

APPENDIX 2

ARCHAEOLOGICAL IMPACT ASSESSMENT: PROPOSED CONSTRUCTION OF THE MARALLA EAST WIND ENERGY FACILITY NEAR LAINGSBURG IN THE WESTERN AND NORTHERN CAPE PROVINCES

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act No 25 of 1999)

HWC Case No: 16041211AS0418E
SAHRA Case Id: 10184

Prepared for:
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WSP/Parsons Brinckerhoff

On behalf of:
BioTherm Energy (Pty) Ltd

August 2016
Revised March 2017



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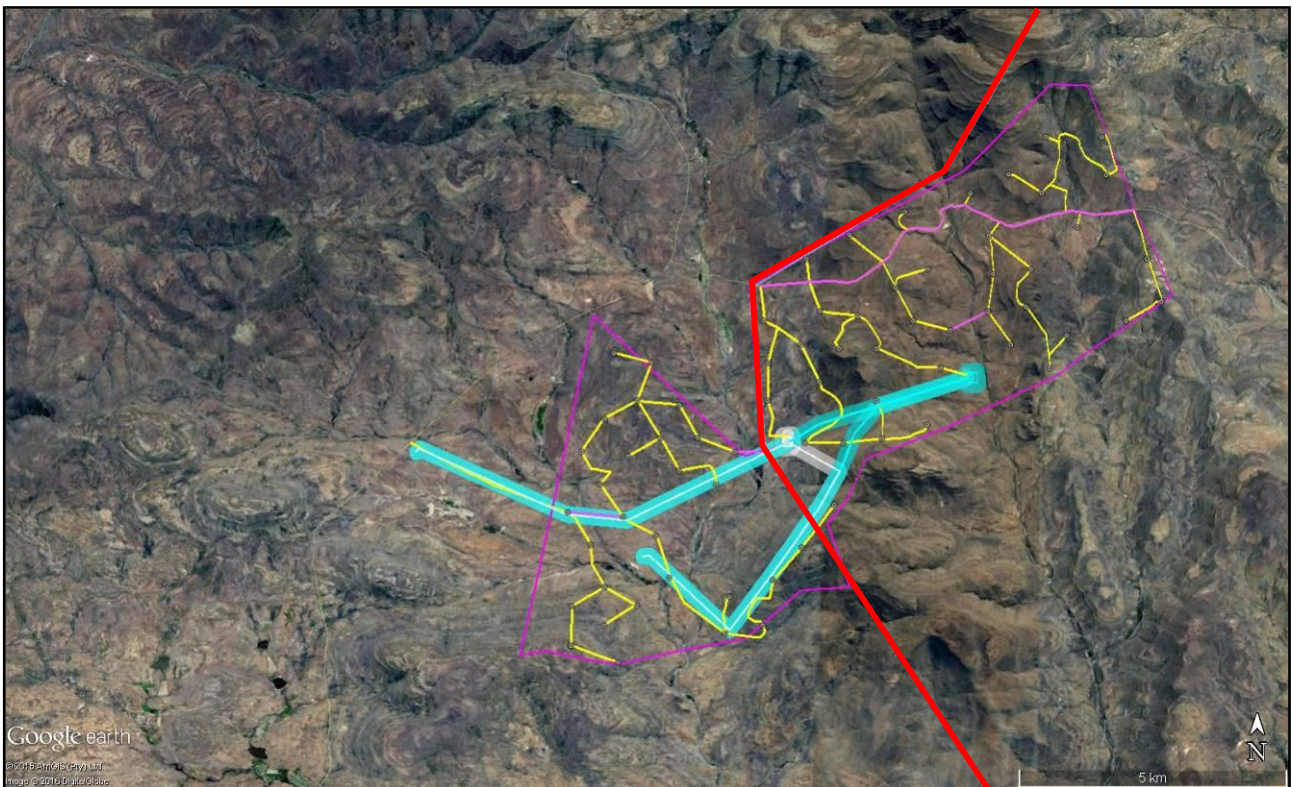
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EXECUTIVE SUMMARY

Site Name:

The Maralla East Wind Energy Facility in the Western and Northern Cape Provinces.

Location



Locality Map: The Maralla East Wind Farm is situated to 20km to the east of the R354, midway between Matjiesfontein and Sutherland. It is located predominantly within the Western Cape Province, with about a

third of the WEF inside the Northern Cape. The provincial border is shown in red, the Western Cape being to the east. The WEF spans approximately three major drainage systems.

Proposed Development

The proposed Maralla East WEF lies 46km north of the N1, 34km south of Sutherland and 20km east of the R354 which connects Matjiesfontein and Sutherland.

Biotherm Energy (Pty) Ltd initially proposed a facility of 250MW with 125 turbines, this was reduced to 70 turbines and the most recent version of the layout is for a facility of 140MW with 56 turbines.

Heritage Western Cape/South African Heritage Resources Agency

The Maralla East WEF falls inside the Western and Northern Cape Provinces. The heritage authorities responsible for providing comments (in terms of Section 38(8) of the NHRA) on the proposed development are both *Heritage Western Cape* (HWC) and SAHRA.

A NID was submitted to HWC and the BID documents were uploaded to the SAHRIS database. Both authorities have made interim comments and this report addresses the archaeological concerns.

Archaeological Resources Identified

There are at least three concentrations of archaeological (with superimposed historical) sites along the river banks on Maralla East WEF site which are of Grade IIIB or IIIA significance:

- There is a large and informal graveyard (at least 5-10 graves) on the banks of the Komsberg River in the southern portion of the farm Schalkwyskraal, associated with 19th century historic remains and a nearby stone kraal;
- Also on the Komsberg River, are the remains of a late 19th century stone stockpost, with small dwelling and extensive stone kraal complex;
- There are extensive archaeological and colonial period sites along the Venters River on the farm Welgemoed, including stone artefact scatters, rock art as well as ruined farm buildings, kraals, stockposts and graves.

There are no significant archaeological resources on the high lying ridges which will accommodate the wind turbines.

Anticipated Impacts on Archaeological Resources

Access roads and underground cabling may result in the destruction/damage of:

- A graveyard on the Komsberg River, Schalkwyskraal;
- An historic 19th century stockpost on the Komsberg River.

The proposed blue substation may result in the destruction/damage of the following sites:

- Graves and a rock art site in the Venters River, Welgemoed.

Anticipated Impacts on Cemeteries and Graves

- The construction of access roads and underground cabling (as well as on site substation and powerlines) may impact negatively on unmarked graves near historic settlements along the main river systems (Komsberg and Venters Rivers) running through the WEF.

Cumulative Impacts on Archaeology

The Maralla East WEF 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. The Visual Study (Table 11) lists the 16 applications for renewable energy facilities within a 60km radius of Maralla East WEF and their current status. Some have received environmental status, others have been withdrawn or lapsed, and others are still in the process of obtaining authorisation. The Visual Study 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.

The cumulative impacts of a number of Wind Energy facilities in this particular area – increases the probability of negative impacts to archaeological resources, despite the mitigation measures proposed in each individual AIA report. This is because:

- Surveys can never achieve a 100% cover of the area which may potentially be impacted. They sample a portion of the proposed area, and draw deductions from this. There may be significant sites (such as rock art sites or graves) which were not identified during the survey;
- Many archaeological sites (including graves) are located under the soil surface, and are only exposed once the construction work commences. It is essential that the EMPr make provision for the recovery of archaeological material which may be uncovered during construction.

Archaeological Recommendations

The following highly sensitive archaeological areas have been identified and they should be declared *no-go* areas during the construction:

- The large and informal graveyard (at least 5-10 graves) on the banks of the Komsberg River in the southern portion of the farm Schalkwykskraal, associated with 19th century historic ruins and a nearby stone kraal;
- Also on the Komsberg River, the remains of a late 19th century stone stockpost, with small dwelling and extensive stone kraal complex;
- The extensive archaeological and colonial period sites along the Venters River on the farm Welgemoed, including stone artefact scatters, rock art as well as ruined farm buildings, kraals, stockposts and graves.

