRA acts on an agency basis for the Northern Cape Provincial Heritage Resources Authority, Ngwao Boswa jwa Kapa Bokone.

The NHRA gives legal definition to the range and extent of what are considered to be South Africa's heritage resources. According to Section 2(xvi) of the Act a heritage resource is "any place or object of cultural significance". This means that the object or place has aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

In terms of the definitions provided in Section 2 of the NHRA, heritage resources potentially relevant to this assessment are:

- Material remains of human activity which are in a state of disuse and are in or on land [which includes land under water] and which are older than 100 years, including artefacts, human and hominid remains and artificial features;
- 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;

- 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;
- Any movable property of cultural significance which may be protected in terms of any provisions of the NHRA, including any archaeological artefact or palaeontological specimen; and
- Intangible heritage such as traditional activities, oral histories and places where significant events happened.

As per the definitions provided above, these cultural heritage resources are protected by the NHRA and a permit from SAHRA is required to destroy, damage, excavate, alter, deface or otherwise disturb any such site or material.

It is also important to be aware that in terms of Section 35(2) of the NHRA, all archaeological objects and palaeontological material is the property of the State and must, where recovered from a site, be lodged with an appropriate museum or other public institution.

Section 38 of the NHRA requires a HIA for certain kinds of development. In relation to this project, the relevant activities are:

- The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length (Section 38(1)(a)); and
- A development which will change the character of a site exceeding 5000 m^2 in extent (Section 38(1)(c)(i)).

6.1.1 Grading of Heritage Resources

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Grading, according to Winter & Oberholzer (2014) is “generally based on the intactness, rarity and representivity of the resource, as well as its role in the larger landscape or cultural context”.

Heritage resources are graded according to criteria specified in Section 3 of the NHRA which suggests the following criteria for assigning heritage significance:

- Importance in the community or pattern in South Africa’s history;
- Possession of uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage;
- Potential to yield information that will contribute to an understanding of South Africa’s natural or cultural heritage;
- Importance in demonstrating the principal characteristics of a particular class of South Africa’s natural or cultural places or objects;
- Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Importance in demonstrating a high degree of creative or technical achievement during a particular period;

- Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- Significance in relating to the history of slavery in South Africa.

The generally accepted heritage resource grades are shown in Table 1 below.

Table 1: Grading of heritage resources (Source: Baumann & Winter 2005: Box 5).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
3A	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources.

6.2 National Environmental Management Act (No 107 of 1998)

The National Environmental Management Act (NEMA) provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals that are likely to have a negative effect on the environment.

Regulations governing the environmental authorisation process have been promulgated in terms of NEMA and include the EIA Regulations, 2014 as amended (GNR R326/2017) and Listing Notices 1 – 3 (GNR 324, 325 and 327/2017). These regulations were amended in April 2017 by Government Notices 324, 325, 326 and 327.

The proposed Maralla WEF OHL triggers a number of activities in the Listing Notices and, in terms of GNR 325 therefore, the project will be subject to a BA process and will be required to obtain a positive environmental authorisation from the Department of Forestry, Fisheries and the Environment (DFFE) prior to commencement of the proposed activities.

7 PUBLIC PARTICIPATION

As required by NEMA, a public participation exercise is being undertaken as part of the BA process. A database of stakeholders and interested and affected parties (I&APs) has been compiled and there will be a 30 day period for public comment on the draft Basic Assessment Report.

Local conservation bodies and the relevant the local and regional municipalities will be approached for comment as part of this process.

Any heritage-related comments generated by the during public participation process will be addressed in the revised HIA in the final BAR.

8 METHODOLOGY

8.1 Palaeontological Assessment

Much of the study area for the Maralla 132 kV Transmission Integration Project had already been palaeontologically surveyed for the Maralla East and West, Soetwater and Karusa WEF projects (Almond 2015c; Almond 2015d; Almond 2016h; Almond 2016i).

For this assessment the remainder was covered by a three-day site visit in October 2021 by Dr John Almond and supplemented by the desktop palaeontological heritage assessment of the currently authorised grid connect to the Komsberg substation (Almond 2017).

8.2 Archaeological Desktop Review

Little was known of the archaeology of the study area until recently, when the area was identified as suitable for wind farm development. This study includes a review of published material and unpublished reports on the SAHRIS database (https://sahris.sahra.org.za), including those generated for a number of previous archaeological assessments and studies that have been conducted in the vicinity of the proposed OHL. This includes:

- The Esizayo Wind Energy Facility (Webley & Halkett 2017d)
- The Suurplaat Wind Energy Facility (Hart et al. 2010)
- The Roggeveld Wind Energy Facility (Hart & Webley 2011, 2013)
- The Sutherland WEF facility (Halkett & Webley 2011 & 2016)
- The Kareebosch Wind Energy Facility (Roggeveld Phase 2) (Hart & Kendrick 2014)
- The Hidden Valley Wind Energy Facility (Phases 1, 2 & 3) (Booth 2012)

The proposed OHL route options all fall within the area for which HIAs were produced for the Maralla East and West WEFs and its authorised OHL (Webley and Halkett 2017a, 2017b, 2017c) and these reports have provided important detail for this HIA.

8.3 Archaeological Field Assessment

As part of the current BA process an initial physical survey of accessible portions of the proposed OHL Option 1(A), (B) and 2(A) routes was undertaken by John Gribble and Gail Euston-Brown of ACO Associates on 31 August 2021.

The three proposed route alignments and other data, such as the location of previously recorded heritage sites, were loaded onto hand-held GPS receivers (on the WGS84 datum) carried by each member of the field team. Travelled tracks were logged and the positions of any new heritage resources located during the survey were recorded as GPS waypoints (Figure 6 and Appendix 6). Photographs were taken of finds and they were graded

according to the Baumann and Winter (2005) system set out in the guidelines for involving heritage practitioners in EIAs.

The field team was suitably qualified and experienced to roughly date and characterise any heritage resources encountered during the survey.

No archaeological material was removed from the project area, and all observations were based on visible surface material.

