

A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED POWERLINE ALTERNATIVES AND SUBSTATIONS FOR THE BRANDVALLEY WIND ENERGY FACILITY (WEF) SITUATED IN THE KAROO HOOGLAND LOCAL MUNICIPALITY (NAMAKWA DISTRICT MUNICIPALITY), THE WITZENBURG LOCAL MUNICIPALITY (CAPE WINELANDS DISTRICT MUNICIPALITY) AND LAINGSBURG LOCAL MUNICIPALITY (CENTRAL KAROO DISTRICT MUNICIPALITY).

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Date: April 2016

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A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED POWERLINE ALTERNATIVES AND SUBSTATIONS FOR THE BRANDVALLEY WIND ENERGY FACILITY (WEF) SITUATED IN THE KAROO HOOGLAND LOCAL MUNICIPALITY (NAMAKWA DISTRICT MUNICIPALITY), THE WITZENBURG LOCAL MUNICIPALITY (CAPE WINELANDS DISTRICT MUNICIPALITY) AND LAINGSBURG LOCAL MUNICIPALITY (CENTRAL KAROO DISTRICT MUNICIPALITY).

NOTE: The phase 1 archaeological impact assessment was conducted as a requirement of the National Heritage Resources Act 25 of 1999, Section 38 (1)(c)(i):

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as –

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (c) any development or other activity which will change the character of the site –
 - (i) exceeding 5000 m² in extent

This report follows the minimum standard guidelines required by Heritage Western Cape and the South African Heritage Resources Agency (SAHRA) for compiling a Phase 1 Archaeological Impact Assessment (AIA).

EXECUTIVE SUMMARY

Purpose of the Study

The purpose of the study was to conduct a phase 1 archaeological impact assessment (AIA) including the built environment and other cultural heritage resources for the proposed power line alternatives and substation options for the Brandvalley Wind Energy Facility (WEF) situated in the Karoo Hoogland Local Municipality (Namakwa District Municipality), the Witzenburg Local Municipality (Cape Winelands District Municipality) and Laingsburg Local Municipality (Central Karoo District Municipality).

The survey was conducted to establish the range and importance of the exposed and *in situ* archaeological heritage material remains, sites and features; to establish the potential impact of the development; and to make recommendations to minimize possible damage to the archaeological heritage. The assessment will inform the Basic Assessment process for the proposed Brandvalley wind farm electrical infrastructure to ensure that negative impacts are mitigated if avoidance is not possible and to enhance any positive impacts.

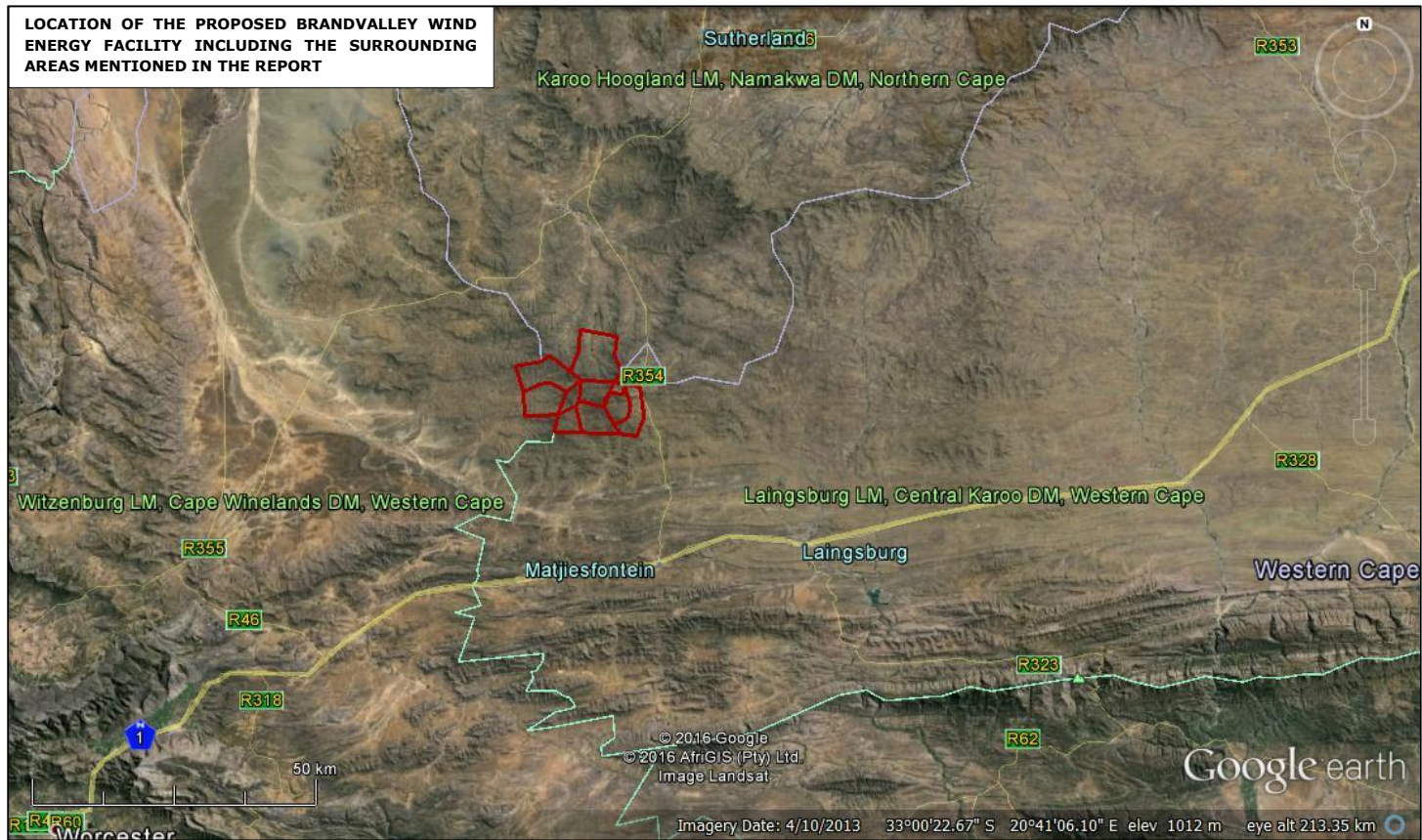


Figure 1: Aerial view showing the location of the proposed Brandvalley Wind Energy Facility including the surrounding areas mentioned in the report

Brief Summary of Findings

It must be noted that the layout for the final power line alternatives were not finalised by the time of the survey conducted for the Brandvalley Wind Energy Facility and associated infrastructure and access roads, therefore the brief summary of findings is a generalised summary observed during the survey of the WEF. Heritage resources located nearby, within 200 m, of the proposed powerline route have been identified and included in this report. It must be emphasized that once the final layout for the power lines has been confirmed an archaeological heritage walk-through must be conducted to determine the positioning of the pylons and make further recommendations.