The following archaeological recommendations are proposed:

- It is recommended that the EMPr includes a walk down of the sensitive river valleys in the Maralla East WEF, once the final layout of the access roads and underground cabling have been determined. Micro-siting of these infrastructural elements may be required;
- If any archaeological remains, including human remains, are uncovered during construction, then work must stop in that area and the responsible heritage authorities (SAHRA or Heritage Western Cape) must be notified.

Author/s and Dates

Lita Webley

ACO Associates cc

Archaeology

GLOSSARY

Archaeology: Remains resulting from human activity which is 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.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2500 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).

Heritage Western Cape: The compliance authority that protect heritage in the Western Cape.

Holocene: The most recent geological time period which commenced 10 000 years ago.

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 20-300 000 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.

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

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

| | |
|-------|-----------------------------------------|
| DEA | Department of Environmental Affairs |
| ESA | Early Stone Age |
| GPS | Global Positioning System |
| HIA | Heritage Impact Assessment |
| HWC | Heritage Western Cape |
| LSA | Late Stone Age |
| MSA | Middle Stone Age |
| NHRA | National Heritage Resources Act |
| SAHRA | South African Heritage Resources Agency |
| WEF | Wind Energy Facility |

Archaeologists/Heritage Specialists

Lita Webley is an archaeologist (PhD from the University of Cape Town 1992) with ACO Associates cc and has been conducting Heritage Impact Assessment and archaeological specialist studies in the Western Cape, Northern Cape and Eastern Cape Provinces since 1996. She is a member of the Archaeology, Palaeontology and Meteorites Committee and the Impact Assessment Committee of Heritage Western Cape (HWC), the Provincial Heritage Resources Authority. She is accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists (ASAPA) CRM section as follows:

- Principal Investigator: Stone Age, Shell Middens and Colonial Period; and
- Field Director: Grave Relocations.

ACO Associates cc has no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

David Halkett (BA, BA Hons, MA (UCT)) is an Archaeologist and Member of the Association of Professional Archaeologists of Southern Africa (ASAPA) and accredited with Principal Investigator status. He has been working in heritage management for 23 years and has considerable experience in impact assessments with respect to a broad range of archaeological and heritage sites in the Northern Cape.

SPECIALIST DECLARATION

I, Lita Webley, declare that –

- 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 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 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 offense in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of specialist



Specialist Field: Archaeology and Heritage

Name of Company: ACO Associates

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1 INTRODUCTION

ACO Associates cc was appointed by WSP on behalf of BioTherm Energy (Pty) Ltd to undertake an Archaeological Impact Assessment for the construction of the Maralla East Wind Energy Facility between Laingsburg and Sutherland in the Western and Northern Cape Provinces (Figure 1).

The Archaeological Impact Assessment forms one component of the Heritage Impact Assessment, the palaeontology is being assessed by Dr John Almond of Natura Viva cc while Belinda Gebhardt is assessing the Visual Impacts on the Cultural Landscape.

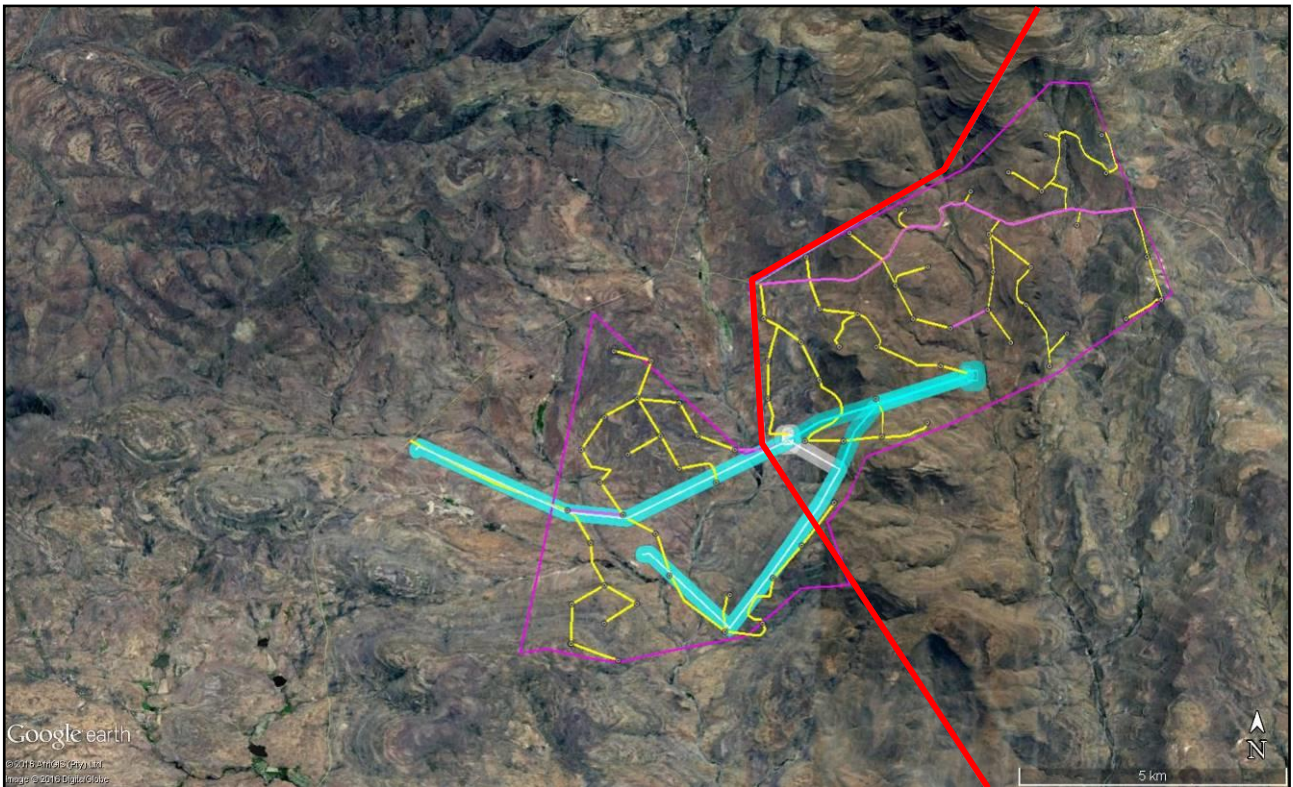


Figure 1: The Maralla East Wind Farm is situated partly in the Northern Cape (to the west of the red line) and partly in the Western Cape Province (to the east of the red line). Two alternative onsite substations have been proposed (blue and white squares), and they will connect to a powerline to the Komsberg substation. The powerline alternatives are assessed as part of a separate BAR assessment.

2 PROJECT DESCRIPTION

The proposed Maralla East WEF is situated in the Moordenaars Karoo, some 34km south of Sutherland and 20km east of the R354 (Figure 1). It falls across the border of the Western and Northern Cape in two local municipalities: the Hoogland Local Municipality under the Namakwa District Municipality and the Laingsburg Local Municipality under the Central Karoo District Municipality. The site is within the Komsberg REDZ.

It comprises the following farms:

- Remaining extent of Annex Drie Roodeheuvelds 181;
- Remaining extent of Schalkwykskraal 204;
- and a portion of Welgemoed 268

The boundary dividing Maralla West WEF from Maralla East runs through the centre of the farm Drie Roodeheuvelds 180 (**Figure 1**).

The Wind Farm will comprise:

- “Up to 56 wind turbines generators with a generating capacity of between 2 and 4MW each. The turbines will have a hub height of up to 195m and rotor diameter of up to 150m;
- Concrete foundation to support the turbines
- The medium voltage collector system will comprise of cables (1kV up to and including 33kV) that will be run underground, except where a technical assessment suggest that overhead lines are applicable, in the facility connecting the turbines to the onsite substation
- A laydown area for the temporary storage of materials during the construction activities.
- The laydown area will be a maximum of 4ha in size
- Permanent laydown for turbine crane platforms
- Haul roads between 4 – 6m wide. Double width roads required in strategic places for passing
- Temporary site compound for contractors
- Operations and maintenance compound area including O&M building, car park and storage area”

The Maralla West WEF will have a 132kV powerline connection from the Onsite IPP substation (150mx150m) to the Komsberg substation, with a 250m wide corridor. The substation and Powerline will be assessed through a separate Basic Assessment Process.