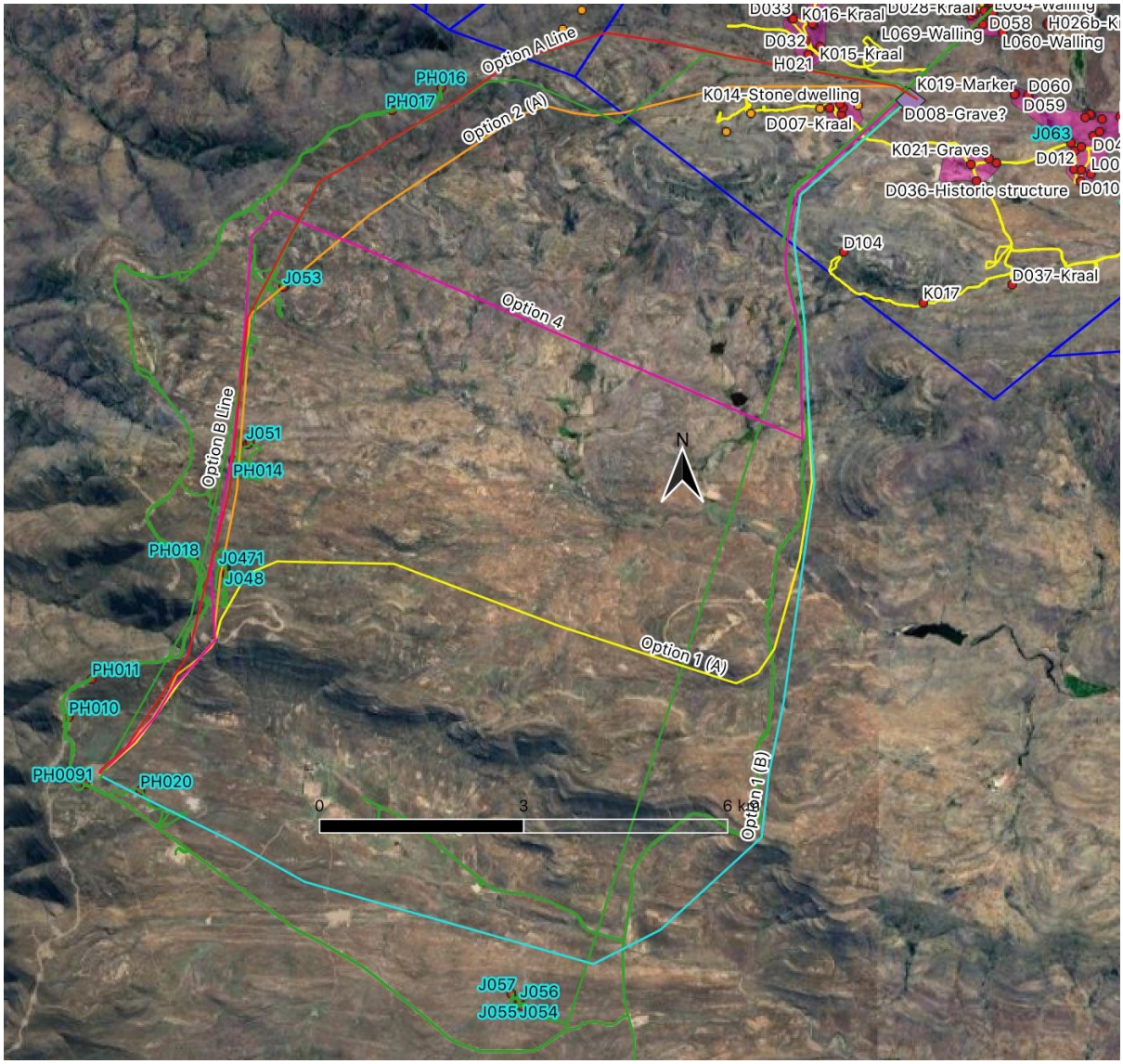

Figure 6: Trackplots (green lines) and positions of heritage resources recorded during the 2021 survey of the Option 1(A), (B) and 2(A) routes. The trackplots from the 2011 and 2016 surveys for the Maralla East and West WEFs are shown as yellow lines, with associated heritage resources (Source: Google Earth).

8.4 Restrictions and Assumptions

Access to large portions of the proposed OHL routes was difficult as they fall within the Karusa and Soetwater WEFs which were under construction and most farm access points were subject to access control. The field team was able to negotiate access, but its movements were constrained by the construction work taking place at places on the site.

Furthermore, a full day of the planned field assessment was lost to heavy rain and snow, so only portions of the proposed OHL routes could be surveyed.

Where access was possible, principally along route Options 2(A) and 1(B), vegetation cover was such that surface visibility was generally good for the purposes of the archaeological survey and it was possible to obtain a good general sense of the archaeological potential of affected area.

9 RECEIVING ENVIRONMENT

The new OHL will installed some 38 km south of Sutherland, below the Great Escarpment and approximately 6,5 km east of the R354 between Matjiesfontein and Sutherland. Three of the OHL options (1(A) and 1(B)) are in close proximity for some of their length to the old road to Sutherland over the Komsberg Pass. The high ridges in this area are windswept, dry, inhospitable and undeveloped. The main river channels in the area are the Venters, Komsberg and Riet River (Plate 1Plate 3).

The area is sparsely populated and many of the farms have absentee landlords. Historical settlements tend to focus on the water resources and along river valleys and there are numerous kraals and stone walling, located near water and built against the rocky ridgelines along the valley sides (Webley & Halkett 2017a).

Plate 1: Panoramic view of landscape within which the OHL options are proposed (Photo: J Gribble).

Plate 2: View of the typical landscape within which the OHLs are proposed. The Karusa substation under

construction is shown at right. OHL Options 1(A) and 2(B), Option 4 and both preferred landowner routes will parallel the route of the exsiting Karusa powerline across this image (Photo: J Gribble).

Plate 3: Landscape that will be traversed by OHL Option 2(B), Option 4 and both preferred landowner routes. Note the adjacent Karusa OHL and the WTGs for the Karusa WEF under construction on the surrounding hills (Photo: J Gribble).

10 PALAEONTOLOGY

A palaeontological impact assessment (PIA) of the OHL routes was commissioned for BioTherm Energy (Pty) Ltd and the full report is attached separately as Appendix 1 (Almond 2021). In summary, the PIA found the following.

The Maralla 132 kV Transmission Integration Project area is located in a region that is underlain by potentially fossiliferous sedimentary rocks of Late Palaeozoic and younger, Late Tertiary or Quaternary age. The Middle Permian sedimentary bedrocks of the Abrahamskraal Formation (Lower Beaufort Group) in the wider study region have yielded scientifically-important fossils of petrified wood and other vascular plants, tetrapod (terrestrial vertebrate) and lungfish burrows and trackways *plus* exceedingly rare skeletal remains of the *Tapinocephalus* Assemblage Zone, but well-preserved fossils are very sparsely distributed (Almond 2021).

The level of bedrock exposure in the study region is highly constrained by extensive superficial deposits (Late Caenozoic superficial sediments such as scree, surface gravels, alluvium, gravelly soils) that are usually unfossiliferous (Almond 2021).

The great majority of the fossils recorded so far within the area covered by the proposed OHLs comprise widely-occurring forms (poorly-preserved fossil wood, sphenophyte ferns, lungfish burrows, low diversity invertebrate trace fossils) that are not considered to be of exceptional scientific or conservation value (Almond 2021).

The overall palaeontological sensitivity of the study area is thus rated as low, although the potential for rare fossil sites of high palaeontological interest cannot be entirely discounted (Almond 2021).

11 ARCHAEOLOGY

11.1 Results of Previous Assessments

The two original Maralla WEF OHL routes, of which one was subsequently authorised, were not field tested and Webley and Halkett's (2017a) assumptions in the HIA about the likely archaeology of the area were based on the field assessments undertaken for the Esizayo WEF and the Maralla East and West WEFs (Webley and Halkett 2017b, 2017c), for the Sutherland WEF (Halkett & Webley 2011) and for the Hidden Valley (now Soetwater) WEF, immediately south of the Maralla WEFs (Booth (2012).

Generally these studies found that there is very little evidence for ESA or MSA material in the area. Scatters of LSA stone artefacts do occur and are often found on the talus slopes, below shelters some of which contain rock art. They are of medium significance.

Three rock art sites were reported from the Maralla WEF study area and these sites are of high significance.

A few "pastoralist settlements" were identified along dry river beds in the bottom of valleys and contain LSA artefacts, ceramics and grindstones. They are of medium significance. There are, potentially, graves/cairns within the study area and these are of high significance. There are numerous roughly-packed, circular enclosures of dry stone walling, which may represent both pre-colonial and colonial era stone kraals, distributed along the lower slopes of small koppies, and close to streams or fountains across the study area. They are of low to medium significance. Booth (2012) reports examples of stone walling in the Hidden Valley WEF.

The field surveys referred to above identified a handful of archaeological stone scatters and isolated artefacts within the Maralla West WEF in the vicinity of the original OHL options where they converge on the onsite WEF substation (see Figure 7 and Appendices 4 and 5). The stone scatters were graded as being of medium significance (3B) while the isolated artefacts were not deemed to be conservation-worthy (NCW) (Halkett & Webley 2011; Webley & Halkett 2017c).

As is clear from Figure 7, the closest of these sites (H021) is approximately 180 m from the proposed alignment of the current, preferred landowner route options and none of the known heritage resources will be directly affected by any of the proposed route alignments.

11.2 2021 OHL Survey Results

The fieldwork conducted by ACO Associates in August 2021 identified very little archaeological material along the portions of the OHL alignment Options 1(A), (B) and 2(A) that were accessed. These occurrences are listed in Appendix 7 and their locations shown in Figure 8 and include some isolated finds of MSA lithics in erosional contexts. This material was graded as NCW.