The assumption of the field study was to locate very little precolonial archaeological heritage material and several historical features and associated artefacts. This assumption arose from previous studies conducted on parts of site and proximity (ACO Associates 2011, 2013, 2014), and from the author's experience in conducting studies for the Hidden Valley (now Karusa, Soetwater and the Great Karoo) WEFs (Booth 2010, 2011, 2015).

As assumed the area held several of historical features (stone walling kraals and cottages) some with associated historical artefacts situated along the access roads in the valleys and associated with the homestead settlements. The area, however, also held evidence of both Middle and Later Stone Age stone artefacts alongside water courses and on the flat floodplains. The heritage resources encountered are briefly explained below:

- **Precolonial / Stone Age material (BVPL_SA1 – BVPL_SA3)**

Both Later Stone Age and Middle Stone Age stone artefact scatters were identified mainly on the flat floodplains up to the foot of the mountains as well as within the valleys along water courses. The artefacts were manufactured from fine-grained chalcedony material as well as hornfels and local shale raw materials.

No other cultural or organic archaeological heritage materials were assumed to be directly related or associated with the stone artefact scatters. In several instances stone artefacts would occur within the same vicinity as historical built environment structures, stone walling features as well as historical artefact scatters, similarly situated on the flat floodplains and within the valleys close to water courses.

- **Stone Walling Features (BVPL_SW1 - BV_SW2)**

Up to three (3) stone walling features were documented along the on the flat floodplains and in the valleys. These features include historical stone packed dwellings / cottages as well as kraals and pens. Historical artefacts were also located within the vicinity of some of the stone packed dwellings and kraals.

- **Built Environment Structures (BVPL_BE1 – BV_BE2)**

These exclude structures that have been constructed by the historical stone packing method. The structures may be younger than 60 years and with very little or no heritage significance. These include abandoned buildings, used and unused reservoirs and drinking troughs. These structures occur across the landscape along the existing access roads of Brandvalley WEF.

The farm houses and associated buildings situated on the homestead / farm complex have been outlined and as a whole are considered as homesteads (described below).

- **Homesteads / Farmhouse Complexes (BVPL_HS1 – BV_HS4)**

Four homesteads / farm complexes were identified and demarcated where the proposed powerline routes will pass. These have been demarcated purely for ease of reference, description and mitigation measures. Most of these homesteads / farm complexes include historically stone packed features including kraals and dwellings as well as nineteenth century farmhouses, modern buildings and typically historical graveyards. These earlier buildings and features have most likely been modified over time for maintenance purposes for continued and contemporary occupation. The homesteads are situated either adjacent to the proposed access roads or in some cases the proposed internal access roads are expected to go through the homesteads.

These homesteads include the farm house and associated staff accommodation, outbuildings and stone walling features and built environment structures.

BVPL_HS3 and BVPL_HS4 have been merely highlighted to show the location of the homesteads and do not occur nearby, within 200 m, the proposed powerline routes.

Recommendations

According to heritage resources located nearby, but not within the direct the path of the proposed powerline alternatives, a medium - high heritage significance has been allocated. The following recommendations are summarised, see Section 9 for full and detailed recommendations with regards to the development of the substations and powerlines the conservation and preservation of the archaeological, historical, and other heritage resources documented within the project area

- This report must be submitted to Heritage Western Cape (HWC), the heritage authority for any Western Cape developments, and as a commenting authority in terms of the National Heritage Resources Act 25 of 1999, Section 38.
- This report must be submitted to the South African Heritage Resources Agency (SAHRA) to comment on the portion of the proposed development that occurs within the Northern Cape Province. Nine proposed turbines are situated on the

Farm Rietfontein 197 in the Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province. No archaeological or other heritage resources were documented within this area. No further studies or mitigation is required.

- The Substation 1 (SS1) alternative is the preferred alternative situated south of the internal access road on the Farm Fortuin 74 is the preferred alternative for the establishment of the substation.
- The preferred alternative for the proposed powerline routes falls under the Substation 1 alternative and includes the: BV_SS1 – central switching station and the BV SS1 – Komsberg powerline alternatives.
- An archaeological heritage walk-through survey of the final layout of the power lines must be conducted to assess the changes where further recommendations and mitigatory measures may be made if necessary.

Declaration of Independence and Qualifications

This section confirms a declaration of independence that the archaeological heritage specialist, Ms Celeste Booth, has no financial or any other personal interests in the project for a phase 1 archaeological impact assessment (AIA) for the proposed power line alternatives and substation options for the Brandvalley Wind Energy Facility (WEF) situated in the Karoo Hoogland Local Municipality, Namakwa District Municipality and the Witzenburg Local Municipality and Laingsburg Local Municipality, Cape Winelands and Central Karoo District Municipalities. Ms Celeste Booth was appointed on a strictly professional basis to conduct a Phase 1 Archaeological Impact Assessment in line with the South African national heritage legislation, the National Heritage Resources Act 25 of 1999 (NHRA 25 of 1999) and in response to the recommendations provided by the Department of Environmental Affairs and according to the relevant environmental impact assessment regulations.

Ms Celeste Booth (BSc Honours: Archaeology) is an archaeologist who has had eight and a half years of full time Cultural Resource Management in the Eastern Cape and sections of the Northern Cape and Western Cape. Ms Booth has conducted several Archaeological Desktop Studies and Phase 1 Archaeological Impact Assessments within the Eastern Cape and in the Karoo region across the Eastern Cape, Northern Cape and Western Cape.

1. INTRODUCTION

1.1. Background Information (extract from the Environmental Scoping Report, EOH Coastal and Environmental Services, 2016)

Brandvalley Wind Farm (Pty) Ltd, propose to develop a 132kV above-ground electricity distribution line, in order to evacuate up to 140 megawatt (MW) energy from the

Brandvalley Wind Energy Facility (WEF) near Laingsburg, bordering and adjacent to the Northern and Western Cape Province, South Africa to the national grid.

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The electrical distribution infrastructure related to this Basic Assessment process is:

- High voltage components of the 33/132kV onsite substation including transformers, isolators, cabling, light mast and other as required by Eskom. The onsite substation would have a footprint of up to 200m x 200m that would also house site offices, storage areas, ablution facilities and the maintenance building.
- 132kV above-ground distribution line to connect the onsite 33/132kV substation to the grid. The pylons for this line will have an average spacing of 250m to 300m.
- Connection to the national grid in order to connect the wind farm. There are three options being considered and the preferred option will be informed by environmental, technical considerations and Eskom's preference:
 - The existing 400kV Komsberg substation with several electrical components to be defined by Eskom (e.g. additional feeder bay, transformer bay) on the existing substation property or
 - The Bon Espirange satellite 132kV substation, upgrading with several electrical components. The Bon Espirange satellite substation will be established by Eskom and other IPPs as an alternative to connecting all wind farms west of Komsberg directly to the Eskom Komsberg Substation.
 - Construction of a central switching station (up to 200m x 200m) to be shared by both Brandvalley and Rietkloof if both are awarded preferred bidders. If the central hub or switching station option is ultimately selected by Eskom, each project will build their own 33/132kV substation and connect to the central station. From there one 132kV line for both projects will lead to either the Komsberg or Bon Espirange substation.