3 METHODOLOGY AND LIMITATIONS

This study has been commissioned as Archaeological Impact Assessment.

It includes a review of the published material as well as unpublished reports on the SAHRIS database. The 1:50 000 maps of the area as well as Google Earth aerial images were consulted. Numerous impact assessments have been conducted in proximity to the proposed facility as reflected on the SAHRIS database. Little was known of the study area until recently, when the area was identified as suitable for wind farm development (Komsberg REDZ). The following CRM reports provide valuable information on the heritage resources of the area and were consulted:

- The Suurplaat Wind Energy facility (Hart et al. 2010)
- The Perdekraal Wind and Solar Facility (Halkett & Webley 2011);
- 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 2015)
- The Hidden Valley Wind Energy facility (Phases 1, 2 & 3) (Booth 2012)
- The Gunstfontein Wind Energy Facility (Heritage Contracts and Archaeological Consulting 2015);
- The Komsberg Wind Energy facility (Hart 2016).

Not all these wind farms have received environmental authorisation

3.1 Assumptions

This impact assessment is based on the knowledge which has been accumulated from archaeological impact assessment undertaken in surrounding areas as well as a site visit in March 2016, and an earlier survey by Halkett & Webley (2011) to the Sutherland WEF which partly overlaps with the Maralla east WEF. It assumes that the heritage resources on Maralla East are like the surrounding areas.

3.2 Limitations

- Due to the mountainous nature of the terrain, only a small percentage of the proposed locations for the wind turbines could be assessed;
- The resolution on aerial photography (Google Earth) is not sufficiently high to identify all stone structures (including kraals), archaeological sites or graves. We are limited to our field assessment of the study area. Due to time constraints, an exhaustive field survey was not possible and various sensitive locations were sampled during this study. Many archaeological sites are probably undetected. Graves are difficult to identify, if they are not within a formal graveyard. Numerous cairns were recorded during the survey, but many more may occur. It is possible that they represent graves, but we can only be certain of this once construction uncovers them.

4 LEGISLATIVE BACKGROUND

This report is conducted in terms of Section 38 (8) of the National Heritage Resources Act, No 25 of 1999.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

4.1 Archaeology & Palaeontology (Section 35(4))

No person may, without a permit issued by HWC, destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

Archaeological is defined as: “material remains resulting from human activity which is in a state of disuse and is in or on land and which is older than 100 years, including artefacts, human and hominid remains and artificial features and structures”.

Palaeontological is defined as: “any fossilised remains or 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”.

4.2 Burial grounds and graves (Section 36(3))

No person may, without a permit issued by the South African Heritage Resources Authority (SAHRA), destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

4.3 Grading

The significance of heritage resources is assessed according to the grading criteria established by the National Heritage Resources Act, No 25 of 1999.

Table 1: Grading of Heritage Resources

| Grade | Level of significance | Description |
|--------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I | National | Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources. |
| II | Provincial | Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources. |
| IIIA | Local | Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3a heritage resources. |
| IIIB | Local | Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3b heritage resources. |
| IIIC | 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. |

The subdivision of Grade III sites has been introduced in the Western Cape to facilitate significance grading at the local level.

4.4 Heritage Authorities

The Maralla East WEF falls predominantly inside the boundaries of the Western Cape although there is a portion inside the Northern Cape. The heritage authorities responsible for providing comments (in terms of Section 38(8) of the NHRA) on the proposed development are both SAHRA and Heritage Western Cape. They are required to comment on the proposed project to facilitate final decision making by the Department of Environmental Affairs (DEA).

Both authorities have requested an archaeological impact assessment (HWC Case No: 16041211AS0418E; SAHRA Case Id: 10184) and this report is submitted in fulfilment of that requirement.

5 REGIONAL OVERVIEW

5.1 Environmental attributes

The Study Area is located some 35km south-east of Sutherland, beneath the plateaux. The local topography is dominated by the Klein Roggeveld Mountains to the west and the Komsberg Mountains to the north, with peaks ranging from 1300 to 1500masl. East of the Klein Roggeveld Mountains and north of Laingsburg is a deeply dissected region, drained by the Buffels River, which is known as the Moordenaars Karoo. The Maralla East Site is situated within this region. Many of the rivers are seasonal or dry, indicative of the arid nature of the area. The geology and topography result in a fairly mountainous to gently undulating landscape that is typical of the Karoo. Visually, the plants comprise low growing, small arid shrubs and tufted grasses, with scattered slightly taller shrubs. Clusters and rows of poplars, gums and willow trees are also found in the landscape, close to roads, homesteads, windmills and water/feeding troughs.

The predominant land use in the area is stock farming (predominantly sheep, game or goat farming). Due to the low carrying capacity, farms are large and usually at least about 10km apart. The Komsberg Wilderness Nature Reserve (private reserve) is located near the Komsberg Pass

neighbouring the Maralla East site. There are no other National Parks or conservation areas in close proximity to the proposed site.

The old road (Klein Roggeveld Road) to Sutherland including the Komsberg pass runs through the Maralla West WEF and provides access to the plateaux.



Plate 1: View in a northerly direction toward the escarpment with the wind testing mast on the farm Welgemoed 268, Maralla East WEF.

Although myriad streams are to be found on all the farms, the Venters (Plate 2) and the Komsberg Rivers are the main channels draining the Maralla East WEF. Old settlements tend to focus on the water resources and along river valleys. These areas contain numerous kraals, located near water and built against the rocky ridgelines along the valley sides.



Plate 2: The Venters River valley with the small rock shelter containing rock art, in the foreground.

5.2 Pre-colonial Archaeology

Recent surveys by heritage practitioners as well as academics from the University of Cape Town have increased our knowledge of the archaeology of the area.

There are very few Early or Middle Stone Age sites in the study area. Halkett & Webley (2011) observed Middle Stone Age (MSA) artefacts including scatters of polished/patinated stone chunks, flakes and cores, with occasional denticulation noted. Distinctive bifaces representative of the ESA was only seen on one site.

Lloyd Evans et al. (1985) excavated a small rock shelter on the grounds of the South African Astronomical Observatory in Sutherland. It contained a Later Stone Age assemblage. They commented (1985: 108) that the presence of the shell beads points to cultural ties with people along the Cape coast while the small scrapers can be assigned to the Wilton industry. Hart (2005) reported finding a dense artefact scatter associated with a shallow rock shelter while doing a survey for a golf course to the south of Sutherlands. The study indicated that archaeological sites may found in areas that were sheltered from the wind.

5.3 Colonial Period Archaeology

Schoeman (1986) has described the early 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. 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. The colonists fought back by establishing the *Kommando* system. 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.

During the South African War, the threat of Boer incursions led British forces to build fortifications at a number of strategic passes through the Roggeveld. With Manie Maritz active in the district, many young men from the Roggeveld joined the Boer cause. A stone redoubt was built at the top of the Brandkloof and Maleishoek passes. Orton & Halkett (2011) reported finding stone-walled structures relating to the South African War on the farm Jakhalsvalley 99, outside Sutherland. They related that stone-walled defensive enclosures were made by both Boer and British and it is difficult to distinguish between them, even when they are associated with historic tin cans, glass and ceramics.

6 FINDINGS

The boundary dividing the Maralla East WEF from the Maralla West WEF runs through the centre of the farm Drie Roodeheuvelds 180 (Figure 2). The Maralla East WEF consists of three farms, or portions of farms, outlined in pink on Figure 2. The proposed WEF includes at least three substantial river systems and the majority of archaeological and historical sites are found along these river systems. However, access to the high lying areas where the turbines will be placed, was difficult due to an absence of roads.