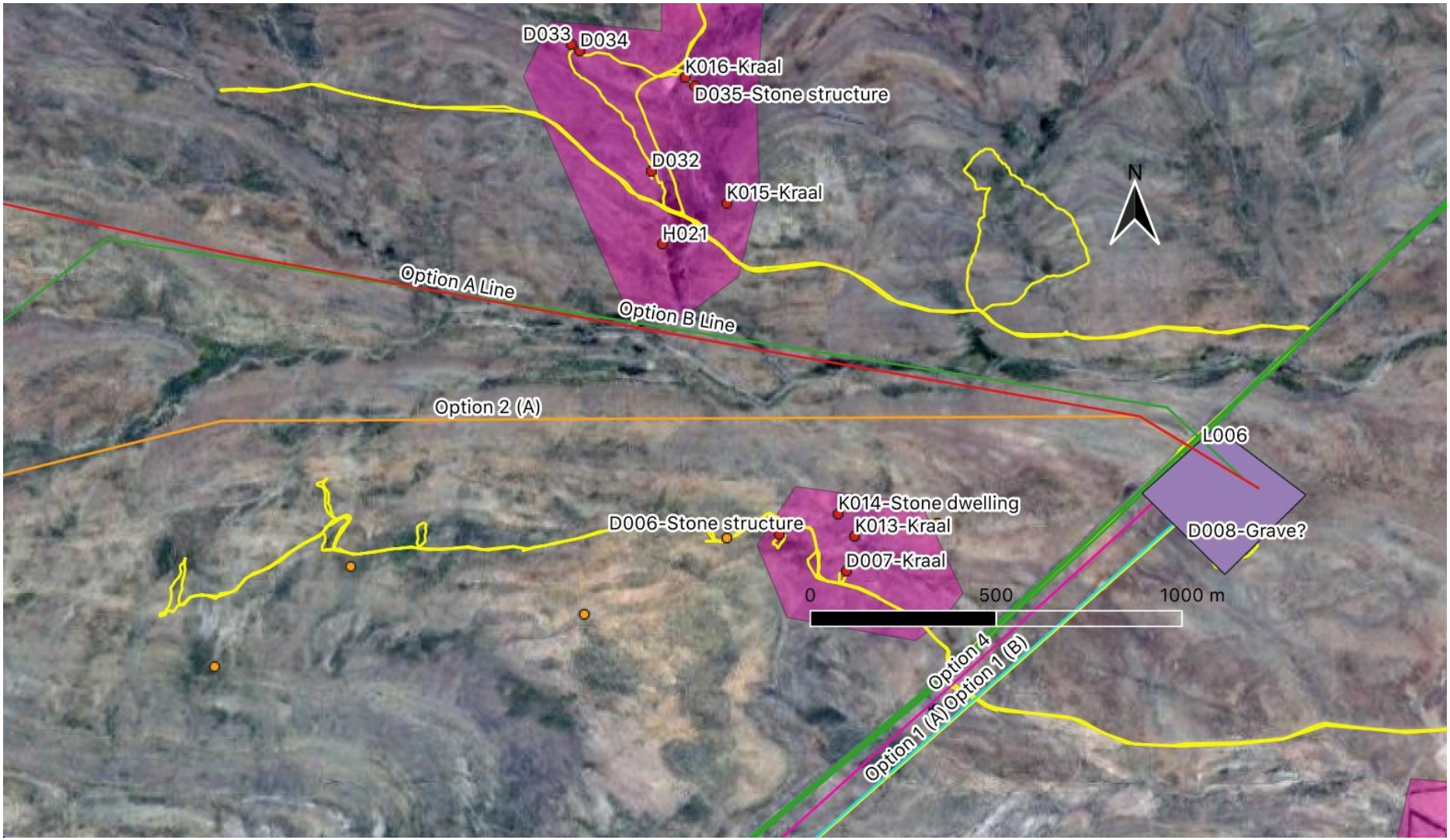

Figure 7: Location of sites (archaeological and built environment) recorded during the 2011 and 2016 Sutherland WEF and Maralla West WEF field assessments in the vicinity of the OHL route options (Option 1(A) = yellow; Option 1(B) = blue; Option 2(A) = orange; Option 4 = pink; Option A Line = red; Option B Line = green) where they converge on the Maralla WEF substation. These sites have all been included in no-go areas recommended the EMPr Report for the Martalla West WEF (Source: Google Earth).

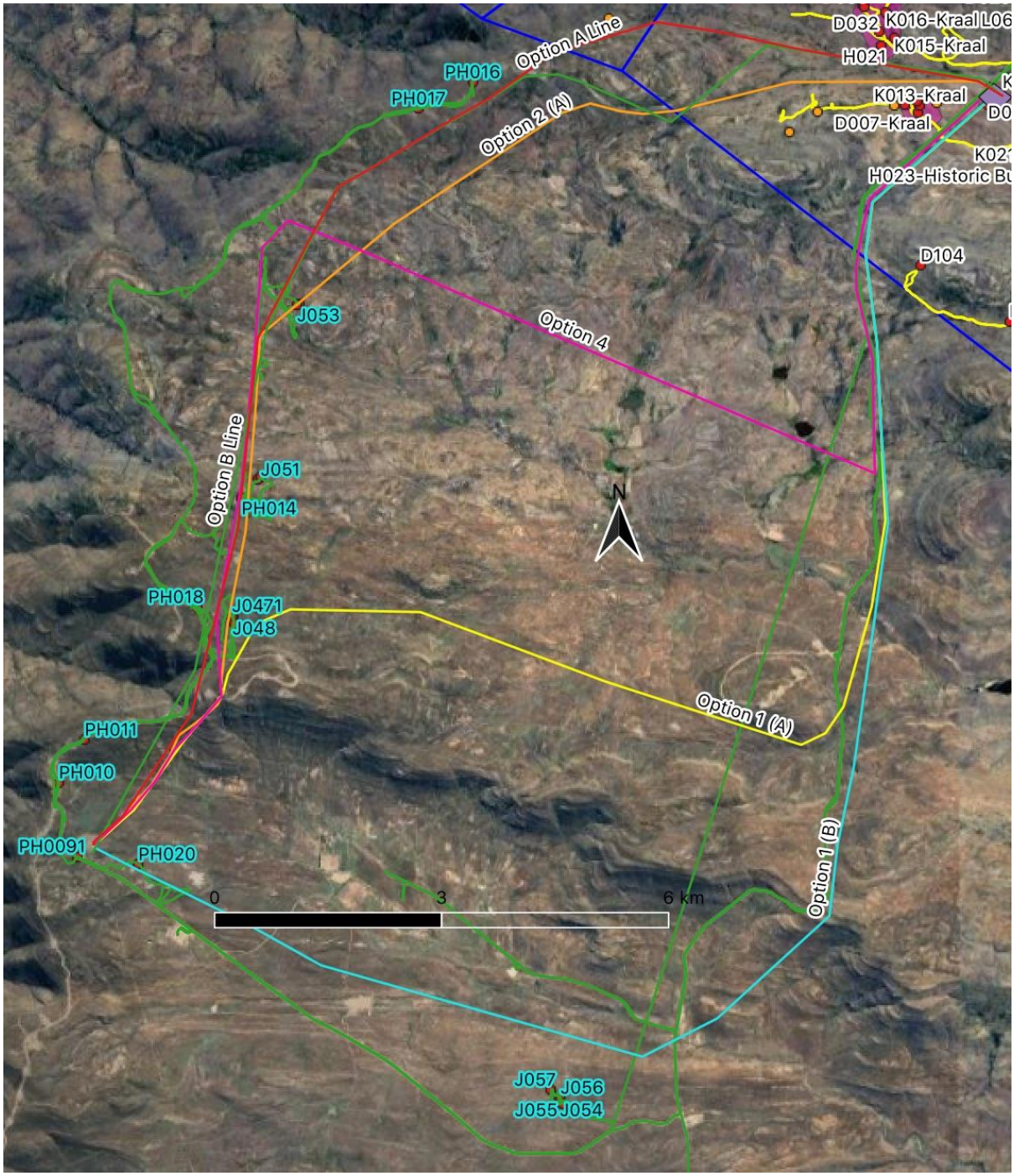

Figure 8: Sites (archaeological and built environment) located during the 2021 ACO survey of OHL Options 1(A), 1(B) and 2(A) (Source: Google Earth).

One site of note was a widespread scatter of LSA lithics eroding out of thin coversand on a flat, outcropping rocky platform (J052 & J053) adjacent to the small stream valley (Figure 8 and Plate 4). The lithics include a number of formal tools. This, and the relative scarcity of LSA material in this area adds to the significance of the site which was given a grading of IIIB. This site is directly on the Option 2(A) OHL alignment, but Option 4 and the Option A Line and Option B Line routes both avoid it.