Brandvalley Alternatives

Various alternatives are being considered to 1) step up the voltage from 33kV to 132kV (onsite 33/132kV substations), 2) to distribute the 132kV electricity to the grid (overhead distribution line) and 3) various grid connection options.

There are three potential grid connection options being considered:

- Komsberg's existing 400kV substation
- Bon Espirange satellite substation that will be constructed as an alternative for all wind farms connecting from the West of Komsberg
- Rietkloof and Brandvalley Central Hub switching station in case both projects Rietkloof and Brandvalley get awarded preferred bidder at the same time. This option would be an opportunity to share infrastructure and reduce the project footprint. From the switching station there will be one shared 132kV line to either Komsberg or Bon Espirange substation

All three grid connection options above have different sub-alternatives for line routings to connect to the four potential onsite 33/132kV substations as indicated below.

- Substation alternative 1 to:
 - Brandvalley and Rietkloof shared central switching station via one 132kV overhead distribution line from substation 1 (referred to as alternative BV SS1- central switching station)
 - Eskom Komsberg substation via one 132kV overhead distribution line from substation 1 (referred to as alternative BV SS1-Komsberg)
 - Bon Espirange Substation via one 132kV overhead distribution line from substation 1 (referred to as alternative BV SS1- Bon Espirange)
- Substation alternative 2 to:
 - Brandvalley and Rietkloof shared central switching station via one 132kV overhead distribution line from substation 2 (referred to as alternative BV SS2- central switching station)
 - Eskom Komsberg substation via one 132kV overhead distribution line from substation 2 (referred to as alternative BV SS2-Komsberg)
 - Bon Espirange Substation via one 132kV overhead distribution line from substation 2 (referred to as alternative BV SS2- Bon Espirange)
- Substation alternative 3 to:
 - Brandvalley and Rietkloof shared central switching station via one 132kV overhead distribution line from substation 3 (referred to as alternative BV SS3- central switching station)
 - Eskom Komsberg substation via one 132kV overhead distribution line from substation 3 (referred to as alternative BV SS3-Komsberg)
 - Bon Espirange Substation via one 132kV overhead distribution line from substation 3 (referred to as alternative BV SS3- Bon Espirange)
- Substation alternative 4 to:
 - Brandvalley and Rietkloof shared central switching station via one 132kV overhead distribution line from substation 4 (referred to as alternative BV SS4- central switching station)
 - Eskom Komsberg substation via one 132kV overhead distribution line from substation 4 (referred to as alternative BV SS4-Komsberg)
 - Bon Espirange Substation via one 132kV overhead distribution line from substation 4 (referred to as alternative BV SS4- Bon Espirange)

Each of these distribution line alternatives will be buffered by 100m (i.e. 200m in total) in order to allow for micro-siting. Although numerous alternatives are considered, only one 33/132kV substation and one 132kV overhead power line will be built to connect to one grid connection option per project.

1.2. Applicant

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1.3. Consultant

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1.4. Terms of reference

The purpose of the study was to conduct a phase 1 archaeological impact assessment (AIA) the proposed power line alternatives and substation options for the Brandvalley Wind Energy Facility (WEF) situated in the Karoo Hoogland Local Municipality, Namakwa District Municipality and the Witzenburg Local Municipality and Laingsburg Local Municipality, Cape Winelands and Central Karoo District Municipalities.

- Determine the likelihood of heritage or archaeological remains of significance being present on the proposed site;
- Identify and map (where applicable) the location of any significant heritage or archaeological remains and comment on the potential for the proposed project to impact these;
- Assess the sensitivity and significance of heritage and archaeological remains in the site;
- Identify mitigatory measures to protect and maintain any valuable heritage or archaeological sites and remains that may exist within the proposed site; and
- Determine which power line alternatives are not feasible, which lines are possible, and which lines are preferred in terms of the heritage component.

2. HERITAGE LEGISLATIVE REQUIREMENTS

Parts of sections 3(1)(2)(3), 34(1), 35(4), 36(3) and 38(1)(8) of the National Heritage Resources Act 25 of 1999 apply:

S3. National estate

3. (1) For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future

generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.

3. (2) Without limiting the generality of subsection (1), the national estate may include –

- (a) places, buildings, structures and equipment of cultural significance;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features of cultural significance;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and palaeontological sites;
- (g) graves and burial grounds, including –
 - (i) ancestral graves;
 - (ii) royal graves and graves of traditional leaders;
 - (iii) graves and victims of conflict;
 - (iv) graves of individuals designated by the Minister by notice in the Gazette;
 - (v) historical graves and cemeteries; and
 - (vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- (h) sites of significance relating to the history of slavery in South Africa;
- (i) movable objects, including –
 - (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological specimens;
 - (ii) objects to which oral traditions are attached or which are associated with living heritage;
 - (iii) ethnographic art and objects;
 - (iv) military objects;
 - (v) objects of decorative or fine art;
 - (vi) objects of scientific or technological interest; and
 - (vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act (Act No. 43 of 1996).

3. (3) Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of –

- (a) its importance in the community, or pattern of South Africa's history;
- (b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- (c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- (d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- (e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;

- (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- (g) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- (i) sites of significance relating to the history of slavery in South Africa.

S34. Structures

34. (1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

S35. Archaeology, palaeontology and meteorites

35 (4) No person may, without a permit issued by the responsible heritage resources authority—

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

S36. Burial grounds and graves

36. (3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, 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; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

S38. Heritage resources management

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as –

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (b) the construction of a bridge or similar structure exceeding 50 m in length;
- (c) any development or other activity which will change the character of the site –
 - (i) exceeding 5 000 m² in extent, or
 - (ii) involving three or more erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA, or a provincial resources authority;
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must as the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

3. ARCHAEOLOGICAL BACKGROUND (Literature Review)

Little systematic archaeological research has been conducted within this region bordering the Northern Cape and Western Cape Provinces, therefore, little is known about the archaeology of the immediate area proposed for the substations and powerline alternatives. The literature research was extended to include the wider Karoo region.

Several heritage impact assessment studies conducted within the wider and immediate region have aided in the collection of archaeological sites on this landscape. Heritage impact assessments have been conducted south of Sutherland (Hart 2005; Hart *et al.* 2010; Orton & Halkett 2011) as well as within the Komsberg Valley east and north-east of the current study site (Booth 2011, 2012, 2015a, 2015b; Hart 2015; Webley 2016). The most relevant studies conducted for the Roggeveld and Kareebosch Wind Farms include portions of the current Brandvalley Wind Energy Facility (Hart & Webley 2011, 2013, 2014). A mitigation phase excavation (Evans *et al.* 1985) has been undertaken at two small rock shelters in the grounds of the South African Astronomical Observatory near Sutherland during November 1983 and March 1984.