Nevertheless, Maralla East WEF has been surveyed twice, initially in 2011 by Halkett & Webley, when it formed part of the Sutherland WEF, and numerous sites have been recorded. The tracks of the 2016 survey are shown in dark blue. Archaeological sites are listed in Table 2c (2016 survey) and 2d (2011 survey) at the end of this report.

6.1 Pre-Colonial Archaeological Sites

There is a distribution of LSA archaeological material along the river banks of the Venters River on the farm Welgemoed as well as the Komsberg River on the farm Schalkwykskraal.

6.2 Rock Art Sites

Halkett & Webley (2011) recorded and illustrated a rock art site in the Venters River valley on the farm Welgemoed (Table 2c) (Maralla East WEF). It is in a rock shelter with a rock wall about 15m wide and there are many vertical finger daubs in red. There is very little associated archaeology on the shelter floor, with the exception of some ostrich eggshell fragments.



Plate 3: The rock art (finger daubs in red) in the Venters River valley.

6.3 Colonial Archaeology

The other aggregation of colonial period sites is along the Venters River on the farm Welgemoed as well as the Komsberg River on the farm Schalkwykskraal. See Table 2c for a full list of sites. There are two sites on Schalkwyksraal, the southern one including a stone kraal, a large spread of graves (represented by stone cairns, some with historic ceramics and grindstones) and while the northern one is a stock post, consisting of a stone dwelling with a cooking shelter (kookskerm) as well as a very large kraal with numerous smaller compartments, presumably used for keeping lambs.

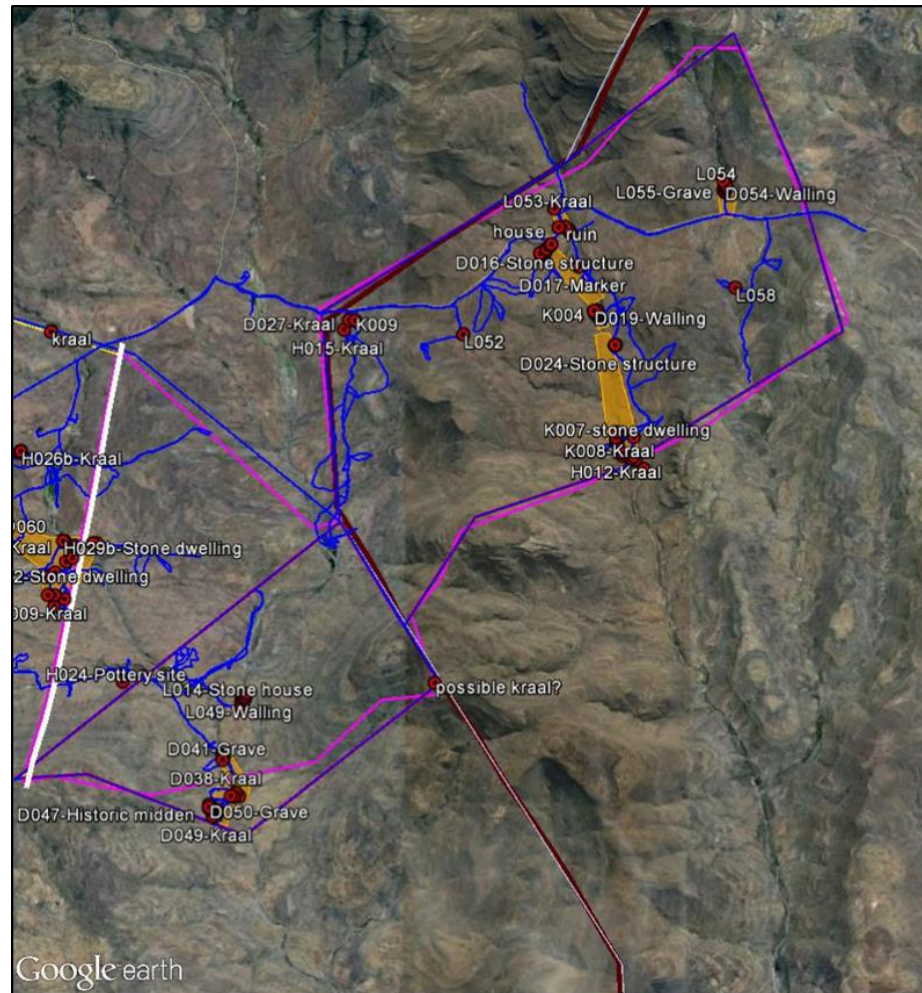


Figure 2: Maralla East WEF comprises portions of Drie Roode Heuvel 180, Schalkwykskraal 204 and the farm Welgemoed 269. The provincial boundary of the Western Cape Province is indicated in dark brown. Our survey tracks are shown in royal blue. Archaeological sites are indicated with red dots, and sensitive heritage areas are shown as orange polygons. Heritage sites are primarily concentrated along the river valleys.

6.4 Cemeteries and Graves

A large and informal graveyard (Table 2c: Site D042), comprising at least 5-10 graves, covered in flat slabs or large boulders was recorded (Halkett & Webley 2011 and this study) on the silty banks of the Komsberg River in the southern portion of the farm Schalkwykskraal. They were associated with a scatter of ceramics including oriental blue and white porcelain, 19th century refined earthenware and some fragments of Khoekhoen pottery. At least two lower grindstones were recorded in the graveyard. The presence of a large kraal nearby suggests that the graves are related to a historic settlement in this area.



Plate 4: The small stockpost on banks of a small stream, in the Brandhoek valley on the farm Welgemoed, includes a grave (L055), kraal and historic rubbish dump.

A spread of at least four graves (Table 2c: Sites D015, D019a, K005 & K006) was recorded along the banks of the Venters River on the farm Welgemoed. One of the graves is packed with a stone covering and is associated with a 19th century ceramic pipe stem.

6.5 Stockposts and stone kraals

The settlements on Drie Roode Heuvels, Schalkwykskraal and Welgemoed (Figure 2) are generally located in valleys, close to water. The kraals vary; some are rectangular or square in shape, while others are oval or round. They are generally made of dry stone walling of irregular, angular blocks. Orton (pers comm) has recorded a complex of stone kraals (Site 543) some 20km to the east of the proposed Maralla East WEF, comprising a nested series of rough stone enclosures. These are similar to the stone kraals reported from the Zeekoei Valley Project, and suggest early pastoralist activity in this area. While similar stone kraals were not recorded during the Halkett & Webley (2016) survey, identification remains difficult and requires detailed field surveys, often not possible in CRM assessments.



Plate 5: Stone, two-bedroomed structure on Schalkwykskraal.



Plate 6: A stone kraal on Welgemoed.

7 IMPACT ASSESSMENT

7.1 Construction Phase

The most significant heritage sites, both colonial settlements and archaeological sites, are located in river valleys and kloofs, and they will not be impacted by the construction of the turbines. However, impacts may occur when access roads, underground cabling or powerlines cross these river valleys/kloofs. This is where careful placement of the access roads through river valleys will be required. In this respect, the rock art site in the Venters River valley is particularly vulnerable.

With respect to cemeteries and graves, any impacts which result in a disturbance to a grave are considered high. They are best avoided by development. There is a single large graveyard on Maralla East WEF, as well as a number of scattered graves throughout the area. They are generally located in the soft soils of the river banks, close to abandoned human settlements. *All graveyard and graves must be declared "No-Go" areas.*

The following activities may result in direct impacts to the landscape and any heritage that lies on it:

- Bulldozing of roads across river valleys to the turbine sites;
- Upgrading of existing roads particularly where they cut through river valleys or are in close proximity to existing settlements (i.e. farmhouse of Welgemoed);
- Excavation of linear trenches for cables through river valleys, resulting in destruction of archaeological sites or graves on the banks of the rivers.