Plate 4: View across site of LSA scatter (J052 & J053) towards the south. OHL Option 2(A), Option 4 and the Option A Line and Option B Lines run towards and converge the centre of the hills in the distance (Photo: J Gribble).

12 HISTORICAL BUILT ENVIRONMENT

Schoeman (1986) has described the early colonial era settlement of the Roggeveld and Sutherland area which commenced around 1750. The first recorded loan farms in the Roggeveld date to 1743, and by 1750 there were 31 registrations (Penn 2005).

The early farmers found the escarpment, which enjoys the highest rainfall, particularly suitable for small stock farming during the summer months but they moved down into the valleys and plains of the Karoo to escape the extreme winters. Each Trekboer usually had in addition to a loan farm on the plateaux, a farm in the Karoo known as a legplaats or leenplaas (outpost or loan farm).

Initially, the population of the area remained small, because many of the early loan farms were merely “stock posts” and the owners lived elsewhere. Drought, poor grazing and attacks by the San caused many farms to be abandoned. According to Penn (2005), in the 18th century there were numerous independent Khoekhoen kraals located amongst the Trekboer farms in the Roggeveld.

Resistance to the Trekboers in the Roggeveld came initially from the San who resisted fiercely throughout the great Karoo, at times beating back the vanguard of Trekboer farmers. In 1754, attacks from the Khoisan are reported to have increased and flocks of sheep and herds of cattle belonging to the Trekboers were driven out of the area. This increased to the extent that it is described by Schoeman (1986) as a type of guerrilla warfare. Livestock was stolen, Khoisan herders and slaves killed, and Trekboer farms attacked. The colonists fought back by establishing the Kommando system.

There was apparently a massacre of 186 San in the Roggeveld in 1765 and both Penn (2005) and Schoeman (1986) refer to mass grave on the farm Gunsfontein (to the west of Schietfontein (Scholtzenhof) - and now part of a private nature reserve), possibly dating to the rebellion of the 1770's. The Khoisan were gradually driven from the Roggeveld northward to the extent that by 1809 there is reported to have been only one settled "Bushmen" kraal left in the area.

Schoeman (1986) notes that during the early years of settlement in the Roggeveld, many of the Trekboers lived in grass huts or *matjieshuise (*mat covered houses), and in tents and some travellers found farmers living in such dwellings as late as 1839. Attempts at constructing more permanent structures were inhibited by the lack of suitable wood for roofs.

12.1 Results of Previous Assessments

Most of the heritage sites identified by (Halkett & Webley 2011; Webley & Halkett 2017c) in the vicinity of the OHL route options shown in Figure 7 above and listed in Appendices 4 and 5 were stone-built structures reflective of historical farming in the area and comprised:

- A cluster of stone structures, including kraals and the remains of a stone dwelling (D006-D007, K013-K014) near the gravel road in the south-eastern corner of the WEF site; and
- A number of stone artefacts scatters and stone structures within a north-south trending river valley near the centre of the WEF site (D005, D032-D035, K015-K016, H021-H022, L005).

These sites and structures were generally given a grade of 3B.

12.2 2021 OHL Survey Results

As is shown in Appendix 6, the fieldwork conducted by ACO Associates in August 2021 also identified a number of stone-built structures of various forms.

Two small kraals with associated structures (walls and cairns) were recorded at J0461-J050 (Figure 8 and Plate 5) approximately 35 m east of OHL Option 2(A).

Plate 5: Views of stone kraal J047 on OHL Option 2(A) looking south (left) and north (right). Note the proximity of infrastructure for the Karusa WEF (Photo: J Gribble).

A substantial stone-built farm werf complex was recorded about 650 m south of OHL Option 1(B) (Figure 8), comprising a ruined house and barn, a large kraal and two smaller kraals, a possible sheep dip and a stone lined well. Associated with this site was a rich kitchen midden containing mid-19th century artefacts, but also LSA lithics and some fragments of Khoi pottery (Plate 6).

All of the historical structures recorded by ACO Associates in 2021 were graded 3B.

Plate 6: Stone built farm complex south of south of OHL Option 1(B). Ruined house, kraal and barn (top left); barn (top right); stone lined well (middle left); selection of artefacts from the midden around the house (middle right); cobbled kraal (bottom left); and sheep dip (bottom right) (Photos: J Gribble / G Euston-Brown).

12.3 Cemeteries And Graves

The 2016 survey for the Maralla West WEF identified a stone cairn on the site of the onsite substation which could be a grave (D008) (Figure 7), although Webley & Halkett (2017c) believed this was unlikely.

No cemeteries or graves were found during the 2021 ACO OHL survey.

13 CULTURAL LANDSCAPE AND VISUAL

The concept of “cultural landscapes” finds expression in Article 1 of the World Heritage Convention 1972 where it is defined as a category of cultural heritage site which is

representative of the "combined works of nature and of man”. Although not referenced in the NHRA, a consideration of any proposed development within the context of the cultural landscape within which it is proposed has become a standard requirement of HIA’s in South Africa.

The term "cultural landscape" embraces a diversity of manifestations of the interaction between humankind and its natural environment. Cultural landscapes are thus illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (https://whc.unesco.org/en/culturallandscape/#1).

In respect of the landscape within which the OHL will be constructed, the VIA produced for the nearby Esizayo WEF (Gebhardt 2017:20) notes that the “climate of the area together with its geology, has resulted in rugged landforms with low-growing, Karoo shrub extending over an expansive, undulating landscape”. The uninhabited nature of the wide-open spaces gives a feeling of remoteness and isolation to the OHL route.

Furthermore, the land-use in the this area of the Karoo “does not significantly alter the natural visual character. The area is remote and sparsely populated. The patterns created by the winding power lines, fences and roads, with few dwellings or other man-made structures add to the sense of wilderness and isolation” (Gebhardt 2017:20).

The proposed Maralla 132 kV Transmission Integration Project will thus be constructed in an area with a largely natural, untransformed visual character – an organically evolved landscape, as defined in the *Operational Guidelines* (2008) of the World Heritage Convention. It’s construction will, as a result, alter the visual character of this rural landscape and contrast with the typical land use and historical form of human elements that are present in the landscape.

This level of contrast will, however, be reduced by the presence in the immediate surroundings of the proposed Maralla 132 kV Transmission Integration Project of a number of other WEFs and their associated power line infrastructure that are under construction, most notably the surrounding and adjacent Karusa and Soetwater WEFs.

These WEFs all form a part of the development of this area as the designated Komsberg Renewable Energy Development Zone (REDZ) and the Central Strategic Transmission (EGI) Corridor. The character of the landscape is thus changing with the turbines and associated WEF infrastructure such as OHLs introducing a more modern character to the landscape which may dominate the immediate visual landscape and cause a change to the cultural landscape.

14 SUSTAINABLE SOCIAL AND ECONOMIC BENEFITS

Section 38(3)(d) of the NHRA requires that a heritage impact assessment must “evaluate the impact of [a] development on heritage resources relative to the sustainable social and economic benefits to be derived from the development”.

Although the proposed construction of the OHL as part of the Maralla West and East WEF projects has the potential to impact heritage resources these impacts will be very limited and it is likely that the sustainable social and economic benefits accruing from the contribution this facility will make to the development of a sustainable energy supply for South Africa and the Northern Cape will outweigh any possible impacts to heritage resources. Furthermore, the preferred landowner negotiated Option A Line and Option B Line routes have been designed to reduce the impact of the powerline on the usable land of the farms it crosses.

15 IMPACT ASSESSMENT

The construction phase of the proposed 132 kV powerline will entail surface clearance for access roads and pylon footings, as well as excavations into the superficial sediment cover and possibly also into the underlying bedrock, albeit to a limited extent. The development may thus adversely affect heritage resources within its footprint.

The operational and de-commissioning phases of the transmission integration infrastructure are unlikely to involve further adverse impacts on local heritage resources and are therefore not separately assessed here.

Based on experience with WEFs currently under construction, the main source of potential impacts on heritage resources arising from grid connection projects is the construction of new access roads, especially in hilly terrain. The area of ground disturbance for 132 kV pylons is relatively modest (see Plate 7) and is unlikely to be a substantial contributing factor to heritage impacts, except if a pylon footing and a heritage site coincide.