It is known that wider Karoo landscape has been occupied by humans since the Early Stone Age (ESA), spanning an occupation period of about 1.5 million years. Archaeological evidence is usually observed as surface scatters and is widely dispersed across the landscape. Caves are uncommon in the Karoo and open sites (Early Stone Age to the last 2 000 years) generally consist of single-level occupations near sources of water such as rivers, streams and springs. Rock engravings are widespread over the Karoo landscape, substantial research has been conducted within the Northern and Western Cape areas of the Karoo (Parkington *et al.* 2008). Early travellers and trekboere (Dutch farmers) started entering this part of colonial South Africa towards the end of the

18th century and colonial settlement increased towards the second half of the 19th century.

3.1. Early Stone Age (ESA) – 2.5 million to 250 000 years ago

The Early Stone Age from between 2.5 million and 250 000 years ago refers to the earliest that *Homo sapiens sapiens* predecessors began making stone tools. The earliest stone tool industry was referred to as the Olduvai Industry originating from stone artefacts recorded at Olduvai Gorge, Tanzania. The Acheulian Industry, the predominant southern African Early Stone Age Industry, replaced the Olduvai Industry approximately 1.5 million years ago, is attested to in diverse environments and over wide geographical areas. The hallmark of the Acheulian Industry is its large cutting tools (LCTs or bifaces), primarily handaxes and cleavers. Bifaces emerged in East Africa more than 1.5 million years ago (mya) but have been reported from a wide range of areas, from South Africa to northern Europe and from India to the Iberian coast. The end products were similar across the geographical and chronological distribution of the Acheulian techno-complex: large flakes that were suitable in size and morphology for the production of handaxes and cleavers perfectly suited to the available raw materials (Sharon 2009).

One of the most well-known Early Stone Age Acheulean sites in southern Africa is Amanzi Springs (Deacon 1970), situated about 10 km north-east of Uitenhage and 45 km south east of the WEF site. The site is situated on a north-facing hill overlooking the Coega River. The earliest reference to the spring was made by an early traveller, Barrow (1801). FitzPatrick first reported stone artefacts in the area in 1924. Ray Inskeep (Inskeep 1965) conducted a small-scale excavation of the site in 1963. It was only in 1964 and 1965 that large scale excavations were conducted by Hilary Deacon. In a series of spring deposits a large number of stone tools were found *in situ* to a depth of 3-4 m. Wood and seed material preserved remarkably very well within the spring deposits, and possibly date to between 800 000 to 250 000 years old.

Other Early Stone Age sites that contained preserved bone and plant material include Wonderwerk Cave in the Northern Province, near Kimberly and Montagu Cave in the Western Cape, near the small town of Montagu (Mitchell 2007). Early Stone Age sites have also been reported in the foothills of the Sneeuberge Mountains (in Prins 2011). Early Stone Age handaxes were reported from a site near Victoria West (Binneman et al. 2011).

It is rare that Early Stone Age stone artefacts are found to be in association with other archaeological remains and are usually in secondary context owing to natural disturbances over time and, more recently, human and domestic animal impact. These artefacts may be found exposed between the surface and 50 cm – 80 cm below the ground on floodplains and at the foot of hill and ridges.

Within the wider region a few surface scatters of Early Stone Age stone artefacts were documented on the Witteberg WEF site to west of Matjiesfontein (Hart & Miller, nd) and on the Suurplaats WEF site south of Sutherland (Hart *et al.* 2010).

3.2. Middle Stone Age (MSA) – 250 000 – 30 000 years ago

The Middle Stone Age spans a period from 250 000 - 30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art and symbolism. Various stone artefact industries occur during this time period, although less is known about the time prior to 120 000 years ago, extensive systemic archaeological research is being conducted on sites across southern Africa dating within the last 120 000 years (Thompson & Marean 2008). The large handaxes and cleavers were replaced by smaller stone artefacts called the Middle Stone Age flake and blade industries. Surface scatters of these flake and blade industries occur widespread across southern Africa although rarely with any associated botanical and faunal remains. It is also common for these stone artefacts to be found between the surface and approximately 50-80 cm below ground. Fossil bone may in rare cases be associated with Middle Stone Age occurrences (Gess 1969). These stone artefacts, like the Earlier Stone Age handaxes are usually observed in secondary context with no other associated archaeological material.

From as early as 1915, stone artefacts which were of a "peculiar character", referred to as hand-axes and tortoise-cores by Reginald A. Smith, were plentiful within the Victoria West district. The latter were only found in certain areas and the hand-axes occurred in conjunction with the cores or without them (Smith 1919). During the 1920's, A.H.J Goodwin (1926, 1946), identified the Victoria West stone artefact industry, presumably referring to those artefacts with a "peculiar character" found within the district, the wider Karoo region, as well as along the Vaal Rivier. They comprised mainly of stone tools that had been manufactured using a prepared core technique, and were regarded as being transitional between the Early Stone Age and Middle Stone Age. Recent research has established that the Victoria West cores were the "evolutionary step" towards the Levallois prepared core industry, indicating an outward spread of this technological change (Lycett 2009).

The Middle Stone Age is distinguished from the Early Stone Age by the smaller-sized and distinctly different stone artefacts and *chaîne opératoire* (method) used in manufacture, the introduction of other types of artefacts and evidence of symbolic behaviour. The prepared core technique was used for the manufacture of the stone artefacts which display a characteristic faceted striking platform and includes mainly unifacial and bifacial flake blades and points. The Howiesons Poort Industry (80 000 - 55 000 years ago) is distinguished from the other Middle Stone Age stone artefacts: the size of tools are generally smaller, the range of raw materials include finer-grained rocks such as silcrete, chalcedony, quartz and hornfels, and include segments, backed blades and trapezoids in the stone toolkit which were sometimes hafted (set or glued) onto handles.

In addition to stone artefacts, bone was worked into points, possibly hafted, and used as tools for hunting (Deacon & Deacon 1999).

Other types of artefacts that have been encountered in archaeological excavations include tick shell (*Nassarius kraussianus*) beads, the rim pieces of ostrich eggshell (OES) water flasks, ochre-stained pieces of OES and engraved and scratched ochre pieces, as well as the collection of materials for purely aesthetic reasons.

Surface scatters of Middle Stone Age stone artefacts are widely distributed across the Karoo landscape and have been reported from the Witteberg WEF site to the west of Matjiesfontein (Hart & Miller, nd) and at the Suurplaat WEF and the Sutherland SEF sites south of Sutherland (Hart et al. 2010; Orton & Halkett 2011).

3.3. Later Stone Age (LSA) – 30 000 years ago – recent (100 years ago)

The Later Stone Age (LSA) spans the period from about 20 000 years ago until the colonial era, although some communities continue making stone tools today. The period between 30 000 and 20 000 years ago is referred to as the transition from the Middle Stone Age to Later Stone Age; although there is a lack of crucial sites and evidence that represent this change. By the time of the Later Stone Age the genus *Homo*, in southern Africa, had developed into *Homo sapiens sapiens*, and in Europe, had already replaced *Homo neanderthalensis*.