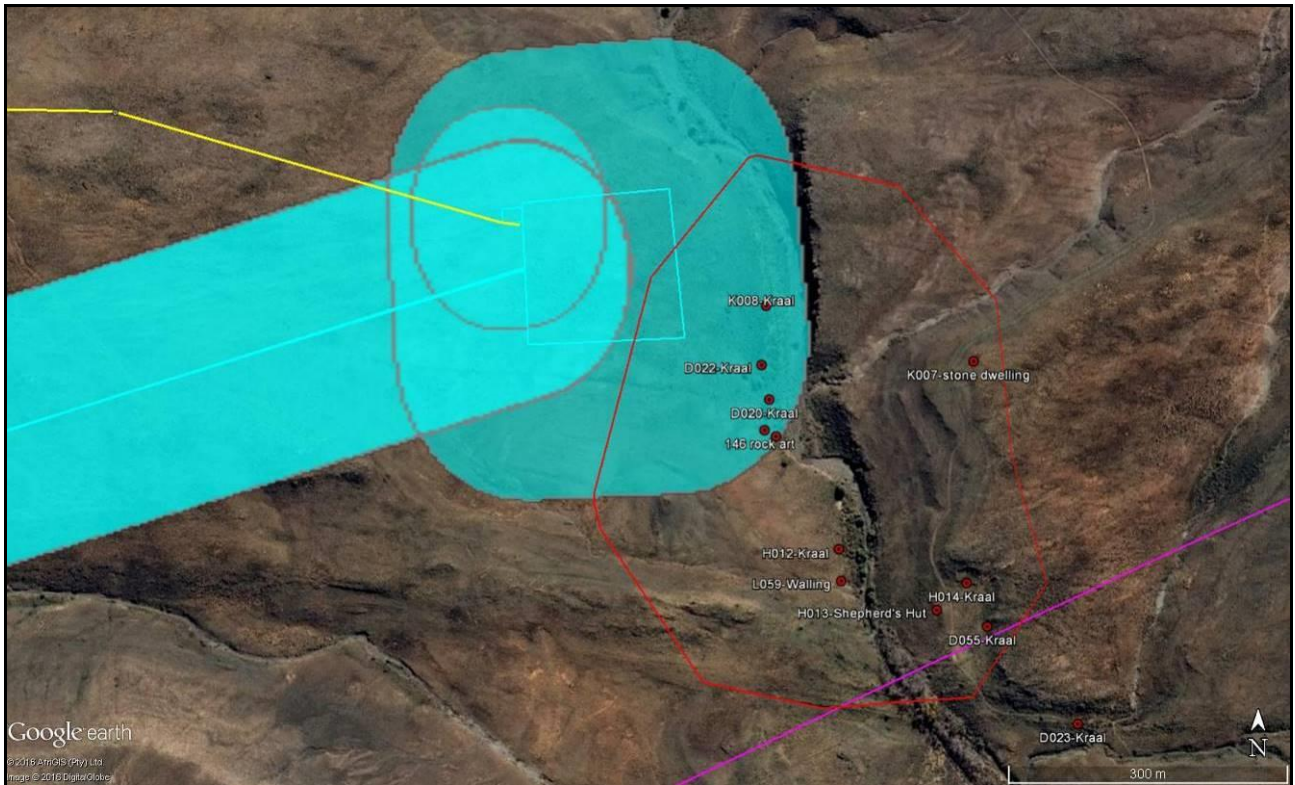


Figure 3: The blue substation, on the Venter's River, is in close proximity to a number of heritage sites including ruined stone dwellings, stone kraals and the rock art site.



Figure 4: A cluster of heritage resources (including stone structures, kraals and graves) around the farmhouse on Welgemoed on the Venters River. Note the concentration of heritage resources on the adjoining, unnamed river to the east. None of these sites will be directly impacted by turbines, but they are all located on access routes or routes of underground cabling.

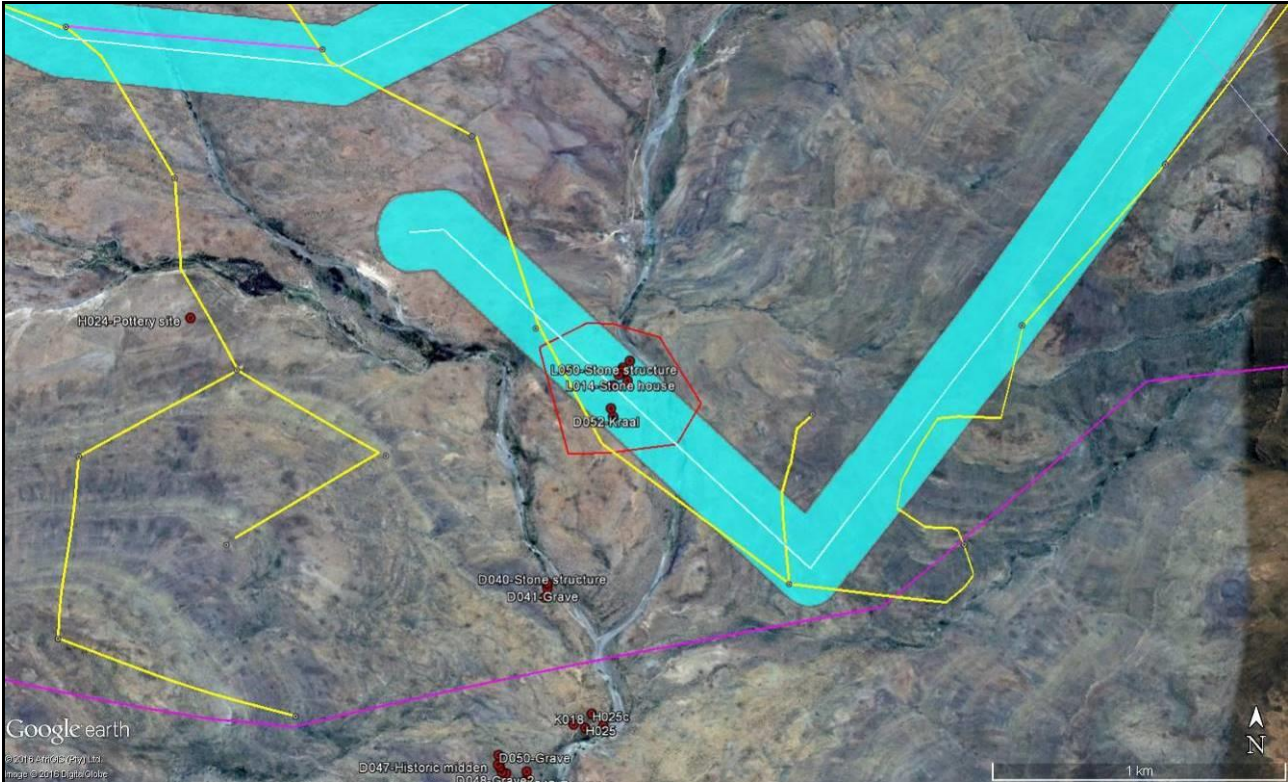


Figure 5: A concentration of heritage sites on the Komsberg River in the buffer zone of the on-site powerline.

7.2 Operational Phase

- In the case of Maralla East WEF, the proximity of the blue substation to the rock art site on the Venters River may result in damage (graffiti) during the operational life of the wind farm (Figure 3).

7.3 Impact Rating

With respect to the Maralla East WEF, the probability of the current wind farm layout encountering heritage sites is “probable” and the severity impact is likely to be “moderately severe”. In other words, mitigation (preferably avoidance of sensitive sites) is possible.