Plate 7: Example of the extent of the disturbance footprint of a 132 kV pylon (Photo: J Gribble, Excelsior WEF grid connection).

15.1 Methodology

The following impact assessment methodology, supplied by WSP, has been applied to this HIA.

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct, indirect, secondary as well as cumulative impacts.

Direct impacts are those that arise directly from activities that form an integral part of the Project, indirect impacts arise indirectly from activities not explicitly forming part of the Project and secondary or induced impacts are caused by a change in the Project environment. Cumulative impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria presented in Table 2.

Table 2: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

15.2 Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any

ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in Figure 9 below

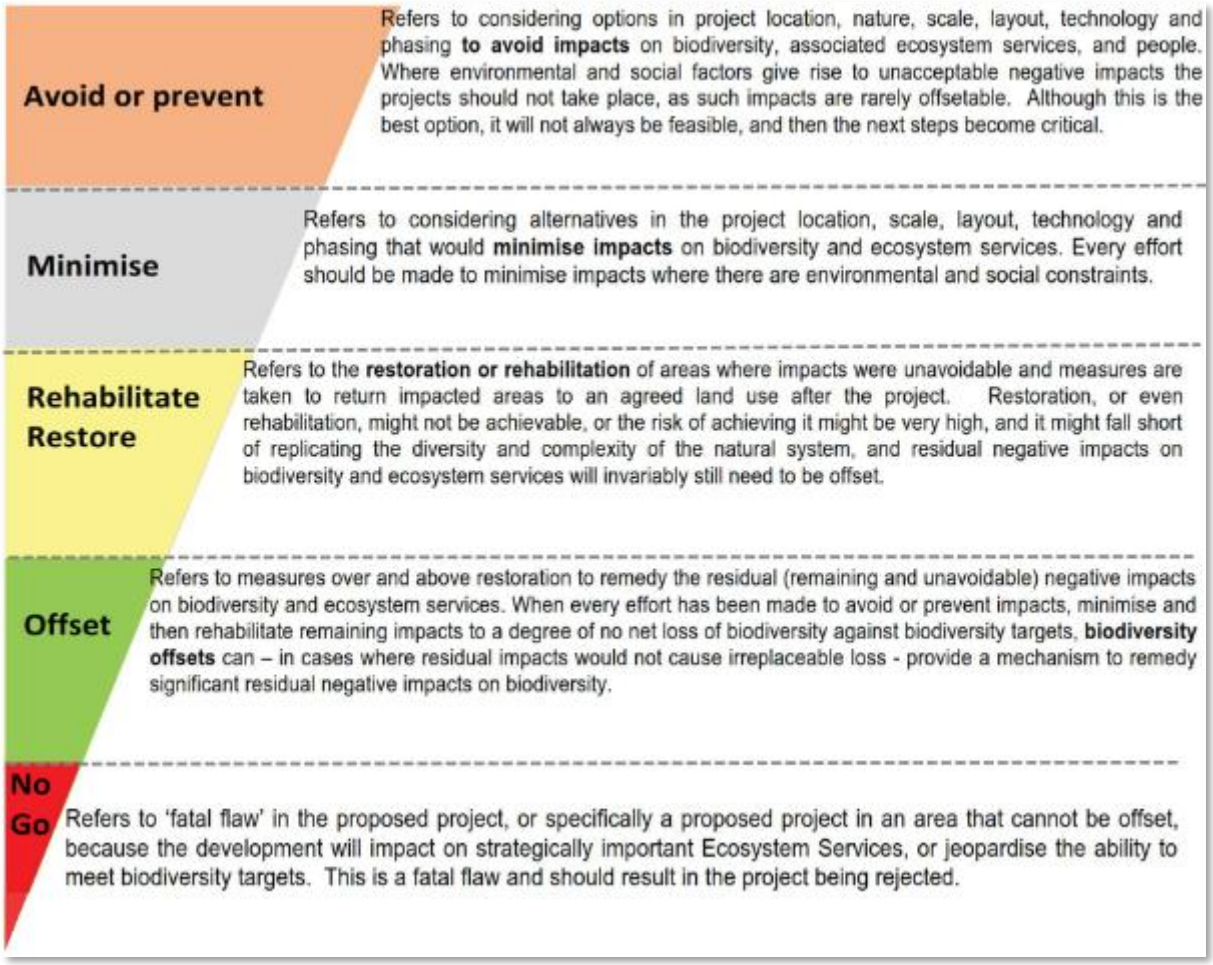

Figure 9: Mitigation Sequence/Hierarchy

15.3 Palaeontology

None of the fossil sites recorded during the field assessments for this and the surrounding renewable energy projects referred to above fall within the footprints of the OHL route options under consideration. Direct impacts on these known fossil sites are therefore not anticipated and no mitigation is recommended in regard to them.

The impact significance of the construction phase of the project is assessed as low (negative) in terms of palaeontological heritage resources. This is a consequence of the paucity of irreplaceable, unique or rare fossil remains within the project area and the extensive superficial sediment cover overlying most potentially-fossiliferous bedrocks.

This assessment applies equally to all OHL route options to the Karusa substation which are each likely to have a lower impact significance than the considerably longer authorised grid connection to the Komsberg Substation.

Impacts due to the construction of new powerline access roads will probably be greater than those attributable to excavations for pylon footings.

Significant further impacts during the operational and de-commissioning phases of the electrical infrastructure are not anticipated.

There are no preferences on palaeontological heritage grounds for any particular powerline route option among those under consideration.

The no-go alternative (*i.e.* no development) will probably have a low (neutral) impact on palaeontological heritage.

Potential impacts on palaeontological resources arising from the construction of the Maralla East and West WEF OHL are assessed as follows:

Table 3: Assessment of project impacts on palaeontological resources

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)		Low			
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent
Probability of Occurrence (P)		Low Probability			
Significance (S)	(2 + 1 + 5 + 5) x 2 = 26				
IMPACT SIGNIFICANCE RATING					
Total Score	**16 to 30**				
Environmental Significance Rating (Negative (-))	**Low**				
Environmental Significance Rating (Positive (+))	**Low**				

15.4 Archaeology

Very little archaeological material was identified on those portions of the three OHL route options (1(A), 1(B) and 2(A)) accessed in 2021. Neither Option 4 or the preferred Option A Line and Option B Line routes have been specifically subject to archaeological survey.

However, the results of the numerous archaeological assessments conducted in the Klein-Roggeveldberge serve as a good indicator of the distribution and type of archaeological sites and materials that may be expected on the OHL route options under consideration.

The nature of the local geology means that rock shelters with layered deposits are rare and archaeological material tends to be found in open contexts. Material is also generally not visible on the surface, except where exposed by the erosion of the colluvial coversands which mantle the area. Sites are often associated with watercourses and do not tend to occur on the exposed mountaintops of the area.

The material identified by this and other nearby assessments tends to comprise mainly isolated artefacts or very thin scatters of lithics, most usually dating to the MSA, and of generally low to very low archaeological significance. Should this material be damaged or destroyed during the construction of the OHL the loss to heritage will not be significant.

Where more dense occurrences of material have been recorded, such as the LSA scatter on OHL Option 2(A), these have been assigned a medium archaeological significance and damage to or the destruction of such sites during the construction of the OHL will be more significant.

Based on the above, the impact significance of the construction of the OHL on archaeological resources is assessed as low (negative).

This assessment applies to the all the OHL route options under consideration which are all likely to have a lower impact significance than the considerably longer authorised grid connection to the Komsberg substation.

Impacts due to the construction of OHL access roads will probably be greater than those attributable to excavations for pylon footings.

Significant further impacts during the operational and de-commissioning phases of the electrical infrastructure are not anticipated.

There are therefore no preferences on archaeological grounds for any particular powerline route option among those under consideration. However, both Option 2(A) and the preferred Option A Line and Option B Line routes keep to relatively high ground where archaeological sites and material are less prevalent which suggest that these route option may have a lower potential for impact.

The no-go, no development alternative will result in a low (neutral) impact on archaeological resources.