The Later Stone Age is marked by a series of technological innovations, new tools and artefacts, the development of economic, political and social systems, and core symbolic beliefs and rituals. The stone toolkits changed over time according to time-specific needs and raw material availability, from smaller microlithic Robberg (20/18 000-14 000 ya), Wilton (8 000-the last 500 years) Industries and in between, the larger Albany/Oakhurst (14 000-8 000ya) and the Kabeljous (4 500-the last 500 years) Industries. Bored stones were used as part of digging sticks, grooved stones for sharpening and grinding and stone tools fixed to handles with mastic also become more common. Fishing equipment such as hooks, gorges and sinkers also appear within archaeological excavations. Polished bone tools such as eyed needles, awls, linkshafts and arrowheads also become a more common occurrence. Most importantly bows and arrows revolutionized the hunting economy. It was only within the last 2 000 years that earthenware pottery was introduced, before then tortoiseshell bowls were used for cooking and OES flasks were used for storing water. Decorative items like ostrich eggshell and marine/fresh water shell beads and pendants were made.

Hunting and gathering made up the economic way of life of these communities; therefore, they are normally referred to as hunter-gatherers. Hunter-gatherers hunted both small and large game and gathered edible plantfoods from the veld. For those that lived at or close to the coast, marine shellfish and seals and other edible marine resources were available for gathering. The political system was mainly egalitarian, and

socially, hunter-gatherers lived in bands of up to twenty people during the scarce resource availability dispersal seasons and aggregated according to kinship relations during the abundant resource availability seasons. Symbolic beliefs and rituals are evidenced by the deliberate burial of the dead and in the rock art paintings and engravings scattered across the southern African landscape.

Later Stone Age sites occur both at the coast (caves, rock shelters, open sites and shell middens) and in the interior (caves, rock shelters and open sites) across southern Africa. The Later Stone Age archaeology of the Great Karoo stretching across the Eastern Cape, Western Cape, and Northern Cape Provinces is rich and varied. Various studies (Beaumont & Vogel 1984, Morris & Beaumont 1990), have shown that the general area surrounding the proposed area for development has been relatively marginal regarding pre-colonial human settlement, but is in fact exceptionally rich in archaeological sites and rock art (paintings and engravings). Garth Sampson (1985; Close & Sampson 1998, 1999; Sampson 1988; Sampson et al. 1989, 1997; and Sampson & Vogel 1996) has conducted thirty years of extensive research within the Seacow River Valley and provides invaluable insight on the distribution of both Later Stone Age and pastoralist / herder sites across the landscape. Unfortunately, no such similar studies have yet been conducted within this area.

Substantial Later Stone Age research has been conducted in the surrounding Northern Cape region in the Richtersveld within the Orange River Valley, to the north near the Carnarvon area, Bushman land and areas surrounding Kimberly, as well as to the south in the Klein Karoo at a site called Boomplaas near Oudtshoorn. The research conducted provides considerable evidence of Later Stone Age occupation within the wider region of the proposed development area.

The majority of archaeological sites found in the area would date from the past 10 000 years where San hunter-gatherers inhabited the landscape living in rock shelters and caves as well as on the open landscape. These latter sites are difficult to find because they are in the open veld and often covered by vegetation and sand. Sometimes these sites are only represented by a few stone tools and fragments of bone. The preservation of these sites is poor and it is not always possible to date them (Deacon and Deacon 1999). Caves and rock shelters, however, in most cases, provide a more substantial preservation record of pre-colonial human occupation.

Scatters of Later Stone Age destone artefacts were documented at the Witteberg WEF site to the south-east of Matjiesfontein (Hart & Miller, nd) and at the Suurplaats WEF and the Sutherland SEF sites to the south of Sutherland (Hart *et al.* 2010). The rescue excavations conducted at the two Observatory Shelters near Sutherland yielded a variety of lithic variants including cores, utilized flakes, blades and chunks, as well as formal tools such as scrapers, adzes, backed blades, points and miscellaneous retouched pieces. In addition, fragments of OES and OES beads, faunal remains and fresh water molluscs were documented (Evan *et al.* 1985).

3.4. Last 2 000 years – Khoekhoen Pastoralism

Until 2 000 years ago, hunter-gatherer communities traded, exchanged goods, encountered and interacted with other hunter-gatherer communities. From about 2 000 years ago the social dynamics of the southern African landscape started changing with the immigration of two 'other' groups of people, different in physique, political, economic and social systems, beliefs and rituals. Relevant to the study area, one of these groups, the Khoekhoen pastoralists or herders entered southern Africa with domestic animals, namely fat-tailed sheep and goats, travelling through the south towards the coast. Khoi pastoralist sites are often found close to the banks of large streams and rivers. They also introduced thin-walled pottery common in the interior and along the coastal regions of southern Africa. Their economic systems were directed by the accumulation of wealth in domestic stock numbers and their political make-up was more hierarchical than that of the hunter-gatherers.

There are two main suggestions on the migration routes of the Khoekhoen pastoralists into South Africa within the last 2 000 years that have been based on linguistic comparisons and archaeological evidence. The first route, based on rock art and oral traditions suggest that the pastoralists groups entered from Namibia moved down the west coast into south-western Cape and then spread to the east along the southern Cape coast (Stow 1905; Cooke 1965). The second route, based on linguistic evidence, suggests that the pastoralist groups entered from Botswana with one branching to the west along the Orange River to the Atlantic west coast and groups branching down the central plateau, through the Karoo (via the Seacow River Valley), down the escarpment into the Eastern Cape (Elphick 1977; 1985). Extensive pastoralist research has yielded evidence from sites along the suggested routes within the Northern Cape, Karoo, Orange River Valley, along the Namaqualand and west coast into the southern and south-eastern Cape.

Circular dry stone piled wall enclosures up to half a metre high and 3 m – 4 m and 9 m in diameter situated on the leeward slopes of low ridges were documented on the Suurplaat WEF site south of Sutherland (Hart *et al.* 2010). These enclosures were arranged in complexes of up to thirteen (13) interlocking enclosures with adjoining 'lammerkraals' (lamb pens). Archaeological remains associated with these enclosures included fine red burnished pottery and OES fragments. In addition, open Khoekhoen encampments situated among the Kameeldoring trees along dry river beds in the bottom of valleys were documented on the site south of Sutherland. These encampments are rare and have only been recorded in the Richtersveld area (Hart *et al.* 2010). These sites are relatively extensive, approximately 80 m x 80 m in diameter. The archaeological material remains associated with these encampments included very fine thin walled burnished Cape Coastal pottery, numerous informal stone artefacts, stone features, grinding surfaces, discreet ash middens, animal bone, and a number of graves that have broken grinding stones placed on top. Nineteenth century glass and ceramics were documented at two of the sites.

Several pre-colonial stone walled structures were also documented on the site for the Sutherland SEF (Orton & Halkett 2011) which could be differentiated from the historical layered courses of the packed stone as opposed to the more organic piled nature of the walling.