Table 3: The potential impacts of the proposed Maralla West Powerline on the heritage resources of the area.

| Nature of Impact: Damage/destruction of pre-colonial and colonial period sites as well as graves | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------|
| | Without Mitigation | With Mitigation |
| Extent | 4 | 1 |
| Duration | 5 | 1 |
| Magnitude | 8 | 2 |
| Probability | 4 | 2 |
| Significance | 68 | 8 |
| Irreplaceable loss of resources? | Yes | No |
| Can impacts be mitigated? | Yes, by avoiding sensitive areas as careful placement of access roads and underground cabling through river valleys | |
| Mitigation: If any heritage resources (particularly graves) are uncovered during construction of the WEF, then work must stop, and SAHRA (Tel: 021) must be notified. | | |
| Cumulative Impacts: Cumulative impacts on archaeology are likely to occur unless mitigation is implemented | | |
| Residual Impacts: n/a | | |

8 MITIGATION

The study has identified that the most significant heritage sites, both colonial settlements and archaeological sites, are located in river valleys and kloofs, and they will not be impacted by the construction of the turbines. However, impacts may occur when access roads, underground cabling or powerlines are constructed across these river valleys/kloofs.

- Buffers of at least 15m need to be established around graveyards and graves to ensure that they are not damaged during construction. Frequently, burials occur outside the walls of a cemetery, and a buffer ensures that they are not accidentally damaged or destroyed;
- A similar buffer needs to be implemented around the rock art site on the Ventersrivier. The blue substation, on the Venters River, is in close proximity to a number of heritage sites including ruined stone dwellings, stone kraals and a rock art site and it is recommended that the alternative substation (white) location is used;
- If any archaeological remains, including human remains, are uncovered during construction, then work must stop in that area and the responsible heritage authorities (SAHRA/Heritage Western Cape) must be notified.
- If there are any significant changes to the layout of the wind turbines, then a walk down of sensitive area on the proposed facility is recommended as part of the EMPR;

- Since heritage resources are concentrated in the river valleys, such as the Venters River and Komsberg River valleys, it is important that access roads and underground cabling is carefully placed to avoid negative impacts. This will require a final walk down during the EMP phase, of all river crossings;

9 CUMULATIVE IMPACTS

The site 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. The Visual Study (Table 11) lists the 16 applications for renewable energy facilities within a 60km radius of Maralla East WEF and their current status. Some have received environmental status, others have been withdrawn or lapsed, and others are still in the process of obtaining authorisation. The Visual Study 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.

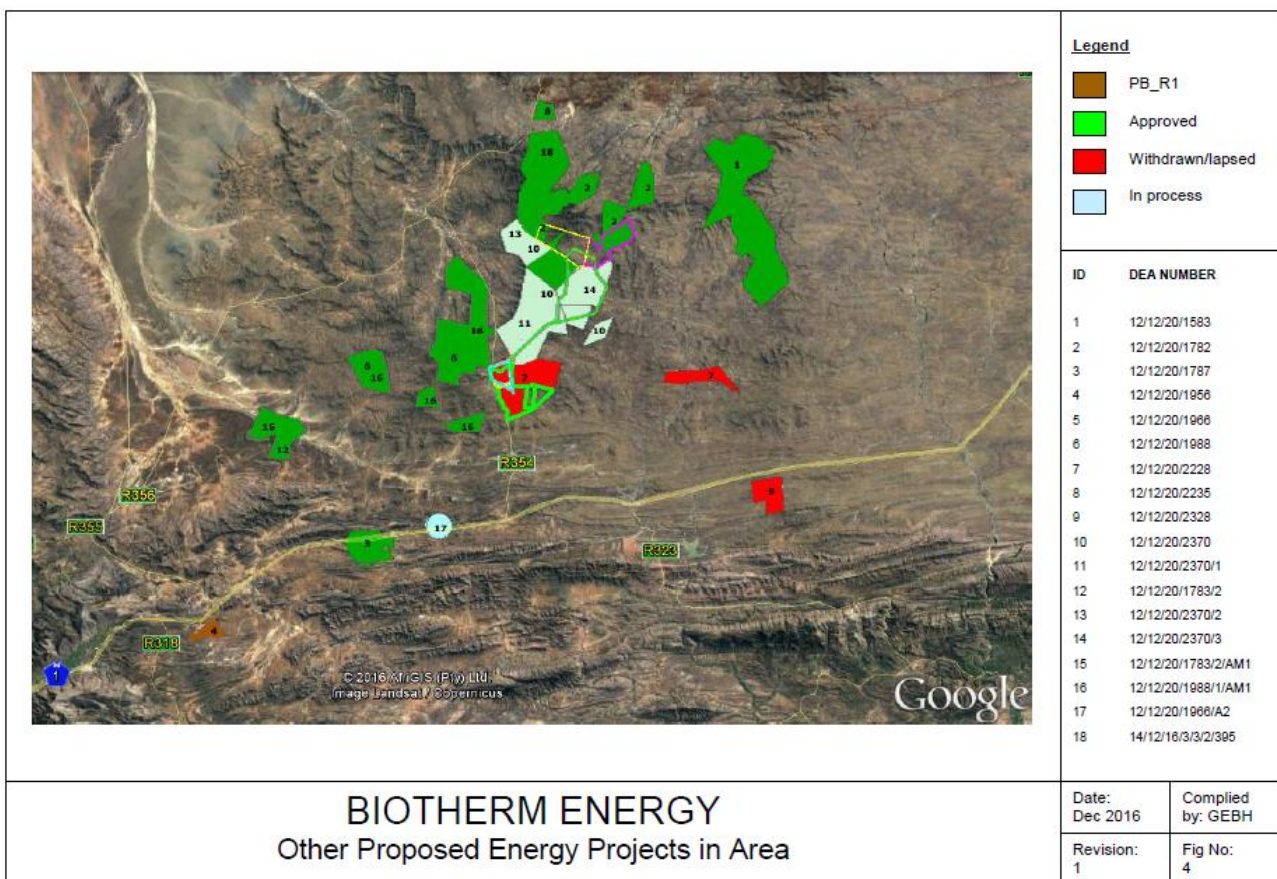


Figure 6: The location of other proposed energy projects in the area (Map by Gebhardt).

The cumulative impacts of a number of Wind Energy facilities in this particular area – increases the probability of negative impacts to archaeological resources, despite the mitigation measures proposed in each individual AIA report. This is because:

- Surveys can never achieve a 100% cover of the area which may potentially be impacted. They sample a portion of the proposed area, and draw deductions from this. There may be significant sites (such as rock art sites or graves) which were not identified during the survey;

- Many archaeological sites (including graves) are located under the soil surface, and are only exposed once the construction work commences. For this reason, it is necessary to have a robust management plan in place to ensure that significant sites are not destroyed when uncovered accidentally.

With respect the cumulative impacts on archaeological resources, the impacts of the Maralla East WEF are predicted to be medium, provided the mitigation measures are implemented.

10 CONCLUSIONS

The following highly sensitive archaeological areas have been identified and they must be declared *no-go* areas during the construction:

- A graveyard on the Komsberg River, Schalkwyskraal;
- An historic stockpost on the Komsberg River;
- Graves and a rock art site in the Venters River, Welgemoed.

10.1 Archaeological Mitigation Measures

- The proximity of the blue substation to significant archaeological resources on the Venters River may result in their destruction. It is recommended that the white substation should be used instead. Alternatively, move the blue substation at least 500m to the west to avoid sites on the Venters River (Figure 3);
- If any archaeological remains, including human remains, are uncovered during construction, then work must stop in that area and the responsible heritage authorities (SAHRA/Heritage Western Cape) must be notified.
- If there are any significant changes to the layout of the wind turbines, then a walk down of sensitive areas in the proposed facility is recommended as part of the EMPr;
- Since heritage resources are concentrated in the river valleys, such as the Venters River and Komsberg River valleys, it is important that access roads and underground cabling is carefully placed to avoid negative impacts. This will require a final walk down during the EMP phase, of all river crossings.