Potential impacts on archaeological heritage resources arising from the construction of the Maralla East and West WEF OHL are assessed as follows:

Table 4: Assessment of project impacts on archaeological resources

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)		Low			
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Duration (D)					Permanent
Probability of Occurrence (P)		Low Probability			
Significance (S)	(2 + 1 + 5 + 5) x 2 = 26 /				
IMPACT SIGNIFICANCE RATING					
Total Score	**16 to 30**				
Environmental Significance Rating (Negative (-))	**Low**				
Environmental Significance Rating (Positive (+))	**Low**				

15.5 Built Environment

The surveys discussed above have identified a number of historical stone structures in the vicinity of a number of the OHL options. These features have all been assessed to have moderate local value as evidence of historical land use pattern in the region and have been graded 3B.

The impact significance of the construction of the OHL on archaeological resources is assessed as moderate (negative).

The significance of potential impacts on the historical built environment features arising from the construction of the OHL are assessed as follows:

Table 5: Assessment of project impacts on the historical built environment

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)			Medium		
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent
Probability of Occurrence (P)			Probable		
Significance (S)	(3 + 1 + 5 + 5) x 3 = 42				
IMPACT SIGNIFICANCE RATING					

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Total Score	**31 to 60**				
Environmental Significance Rating (Negative (-))	**Moderate**				
Environmental Significance Rating (Positive (+))	**Moderate**				

15.6 Other Heritage Resources

No other heritage resources were identified as being at risk from impacts arising from the construction of the OHL.

15.7 Cultural Landscape and Visual

The proposed project is situated in a remote Karoo landscape of high visual value with a relatively good visual absorption capacity primarily due to the undulating nature of the topography. The area is remote and viewer numbers are low but inhabitants generally have a great affinity for the land and landscape (Gebhardt 2017).

Although the no-go option is preferred from a visual perspective, the location of the OHL options within the designated Komsberg REDZ, means that the character of the landscape has and is changing with the turbines and associated WEF infrastructure such as OHLs introducing a more modern character to it which will dominate the immediate visual landscape and cause a change to the cultural landscape.

The significance of potential visual impacts on the cultural landscape arising from the construction of the OHL are assessed as follows:

Table 6: Assessment of visual impacts of the project on heritage resources, sense of place and rural landscape

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)				High	
Impact Extent (E)		Local			
Impact Reversibility (R)	Reversible				
Impact Duration (D)				Long term	
Probability of Occurrence (P)				Highly Probability	
Significance (S)	(4 + 2 + 1 + 4) x 4 = 44				
IMPACT SIGNIFICANCE RATING					

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Total Score	**31 to 60**				
Environmental Significance Rating (Negative (-))	**Moderate**				
Environmental Significance Rating (Positive (+))	**Moderate**				

16 CUMULATIVE IMPACTS

Cumulative impacts or effects can be described as “changes to the environment that are caused by an action in combination with other past, present and future human actions”. They are the result of multiple activities whose individual direct impacts may be relatively minor but which, in combination with others result are significant environmental effects (DEAT 2004:5).

There are a number of environmental authorisations either issued or in progress within area around the proposed OHL route options, which is located within the Komsberg REDZ and is therefore considered to be located within the renewable energy hub that is intended for the Komsberg area.

In respect of potential cumulative impacts on palaeontological resources of the installation of the OHL, these are anticipated to be moderate (negative). Provided that the proposed monitoring and mitigation recommendations made for all these various projects are followed through their significance would probably fall to low (negative). These anticipated levels of change are *acceptable.*

Table 7: Assessment of cumulative impacts on palaeontological heritage

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)			Medium		
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent
Probability of Occurrence (P)			Probable		
Significance (S)	(3 + 1 + 5 + 5) x 3 = 42				
IMPACT SIGNIFICANCE RATING					
Total Score	**31 to 60**				

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Environmental Significance Rating (Negative (-))	**Moderate**				
Environmental Significance Rating (Positive (+))	**Moderate**				

Archaeological material and the historical built environment is potentially at greater risk from cumulative impacts, given its widespread occurrence and exposure across the region.

Multiple human activities in the surrounding landscape, of which the construction of the OHL is the latest, can erode the integrity of these heritage resources through their physical damage or destruction.

At an individual project level these impacts may not appear to be significant, but the cumulative effects of multiple developments on archaeological and built environment heritage resources are expected to be moderate (negative).

Both Option 2(A) and the preferred Option A Line and Option B Line routes parallel an existing OHL and service road for a Karusa powerline for much of their length and this has the potential to reduce the cumulative impacts of the OHLs on archaeological and built environment heritage resources.

The implementation of measures at individual project level can, however, do much to mitigate and reduce cumulative impacts to low (negative).

Table 8: Assessment of cumulative impacts on archaeologiocal resources

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)			Medium:		
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent
Probability of Occurrence (P)			Probable		
Significance (S)	(3 + 1 + 5 + 5) x 3 = 42				
IMPACT SIGNIFICANCE RATING					
Total Score	**31 to 60**				
Environmental Significance Rating (Negative (-))	**Moderate**				

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Environmental Significance Rating (Positive (+))	**Moderate**				

In respect of the cultural landscape and visual impacts, the proposed OHL will add to the existing power generation infrastructure in the area. Although Gebhardt (2017) points out that It is not possible to accurately estimate the significance of the cumulative impacts as not all facilities granted environmental approval will be constructed, she does indicate that it is reasonable to assume that the cumulative impact of any combination of the projects that are built within the Komsberg REDZ will have a high (negative) visual impact on the landscape.

There are not many mitigation measures that can significantly reduce the cumulative visual impact of the introduction of renewable energy projects into a rural landscape, but the consistent implementation of mitigation measures across all projects can help to reduce visual impact to some extent. Additionally the dissected nature of the topography that comprises the Komsberg REDZ breaks up views and will partially obscure developments from viewpoints.

17 PREFERRED ALTERNATIVES

By keeping to higher ground away from areas where heritage resources are more generally encountered, and by clustering infrastructure from multiple WEFs the Option A Line, Option B Line or Option 2(A) routes are preferred for the Maralla East and West WEF OHL.

18 THE NO-GO ALTERNATIVE

This assessment found no fatal flaws in the proposed project with regard to heritage resources that would require the implementation of the no-go option in respect of the proposed construction of the OHL**.**

19 PROPOSED MITIGATION MEASURES

The following measures are proposed to mitigate potential impacts on heritage resources:

Palaeontology:

Pending the potential discovery of significant new fossil remains during construction, specialist palaeontological mitigation is not recommended for this project. Almond (2021) makes the following general recommendations concerning conservation and management of palaeontological heritage resources apply. These recommendations are captured in tabular form in Chance Fossil Finds Protocol in Appendix 1).

The Environmental Control Officer (ECO) / Environmental Site Officer (ESO) responsible for the Maralla 132 kV Transmission Integration Project should be made aware of the potential occurrence of scientifically important fossil remains within the development footprint.

During the construction phase all major clearance operations (e.g. for new access roads, pylon footings) and excavations deeper than 1 m should be monitored for fossil remains on an on-going basis by the ECO / ESO.

Should significant fossil material such as vertebrate bones and teeth, or petrified logs of fossil wood be encountered at surface or exposed during construction, the ECO / ESO should safeguard these, preferably *in situ*. They should then alert SAHRA as soon as possible, (Contact: Dr Ragna Redelstorff, SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: rredelstorff@sahra.org.za). This is to ensure that appropriate action (i.e. recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the developer's expense.

These mitigation recommendations should be incorporated into the Environmental Management Programme (EMPr) for the project.

Please note that:

- All South African fossil heritage is protected by law and fossils cannot be collected, damaged or disturbed without a permit from SAHRA or the relevant Provincial Heritage Resources Agency (in this case SAHRA);
- The palaeontologist concerned with potential mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection);
- All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) and should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013).

If these mitigation measures are successfully implemented, the residual impact of the project on palaeontological resources will low.

Archaeology, the Built Environment and Cemeteries and Burials: Once the final OHL option has been selected, it is recommended that a walk-down of the route is undertaken to verify that the pylons and access road will not damage archaeological sites, element of the historical built environment or any identifiable cemeteries or graves. Micro-siting of pylons and the service road alignment may be required to ensure that significant heritage resources are not damaged.