A few small plain body sherds of fine-grained pottery, about 5 mm thick, and probably from the same pot, were documented on a talus slope of one of the two Observatory sites near Sutherland (Evans *et al.* 1985).

3.5. Human Remains

It is difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion or construction activities for development. In some instances, packed stones or rocks may indicate the presence of informal burials.

Formal cemeteries are usually situated within the vicinity of the homestead settlements. These are general fenced and clearly marked comprising both formally built-up graves with marked headstones and stone packed graves that may only have an upright stone serving as the headstone. The former would belong to the landowners and the latter to the farm staff.

3.6. Rock Art (Paintings and Engravings)

Rock art is generally associated with the Later Stone Age period mostly dating from the last 5 000 years to the historical period. It is difficult to accurately date the rock art without destructive practices. The southern African landscape is exceptionally rich in the distribution of rock art which is determined between paintings and engravings. Rock paintings occur on the walls of caves and rock shelters across southern Africa. Rock engravings, however, are generally distributed on the semi-arid central plateau, with most of the engravings found in the Orange-Vaal basin, the Karoo stretching from the Eastern Cape (Cradock area) into the Northern Cape as well as the Western Cape, and Namibia. At some sites both paintings and engravings occur in close proximity to one another especially in the Karoo and Northern Cape. The greatest concentrations of engravings occur on the andesite basement rocks and the intrusive Karoo dolerites, but sites are also found on about nine other rock types including dolomite, granite, gneiss, and in a few cases on sandstone (Morris 1988). Substantial research has also been conducted in the Western Cape Karoo area around Beaufort West (Parkington 2008), in the northern parts of the Northern Cape between Springbok, Calvinia, Carnarvon, Kimberly, Kuruman, Pomfret and Upington as the outline of the area. Rock paintings are prolific in the inland mountainous regions situated north of the site.

Bushman paintings were observed on one of the privately owned farms within the boundary of the Soetwater WEF, but not affected by any of the related development activities (personal observation). One rock art site was documented in a line of cliffs on the Sutherland Solar site situated south of the town of Sutherland (Orton & Halkett 2011).

Several rock art sites have been systematically documented in the Swartberg Mountains to the south of Matjiesfontein (Rust 2013).

3.7. Historical Background

Historical archaeology refers to the last 500 years when European settlers and colonialism entered into southern Africa. In the early days of colonialism, the Karoo was still a sparse and unknown area. It was only until the early travellers and pioneer Dutch trekboere (trek farmers or migrant farmers) ventured into this harsh landscape and documented their encounters with the San hunter-gatherers and Khoekhoen who has originally inhabited the landscape. Various trade goods exchanged between these pioneering Europeans, the San hunter-gatherers, and Khoekhoen have been recorded in travellers' diaries and historical documents.

Evidence of the remains of historical buildings, stone cairns and stone packed features, as well as European ceramic ware has been recorded in several of the heritage impact assessment specialist studies conducted within the region (Orton & Halkett 2011). Stone packed foundations of rectangular cottages and associated dumping (waste) area, as well as stone packed kraals positioned at the bottom half of slight-gradient koppies. Broken and fragmented pieces of iron implements, glass bottles and European ceramic wares including stoneware, transfer print and willow pattern ceramic types are included. It is likely that these features may be associated with early farming activities where shepherds would have lined with their flocks and herds of domesticated stock (cattle, sheep, and goats).

Evidence of Anglo-Boer War fortifications and artefacts have been recorded south of Sutherland on the site proposed for the Sutherland SEF (Hart *et al.* 2010; Hart & Miller, nd; Hart & Webley 2011, 2013; Hart & Kendrick 2014; Orton & Halkett 2011).

4. DESCRIPTION OF THE PROPERTY

Sutherland is the closest town within the Northern Cape Province and is situated approximately 60 km north of the project area. The closest town within the Western Cape Province is Matjiesfontein, situated 30 km south of the project area. Laingsburg is a further 30 km east Matjiesfontein, along the N1 national road in the Western Cape Province.

The project area can be accessed via the R354 that connects to the N1 between Matjiesfontein and Laingsburg. The R354 is the main arterial road providing access to the project area, where there are a number of existing local untarred roads providing access within the project area.

Three major routes are proposed for the power line alternatives with routings from Komsberg Substation to the east, the Central Hub situated within the Brandvalley WEF area and Bon Espirange situated to the north with various smaller minor routes in between.