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Table 2c: Archaeological Sites (and Built Environment) recorded during the field survey for Maralla East WEF (NCW = No research potential or other cultural significance). Farm Drie Roodeheuvelds 180 = DRH; Annex Drie Roodeheuvelds 181 = ADRH; Wolven Hoek 182 = WH; Schalkwyskraal 204 = SWK; Welgemoed 268 = WG.

| Farm | Site | Lat S | Lon E | Type | Description | Significance |
|------|------|--------------|-------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DRH | L009 | -32.76762301 | 20.77522896 | Midden | On sandy banks of river, spread of green bottle glass, white porcelain with blue design, 1 burnished red potsherd (4mm thick and grit tempered). | |
| DRH | L010 | -32.76773399 | 20.77523399 | Grindstone | A double sided grindstone | NCW |
| DRH | L011 | -32.76774899 | 20.77521899 | Burial cairn | Stone cairn burial (on soft river bank soil), also with a frag of porcelain with blue design. | IIIB |
| DRH | L012 | -32.76739603 | 20.77521798 | Grindstone | A single sided grindstone | NCW |
| SWK | L013 | -32.75485201 | 20.77907701 | Kraal | A large square stone kraal (50mx50m), with only the lower stone left, mostly removed. It is against a stone koppie, it contains two tiny lamb kraals. With green and white glass, refined earthenware | IIIC |
| SWK | L014 | -32.75458102 | 20.77898003 | House | A stone walled house, without a roof, adjoining the kraal wall. Comprised two well-packed stone rooms, leading into a "skerm" of rougher walling. The 1 st room has a very small window, the door, leading into the second room, has a stone lintel. Associated late 19 th , early 20 th century material | IIIC |
| SWK | L047 | -32.75453903 | 20.77882103 | Stone structure | A small (3mx2m) stone structure | NCW |
| SWK | L048 | -32.75443501 | 20.77889596 | Stone structure | A very small square structure, possibly an oven (1mx1m) | NCW |
| SWK | L049 | -32.75421901 | 20.77916100 | Stone walling | A short section of stone walling, semi-circular, near the river, large rocks, maybe the back of a kraal? | NCW |
| SWK | L050 | -32.75466702 | 20.77873997 | Stone structure | Against the back wall of the large kraal, a small (1.5mx1m) stone structure (lambkraal?) | NCW |
| SWK | L051 | -32.75500104 | 20.77855197 | Stone structure | In the corner of the large kraal, a section of stone walling making a tiny triangular kraal (lambkraal?) | NCW |
| WG | L052 | -32.71370198 | 20.80916201 | Isolated stone artefact | In the small pan near T31, a very weathered hornfels flake | NCW |
| WG | L053 | -32.69957897 | 20.82143404 | Kraal | A large rectangular kraal, about 50mx50m, against a koppie, with a stone base. Walling up to 1.3m high | IIIC |
| WG | L054 | -32.69649804 | 20.84401203 | Grindstone | Grindstone on the banks of a small river | NCW |
| WG | L055 | -32.69693901 | 20.84439802 | Cairn/Burial | Raised earth mound with packed large rocks, two upright stones at one end (headstones?), one of the rocks is a grindstone. 1.5mx1.5m in size. On the edge of a river | IIIB |
| WG | L056 | -32.69728401 | 20.84445703 | Midden | A large ash heap, with widespread distribution of bone frags, glass, 3 cartridge cases, ceramics (spongeware, willow pattern & flow blue), OES, penknife blade. | IIIC |
| WG | L057 | -32.69774501 | 20.84422099 | Cairn | One upright stone, could be grave | IIIB |
| DRH | L058 | -32.70841601 | 20.84561298 | | ? | |
| DRH | L059 | -32.72734101 | 20.83037401 | Stone walling | Stone walling as the old road crossed the drift of the river | NCW |
| DRH | 12H | | | Kraal | Stone kraal (50mx30m) against the side of the hill, about 1m high. | IIIC |
| SWK | D013 | -32.76743601 | 20.77443603 | Pottery | 2x pot sherds and 2x stone flakes (1 of green chert) | |
| SWK | D014 | -32.76740198 | 20.77428197 | Grave? | Probable grave – accumulation of stones including 2x LGS on a sandy outwash fan. | |
| SWK | D047 | -32.76714499 | 20.77413403 | Historic scatter | Small scatter of sherds of refined earthenware with blue/black floral decoration. Also some light green glass and 1 x chert flake. Perhaps once associated with a grave? | |
| SWK | D048 | -32.76723300 | 20.77420402 | Grave? | Probable grave | |
| SWK | D049 | -32.76820497 | 20.77461197 | Kraal | Section of wall of a large rectangular stone kraal where it abuts the rock face close to the powerline route. | |
| SWK | D050 | -32.76684299 | 20.77415298 | Grave | Grave with associated ceramics – blue transfer print decoration on refined earthenware | |

| | | | | | | |
|-----|------|--------------|-------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------|--|
| SWK | D051 | -32.75600402 | 20.77852498 | Historic material | Iron horseshoe, tin can and base of a green moulded bottle near kraal. | |
| SWK | D052 | -32.75573504 | 20.77844300 | Stone kraal | Large rectangular stone kraal on slope abutting a rocky ridge (approx. 40x20m). | |
| WG | D053 | -32.69742399 | 20.84405998 | Stone kraal | Crude single layer stone kraal immediately adjacent to a windpump and reservoir. (approx. 3-4m diam). Two possible small lobes attached. | |
| WG | D054 | -32.69713498 | 20.84421798 | Stone walling | Semi-circular section of stone walling (not enclosed) | |
| WG | D055 | -32.72778600 | 20.83208098 | Stone kraal | Rough circular stone kraal on steepish slope up against a "koppie" some 5-6m diam (possibly Regensburg's 141.3) | |

Table 2d: Archaeological (and Built Environment) sites recorded by Halkett & Webley (2011) during their earlier survey. Farms (Drie Roode Heuvels) or De Kom - DK; Nooitgedagt - NG; Schalkwykskraal - SK; Welgemoed – WG. The shaded sites represent Maralla West WEF heritage sites.

NB: Significance Ratings reflect the ratings which were used in 2011. Since 2014, ratings as per the guidelines provided by Heritage Western Cape have been implemented.

| Farm | Site | Lat S (dec°) | Lon E (dec°) | Type | Description | Significance |
|------|-------|--------------|--------------|--------------------------------|------------------|--------------|
| WG | D015 | -32.70371 | 20.820793 | Grave? | from 2011 survey | High |
| WG | D016 | -32.703555 | 20.820985 | Stone structure with artefacts | from 2011 survey | High |
| WG | D017 | -32.706032 | 20.824617 | marker | from 2011 survey | Med |
| WG | D018 | -32.711583 | 20.827036 | Stone kraal with artefacts | from 2011 survey | Med |
| WG | D019 | -32.710988 | 20.826587 | Stone walling? | from 2011 survey | Med |
| WG | D019a | -32.711217 | 20.827155 | Grave with artefacts? | from 2011 survey | High |
| WG | D020 | -32.725549 | 20.829521 | Stone kraal | from 2011 survey | Med |
| WG | D021 | -32.725911 | 20.829601 | Rock Painting | from 2011 survey | High |
| WG | D022 | -32.725209 | 20.829429 | Kraal complex with artefacts | from 2011 survey | High |
| WG | D023 | -32.728761 | 20.833163 | stone kraal | from 2011 survey | High |
| WG | D024A | -32.71484200 | 20.82948402 | Stone structure | from 2011 survey | med |
| WG | D025 | -32.70219899 | 20.82345097 | Stone dwelling? w artefacts | from 2011 survey | high |
| WG | D026 | -32.70196103 | 20.82329197 | Grave? | from 2011 survey | high |
| WG | D027 | -32.71202099 | 20.79369899 | Kraal complex w artefacts | from 2011 survey | med- high |
| DK | D028 | -32.72580301 | 20.73945601 | stone kraal w artefacts | from 2011 survey | med |