Should any human remains be encountered at any stage during the construction or earthworks associated with the project, work in the vicinity must cease immediately, the remains must be left in situ but made secure and the project archaeologist and the archaeologist at SAHRA (Contact: Mr Phillip Hine SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: phine@sahra.org.za), must be notified immediately so that a decision can be made on how best to deal with the remains.

If these mitigation measures are successfully implemented, the residual impact of the project on these categories of heritage resources will be low.

Visual: According to the VIA, although there will be visual impacts during the construction and operational life of the OHL, these can be completely reversed after decommissioning, if all the structures are removed and the land suitably rehabilitated.

No specific mitigation measures in respect of the OHL are proposed by Gebhardt (2017) beyond the general recommendations that non-reflective paints and coatings are used on all new structures to minimise visibility and avoid reflectivity and glare, that the construction footprint is kept as small as possible to avoid unnecessary disruption to the existing vegetation and that the Establishment of vegetative screens /shelterbelts around affected homesteads should be considered in consultation with the owners.

If these mitigation measures are implemented, the residual visual impact of the project will be reduced, but according to Gebhardt will remain moderate.

20 CONCLUSION

This assessment has found that the area identified for proposed Maralla 132 kV Transmission Integration Project is a moderately sensitive heritage environment, and that, impacts on heritage resources arising from the construction of the project can be expected.

The Option A Line, Option B Line or Option 2(A) routes are the preferred OHL alignments in respect of heritage resources.

It is our considered opinion that provided the mitigation measures set out above are implemented, the overall impact and significance of the proposed OHL on heritage resources will be range from low to moderate, and the proposed activity is acceptable.

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21.1 Online Resources

Cultural Landscape Categories and Subcategories (Accessed online on 25 September 2021) https://whc.unesco.org/en/culturallandscape/#1.

National Geo-Spatial Information (Accessed online on 25 September 2021) www.ngi.gov.za

Operational Guidelines (2008) of the World Heritage Convention (Accessed online on 25 September 2021) https://whc.unesco.org/archive/opguide08-en.pdf#annex3.

South African Heritage Resources Information System (Accessed online on 25 September 2021). http://www.sahra.org.za/sahris.

SAHRA Palaeo-sensitivity Map (Accessed online on 10 February 2021) https://sahris.sahra.org.za/map/palaeo

APPENDIX 1: MARALLA WEF OHL – OPTION 4: OPINION ON VIABILITY IN RESPECT OF HERITAGE RESOURCES

(See separate PDF file)

APPENDIX 2: PALAEONTOLOGICAL IMPACT ASSESSMENT

(See separate PDF file)

APPENDIX 3: EVIDENCE OF PUBLIC PARTICIPATION – COMMENTS AND RESPONSE REPORT

(To be inserted once available)

APPENDIX 4: ARCHAEOLOGICAL SITES (AND BUILT ENVIRONMENT) IN THE VICINITY OF THE MARALLA 132 kV TRANSMISSION INTEGRATION PROJECT RECORDED DURING THE 2016 FIELD SURVEY OF THE MARALLA WEST WEF SITE

(Webley and Halkett 2017)

NCW = No research potential or other cultural significance

Site	Lat S	Lon E	Type	Description	Significance
L006	-32.73434300	20.73048603	Midden	Isolated tin can, green bottle glass on position of proposed substation	NCW
D005	-32.71847396	20.71630200	Stone kraal	Stone kraal and hut/lammerkraal close to the edge of a stream. 1x frag clear bottle glass	
D006	-32.73613103	20.72026396	Stone dwelling	Small 2 room stone dwelling with attached semi-circular stone arrangement (kookskerm?). Few artefacts except 1x small ceramic sherd (ref earthenware – no decoration), and 1x iron strip.	
D007	-32.73689303	20.72187002	Old kraal?	Denuded area in veld. Believe this is the remains of an old kraal.	
D008	-32.73606196	20.73013399	Grave?	Concentration of slabby stone in veld. Unlikely to be a grave!	

APPENDIX 5: ARCHAEOLOGICAL SITES (AND BUILT ENVIRONMENT) IN THE VICINITY OF THE MARALLA 132 kV TRANSMISSION INTEGRATION PROJECT RECORDED DURING THE 2011 FIELD SURVEY OF THE PROPOSED SUTHERLAND WEF SITE

(Halkett & Webley 2011)

NCW = No research potential or other cultural significance

Site	Lat S (dec°)	Lon E (dec°)	Type	Description	Significance
D032	-32.72874900	20.71717498	Artefact scatter	from 2011 survey	med
D033	-32.72617802	20.71522904	Isolated artefact	from 2011 survey	low
D034	-32.72630098	20.71544101	Stone quarry	from 2011 survey	low
D035	-32.72701797	20.71820897	Stone structure	from 2011 survey	Medium
H021	-32.73023704	20.71743197	Artefact scatter	from 2011 survey	low-med
H022	-32.72279802	20.71857098	Artefact scatter	Revisited the site in 2016 – few sherds of thin walled (approx. 4mm) pottery including 1x rim sherd. Grey chert and brown ccs flakes/chips, 1x core. At least 3 side scrapers and 1x MRP/scraper. Not as many potsherds as Hugo described, some of which were likely to just be local rock that resembles pottery.	med-high
K013	-32.73618199	20.72208501	Stone kraal	from 2011 survey	med
K014	-32.73572199	20.72168201	Stone dwelling	from 2011 survey	med
K015	-32.72940396	20.71898396	Stone kraal w artefacts	from 2011 survey	med
K016	-32.72684103	20.71797998	Stone kraal	from 2011 survey	med

APPENDIX 6: ARCHAEOLOGICAL SITES (AND BUILT ENVIRONMENT) RECORDED DURING THE 2021 FIELD SURVEY FOR THE MARALLA 132 kV TRANSMISSION INTEGRATION PROJECT

NCW = No research potential or other cultural significance

Site	Lat S	Lon E	Type	Description	Significance
G024	-32.759258°	20.647772°	Stone kraal	Small stone kraal in lee of rocky outcrop. Roughly 10 x 10 m in size. Behind it is a pile of rock on top of the outcrop which creates a sheltered area. To one side of the kraal are two further parallel walls. Tin can and piece of blue glass found downslope	IIIC
G025	-32.834396°	20.678468°	Stone structure – part of farm complex	5-sided stone-walled structure with cobbled floor set in mortar. Floor slopes towards a plastered channel, which in turn leads into a circular cistern about 1.5 m across. A second, larger, square stone kraal-like structure (approx. 7 x 9 m) abuts the far side of the circular cistern. Possible sheep dip and kraals?	IIIB
G026	-32.834934°	20.678937°	Stone structure – part of farm complex	Stone-lined spring-fed pond and run-off	IIIB
G027	-32.835697°	20.679676°	Artefact scatter	Small scatter of MSA lithics in lee of a rock outcrop. Hornfels. One piece with edge damage / retouch. Scatter roughly 5 m in extent	IIIC
J0461	-32.787219°	20.640568°	Stone cairn	Circular pile of rocks below a rocky outcrop. ± 3 x 3 m in extent. Roughly 2 m from stone kraal J047	IIIC
J0471	-32.787100°	20.640355°	Stone kraal	Small stone-packed kraal against a rocky shelf. Faces east. ± 3 m deep and 10 m long. Small entranceway on south side. Walls up to 60 cm high and ± 60 cm thick	IIIC
J048	-32.787284°	20.640407°	Stone structure	Possible remnant of stone walling packed against a rocky outcrop. Above J0461 and south of J0471	IIIC
J050	-32.787873°	20.640651°	Stone cairn	Stone ‘cairn’ ± 60 m south of J0471	IIIC
J0501	-32.773490°	20.643441°	Isolated artefacts	3 x CCS / fine-grained silcrete in erosion gully. MSA	NCW
J051	-32.773262°	20.643770°	Isolated artefact	Isolated MSA core in erosion gully. Patinated but raw material unclear	NCW
J052	-32.755948°	20.648362°	Artefact scatter	Thin (1 piece/m) scatter of LSA lithics. Within eroding red soil on flat outcropping bedrock. CCS and quartz. Microliths. Flakes and chips predominate but CCS core noted, 4 x thumbnail scrapers, 1 x MRP and a bladelet. Lithics visible in an area of ± 20 x 20 m but likely to extend further within coversand. Directly on OHL Option 2(A) alignment	IIIB