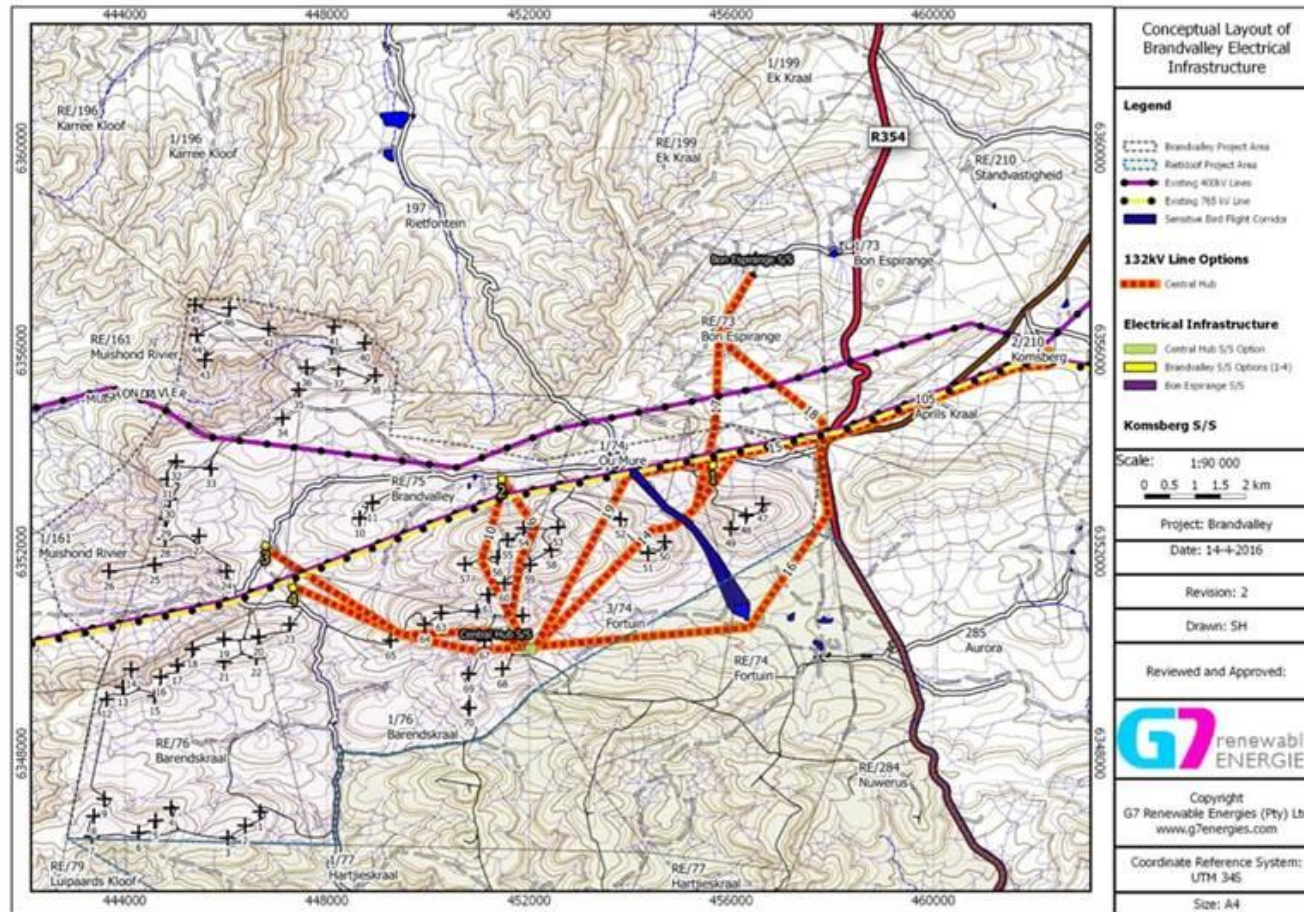


Figure 2. Map showing the location of the proposed Brandvalley Wind Energy Facility and proposed power line alternatives from the Central Hub and substation options (courtesy of EOH Coastal and Environmental Services).

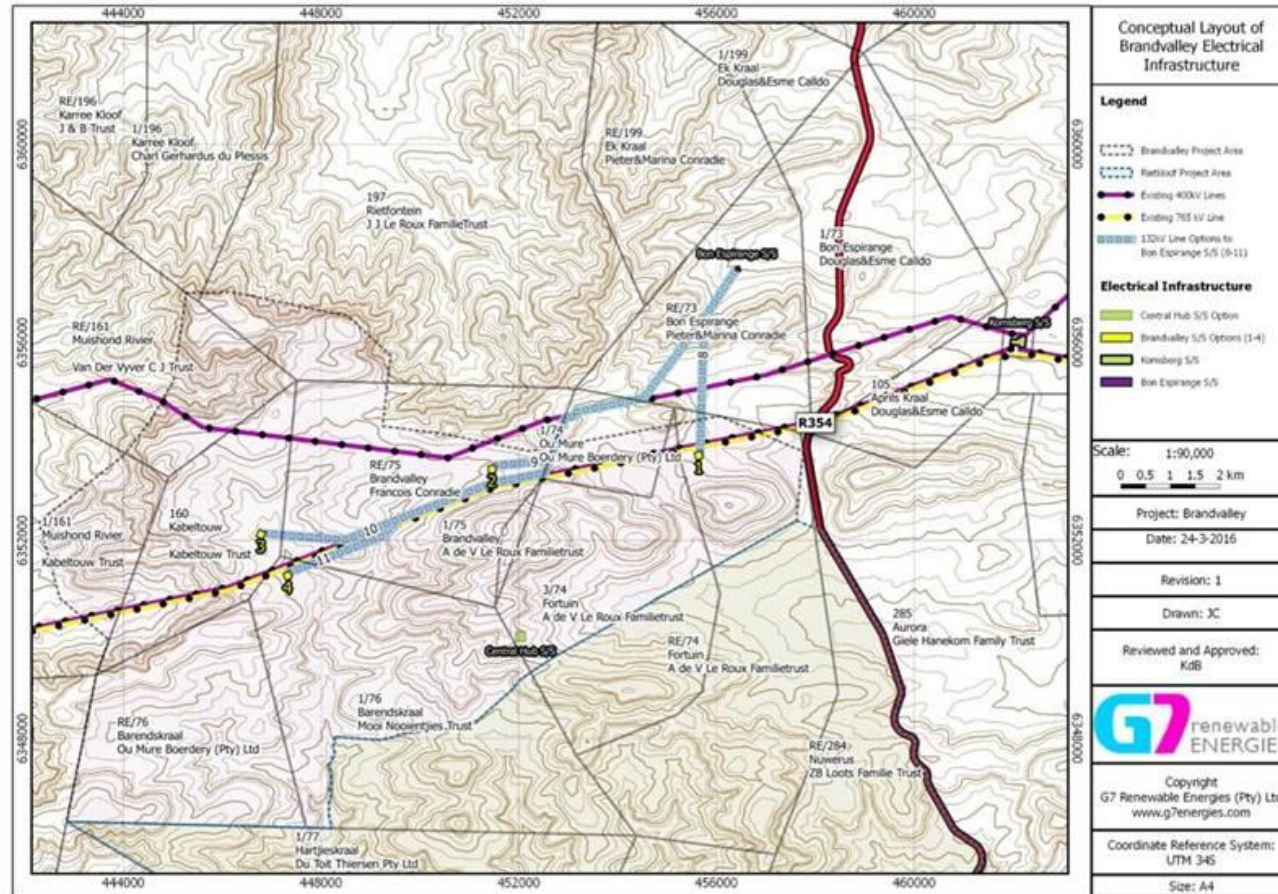


Figure 3. Map showing the location of the proposed Brandvalley Wind Energy Facility and proposed power line alternatives from Bon Espirance Substation and substation options (courtesy of EOH Coastal and Environmental Services).