| Farm | Site | Lat S (dec°) | Lon E (dec°) | Type | Description | Significance |
|------|-------|--------------|--------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DK | D029 | -32.72593897 | 20.73893700 | stone kraal | from 2011 survey | med |
| DK | D030 | -32.72557402 | 20.73935802 | stone kraal w artefacts | from 2011 survey | high |
| DK | D031 | -32.72556103 | 20.74164402 | graves | from 2011 survey | high |
| DK | D032 | -32.72874900 | 20.71717498 | artefact scatter | from 2011 survey | med |
| DK | D033 | -32.72617802 | 20.71522904 | isolated artefact | from 2011 survey | low |
| DK | D034 | -32.72630098 | 20.71544101 | stone quarry | from 2011 survey | low |
| DK | D035 | -32.72701797 | 20.71820897 | stone structure | from 2011 survey | Medium |
| DK | D036 | -32.74427899 | 20.73973202 | Historic building | from 2011 survey | High |
| DK | D037 | -32.75578902 | 20.74441499 | stone kraal | from 2011 survey | medium |
| SK | D038 | -32.76179197 | 20.77591301 | stone kraal w artefacts | from 2011 survey | med |
| SK | D039 | -32.76150003 | 20.77601602 | stone structure | from 2011 survey | med |
| SK | D040 | -32.76137598 | 20.77600496 | stone structure | from 2011 survey | med |
| SK | D041 | -32.76132996 | 20.77601904 | grave | from 2011 survey | high |
| SK | D042 | -32.76773499 | 20.77510499 | graves w artefacts | from 2011 survey | high |
| SK | D043 | -32.76828300 | 20.77475597 | stone kraal | from 2011 survey | med |
| SK | D044 | -32.74048300 | 20.75356099 | Graves? | from 2011 survey | High |
| SK | D045 | -32.73925899 | 20.75506202 | marker | from 2011 survey | Medium |
| SK | D046 | -32.73718203 | 20.75927502 | isolated artefact | from 2011 survey | low |
| DK | D104 | -32.75215404 | 20.72212500 | rock painting | from 2011 survey. The rock art occurs in a natural cave-like feature with a waterfall that runs through it. Possible rock painting (human figure) on the left in a small overhang. Not artefactual material nearby. | Medium-high |
| WG | H010 | -32.70451600 | 20.81970996 | marker | from 2011 survey | Medium |
| WG | H011 | -32.70459697 | 20.81946496 | marker | from 2011 survey | Medium |
| WG | H012 | -32.72702401 | 20.83034400 | stone kraal | from 2011 survey | Medium |
| WG | H013 | -32.72762700 | 20.83149500 | Stone shepherds hut | from 2011 survey | Medium |
| WG | H014 | -32.72735501 | 20.83183397 | stone kraal | from 2011 survey | Medium |
| WG | H015 | -32.71309404 | 20.79300203 | stone kraal | from 2011 survey | Medium |
| WG | H016 | -32.72504001 | 20.74123004 | stone kraal w artefacts | from 2011 survey | high |
| DK | H016b | -32.72473499 | 20.74141997 | " | from 2011 survey | " |

| Farm | Site | Lat S (dec°) | Lon E (dec°) | Type | Description | Significance |
|------|-------|--------------|--------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DK | H016c | -32.72462100 | 20.74162298 | " | from 2011 survey | " |
| DK | H016d | -32.72478998 | 20.74173898 | " | from 2011 survey | " |
| DK | H017 | -32.72408204 | 20.74141301 | stone kraal | from 2011 survey | med |
| DK | H017b | -32.72395698 | 20.74151100 | " | from 2011 survey | " |
| DK | H017c | -32.72360201 | 20.74130698 | " | from 2011 survey | " |
| DK | H017d | -32.72327897 | 20.74111302 | " | from 2011 survey | " |
| DK | H017e | -32.72333697 | 20.74074397 | " | from 2011 survey | " |
| DK | H017f | -32.72366504 | 20.74053199 | " | from 2011 survey | " |
| DK | H017g | -32.72379496 | 20.74083500 | " | from 2011 survey | " |
| DK | H018 | -32.72344401 | 20.74008096 | stone kraal | from 2011 survey | med |
| DK | H019 | -32.72321502 | 20.73985297 | stone kraal | from 2011 survey | med |
| DK | H020 | -32.72304604 | 20.73974501 | stone kraal | from 2011 survey | med |
| DK | H021 | -32.73023704 | 20.71743197 | artefact scatter | from 2011 survey | low-med |
| DK | 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/scrapper. Not as many potsherds as Hugo described, some of which were likely to just be local rock that resembles pottery. | med-high |
| DK | H023 | -32.74239499 | 20.73897103 | historic building | from 2011 survey | high |
| DK | H024 | -32.75285896 | 20.76257899 | isolated artefacts | from 2011 survey | low |
| SK | H025 | -32.76599902 | 20.77744899 | artefact scatter | from 2011 survey | Medium-high |
| SK | H025b | -32.76593397 | 20.77814402 | " | from 2011 survey | Medium-high |
| SK | H025c | -32.76553902 | 20.77770498 | " | from 2011 survey | Medium-high |
| DK | H026 | -32.72690297 | 20.74904398 | stone kraal | from 2011 survey | med |
| DK | H026b | -32.72673802 | 20.74917600 | stone kraal | from 2011 survey | med |
| DK | H026c | -32.72688403 | 20.74919997 | stone kraal | from 2011 survey | med |
| DK | H027 | -32.74229701 | 20.74234801 | stone dwelling w artefacts | from 2011 survey | med |
| DK | H028 | -32.73743601 | 20.75623599 | stone dwelling | from 2011 survey | med |
| DK | H029 | -32.73697601 | 20.75492397 | stone kraal w artefacts | from 2011 survey | med |

| Farm | Site | Lat S (dec°) | Lon E (dec°) | Type | Description | Significance |
|------|-------|--------------|--------------|----------------------------|------------------|--------------|
| DK | H029b | -32.73688699 | 20.75469296 | stone dwelling | from 2011 survey | med |
| | house | -32.70168099 | 20.82197199 | | from 2011 survey | |
| WG | K001 | -32.70411702 | 20.82035797 | stone kraal | from 2011 survey | med |
| WG | K002 | -32.70463804 | 20.82001297 | stone kraal | from 2011 survey | med |
| WG | K003 | -32.71125999 | 20.82674196 | stone kraal | from 2011 survey | med |
| WG | K004 | -32.71097300 | 20.82701999 | artefact scatter | from 2011 survey | high |
| WG | K005 | -32.71132001 | 20.82705896 | Grave? | from 2011 survey | high |
| WG | K006 | -32.71133400 | 20.82702996 | Grave? | from 2011 survey | high |
| WG | K007 | -32.72517404 | 20.83187403 | stone shepherds hut | from 2011 survey | med |
| WG | K008 | -32.72462997 | 20.82947999 | stone kraal w artefacts | from 2011 survey | med |
| WG | K009 | -32.71208603 | 20.79454598 | stone kraal w artefacts | from 2011 survey | med |
| DK | K010 | -32.72545299 | 20.74082896 | Stone feature w artefacts | from 2011 survey | med |
| DK | K011 | -32.72283096 | 20.73864900 | marker | from 2011 survey | med |
| DK | K012 | -32.72160301 | 20.74157001 | marker | from 2011 survey | med |
| DK | K013 | -32.73618199 | 20.72208501 | stone kraal | from 2011 survey | med |
| DK | K014 | -32.73572199 | 20.72168201 | stone dwelling | from 2011 survey | med |
| DK | K015 | -32.72940396 | 20.71898396 | stone kraal w artefacts | from 2011 survey | med |
| DK | K016 | -32.72684103 | 20.71797998 | stone kraal | from 2011 survey | med |
| DK | K017 | -32.75774603 | 20.73267697 | marker | from 2011 survey | med |
| SK | K018 | -32.76588896 | 20.77701104 | artefact scatter | from 2011 survey | med |
| DK | K019 | -32.73459203 | 20.74483702 | marker | from 2011 survey | low |
| DK | K020 | -32.73463301 | 20.74471498 | marker | from 2011 survey | low |
| DK | K021 | -32.74184396 | 20.74136599 | Graveyard | from 2011 survey | high |
| DK | K022 | -32.73881097 | 20.75593801 | stone dwelling w artefacts | from 2011 survey | med |
| DK | K023 | -32.73717298 | 20.75868803 | isolated artefacts | from 2011 survey | low |