J053	-32.756047°	20.648073°	Artefact scatter	Extension of J052 roughly 30 m to the south-west. CCS convex scraper noted	IIIB
J054	-32.835585°	20.679287°	Stone kraal – part of farm complex	Large, square stone-walled kraal. ± 20 x 20 m in extent. Some possible stone channels in floor	IIIB
J055	-32.835580°	20.679048°	Stone dwelling – part of farm complex	Ruined two-roomed stone-walled house. Walls constructed of packed stone with a mud mortar. Historical midden material on flat rocky shelf in front of ruin. Mainly 19th century ceramics and glass (includes Annular Ware), some dark glazed stoneware, 3 x shards Chinese blue and white porcelain, 1 x pipestem. Some metal fragments including possible pieces of cast iron cooking pot. Green bottle glass. Piece of metal slag. LSA CC flake and 2 x fragments (one rim shard) of Khoi pottery	IIIB
J056	-32.835152°	20.679368°	Stone building – part of farm complex	Possible barn / stable approximately 60 m north of J055 and J056. Single room ± 6 x 6 m. Wooden lintel above south-facing doorway. Walls survive to ± 2 m height. Low stone wall enclosing an area of ± 4 x 6 m attached to building. Stock pen? Mideen material noted in area between J054/055 and J056. Includes Chinese porcelain	IIIB
J057	-32.834355°	20.678229°	Stone cairn – part of farm complex	Stone cairn / grave?	IIIB

APPENDIX 7: CURRICULUM VITAE: JOHN GRIBBLE

Name:	John Gribble
Profession:	Archaeologist (Maritime)
Date of Birth:	15 November 1965
Parent Firm:	ACO Associates cc
Position in Firm:	Senior Archaeologist
Years with Firm:	3+
Years of experience:	30
Nationality:	South African
HDI Status:	n/a

Education:

1979-1983	Wynberg Boys' High School
1986	BA (Archaeology), University of Cape Town
1987	BA (Hons) (Archaeology), University of Cape Town
1990	Master of Arts, (Archaeology) University of Cape Town

Employment:

- September 2017 – present: ACO Associates, Senior Archaeologist and Consultant
- 2014-2017: South African Heritage Resources Agency, Manager: Maritime and Underwater Cultural Heritage Unit
- 2012-2018: Sea Change Heritage Consultants Limited, Director
- 2011-2012: TUV SUD PMSS (Romsey, United Kingdom), Principal Consultant: Maritime Archaeology
- 2009-2011: EMU Limited (Southampton, United Kingdom), Principal Consultant: Maritime Archaeology
- 2005-2009: Wessex Archaeology (Salisbury, United Kingdom), Project Manager: Coastal and Marine
- 1996-2005: National Monuments Council / South African Heritage Resources Agency, Maritime Archaeologist
- 1994-1996: National Monuments Council, Professional Officer: Boland and West Coast, Western Cape Office

Professional Qualifications and Accreditation:

- Member: Association of Southern African Professional Archaeologists (ASAPA) (No. 043)
- Principal Investigator: Maritime and Colonial Archaeology, ASAPA CRM Section
- Field Director: Stone Age Archaeology, ASAPA CRM Section
- Class III Diver (Surface Supply), Department of Labour (South Africa) / UK (HSE III)

Experience:

I have more than 30 years of professional archaeological and heritage management experience. After completing my postgraduate studies and a period of freelance archaeological work in South Africa and aboard, I joined the National Monuments Council (NMC) (now the South African Heritage Resources Agency (SAHRA)) in 1994. In 1996 I become the NMC's first full-time maritime archaeologist and in this regulatory role was responsible for the management and protection of underwater cultural heritage in South Africa under the National Monuments Act, and subsequently under the National Heritage Resources Act.

In 2005 I moved to the UK to join Wessex Archaeology, one of the UK's biggest archaeological consultancies, as a project manager in its Coastal and Marine Section. In 2009 I joined Fugro EMU Limited, a marine geosurvey company to set up their maritime archaeological section. I then spent a year at TUV SUD PMSS, an international renewable energy consultancy, where I again provided maritime archaeological consultancy services to principally the offshore renewable and marine aggregate industries.

In August 2012 I established Sea Change Heritage Consultants Limited, a maritime archaeological consultancy. Sea Change traded until 2018, providing archaeological services to a range of UK maritime sectors, including marine aggregates and offshore renewable energy. Relevant experience includes specialist archaeological consultancy for more than two dozen offshore renewable energy projects and aggregate extraction licence areas in UK waters including:

- Lynn and Inner Dowsing OWF;
- Humber Gateway OWF;
- Sheringham Shoal OWF;
- Race Bank OWF;
- Docking Shoal OWF;
- Triton Knoll OWF;
- Neart na Gaoithe OWF;
- Dogger Bank OWF;
- Hornsea OWF;
- Navitus Bay OWF;
- Aggregate Area 392/393, Hilbre Swash;
- Area 478, East English Channel;
- Area 372/1, North Nab;
- Areas 401 & 2;
- Area 466, North West Rough; and

- Area 447, Cutline.

In the UK I was also involved in strategic projects which developed guidance and best practice for the UK offshore industry with respect to the marine historic environment. This included the principal authorship of two historic environment guidance documents for COWRIE and the UK renewable energy sector (*Historical Environment Guidance for the Offshore Renewable Energy Sector* (2007) and *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector* (2010)). I was also manager and lead author in the development of the archaeological elements of the first Regional Environmental Assessments for the UK marine aggregates industry, and in the 2009 *UK Continental Shelf Offshore Oil and Gas and Wind Energy Strategic Environmental Assessment* for Department of Energy and Climate Change. More recently I undertook a review of the potential impacts of marine mining on South Africa's palaeontological and archaeological heritage resources for the Council for Geoscience, on behalf of the Department of Mineral Resources. In 2013-14 I was lead author and project co-ordinator on *The UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001: An Impact Review for the United Kingdom* and in 2016 I was co-author of a Historic England / Crown Estate / British Marine Aggregate Producers Association funded review of marine historic environment best practice guidance for the UK offshore aggregate industry.

I returned to South African in mid-2014 where I was re-appointed to my earlier post at SAHRA: Manager of the Maritime and Underwater Cultural Heritage Unit. In July 2016 I was appointed as Acting Manager of SAHRA's Archaeology, Palaeontology and Meteorites Unit.

I left SAHRA in September 2017 to join ACO Associates as Senior Archaeologist and Consultant. Since being at ACO I have carried out a number of offshore impact assessments (see list of recent projects below) and authored a review of the potential impacts of marine mining on South Africa's palaeontological and archaeological heritage for the Council for Geoscience, on behalf of the Department of Mineral Resources.

I have been a member of the Association of Southern African Professional Archaeologists (No. 043) for more than twenty years and am accredited by ASAPA's Cultural Resource Management section.

I have been a member of the ICOMOS International Committee for Underwater Cultural Heritage since 2000 and served as a member of its Bureau between 2009 and 2018.

Since 2010 I have been a member of the UK's Joint Nautical Archaeology Policy Committee.

I am a member of the Advisory Board of the George Washington University / Iziko Museums of South Africa / South African Heritage Resources Agency / Smithsonian Institution 'Southern African Slave Wrecks Project' and serve on the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee.

Selected Project Reports:

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Gribble, J. 2017. *Archaeological Assessment of Bosjes Phase 2, Farm 218 Witzenberg*. Unpublished report prepared for Farmprops 53 (Pty) Ltd. ACO Associates.

Gribble, J. 2017. *Canal Precinct, V&A Waterfront: Heritage Impact Assessment*. Unpublished report prepared for Nicolas Baumann Urban Conservation and Planning. ACO Associates.

Gribble, J. 2017. *Archaeological Assessment of the proposed dam on the farm Constantia Uitsig, Erven 13029 and 13030, Cape Town*. Unpublished report prepared for SLR Consulting (South Africa) (Pty) Ltd). ACO Associates.

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