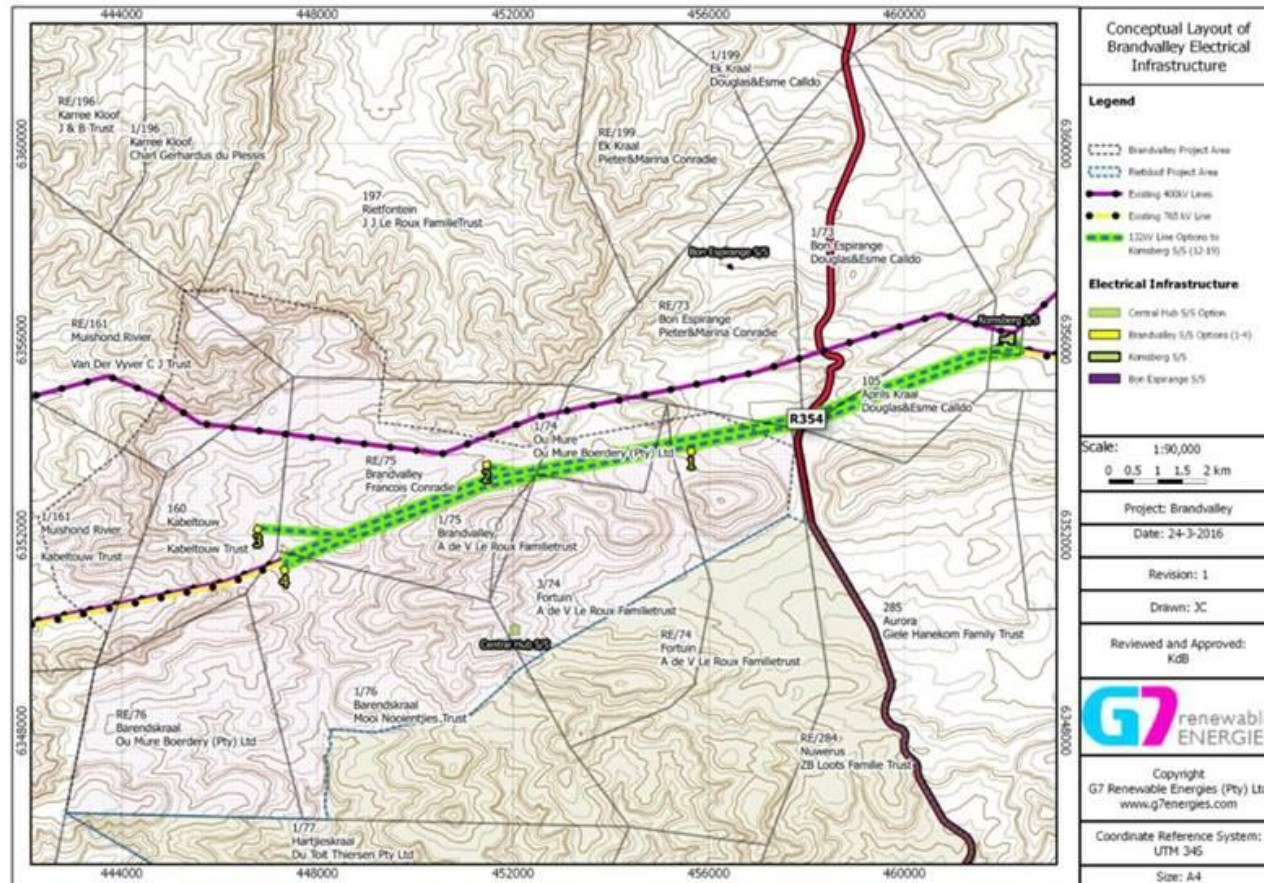


Figure 4. Map showing the location of the proposed Brandvalley Wind Energy Facility and proposed power line alternatives from Komsberg Substation and substation options (courtesy of EOH Coastal and Environmental Services).

5. ARCHAEOLOGICAL INVESTIGATION

5.1. Methodology

An archaeological desktop study was conducted and has been included within this report. Very little systematic archaeological research has been conducted within the immediate area of the proposed WEF therefore the literature research was extended to include the wider Karoo region. Several archaeological and heritage impact assessment have been conducted within close proximity to the study area and were included as part of the literature review.

Commented [MM1]: This is a very good preamble! I think it should also precede the discussion in Chapter 4.

In 2011, Tim Hart and Dr Lita Webley, ACO Associates CC, conducted a heritage impact assessment for two proposed WEFs for the area to the north of the current proposed Brandvalley WEF project and on several of the farms included in the current project. These farms include: Barendskraal 1/76 and RE/76, Fortuin 1/74 and 3/74 and RE/74, Brandvalley 1/75, Hartjieskraal 1/77 and RE/77. A revised heritage impact assessment report on Phase 1 of the Roggeveld Wind Farm was compiled in 2013 (Hart & Webley 2013). Several historical built environment and stone features and structures were recorded. The heritage resources documented within the boundary of the proposed Brandvalley WEF were visited during the survey for the current study.

Heritage Western Cape (HWC) commented on the first assessment conducted for the Proposed Roggeveld Wind Farm (Case No. 111020JB18, 2011) and then revised the comments in 2013 (Appendix A). These recommendations have been included in the recommendations made in this report.

The proposed area for the Brandvalley WEF (together with the survey for the Rietkloof WEF) was visited between 9 March and 17 March 2016. The season of visitation is not relevant to the study concerned.

Waypoints and Tracks for the proposed WEF provided by EOH Coastal and Environmental Services were downloaded onto a handheld Garmin Oregon 650 GPS which aided in tracking and finding the proposed development areas. The survey was conducted by following the accessible roads to be upgraded and used for the transportation of wind turbines and associated infrastructure, this was done mostly in a 4x4 vehicle and conducting spot checks when relevant. The proposed accessible areas proposed for the infrastructure (power line, substations, construction camps) were investigated. Archaeological visibility can be considered as relatively good over most of the area. Photographs were taken using the handheld GPS which automatically plotted location and sites.

5.2. Limitations

Very little systematic precolonial archaeological research has been conducted within the immediate area of the proposed WEF. However, information on the heritage resources

has been accumulated by several heritage impact assessments that have been conducted for wind and solar facilities within the area. Historical archaeological research is currently being conducted by members of the Department of Archaeology, University of Cape Town, on the Khoekhoen trekboere interaction in the Klein Roggeveld and neighbouring escarpment.

Owing to vast extent of the area and the slow pace of conducting the survey by road and on foot the investigation and spot checks were limited to the accessible roads to the top of the mountains and within the valleys and floodplains. Therefore, the areas between these stops that may have yielded potential archaeological remains could not be surveyed on foot.

Vegetation cover across the landscape was relatively sparse allowing for good archaeological visibility. However, the observation of precolonial artefacts is limited to the surface. The artefacts documented occur mainly in secondary context as they sometimes occur in washed and eroded areas. It is likely that stone artefacts and, depending on the state of preservation and extent of surface disturbance over time, associated cultural and organic materials may be uncovered between the surface and generally 50-80 cm below the surface.

5.3. Results of the Archaeological Investigation

Table 1: Coordinates and sites for the proposed Brandvalley Wind Energy Facility (WEF) situated in the Karoo Hoogland Local Municipality, Namakwa District Municipality and the Witzenburg Local Municipality and Laingsburg Local Municipality, Cape Winelands and Central Karoo District Municipalities.

REFERENCE	DESCRIPTION	CO-ORDINATE	HERITAGE GRADING
Homesteads situated within the Brandvalley WEF area			
BV_HS1	Situated on the Farm Fortuin 74	32°57'03.62"S; 20°32'50.31"E	Not yet graded
BV_HS2	Ou Mure homestead situated on the Farm Fortuin 74	32°57'14.15"S; 20°30'16.61"E	Not yet graded
BV_HS3	Barendskraal homestead situated on the Farm Barendskraal 76.	33°00'14.80"S; 20°26'45.57"E	Not yet graded
BV_HS4	Fortuin situated on the Farm Fortuin 74	32°59'17.78"S; 20°33'43.82"E	Not yet graded
BV_HS5	Nuwerus situated on the Farm Fortuin 74	32°59'18.64"S; 20°32'54.70"E	Not yet graded
Stone Artefact Occurrences, Scatters and Sites			
BV_SA1	Stone artefact scatters	32°57'14.67"S; 20°32'43.15"E	'General' Protection B (Field Rating IV B) <i>IIIB</i>
BV_SA2	Stone artefact scatters	32°57'25.22"S; 20°28'46.86"E	'General' Protection B (Field Rating IV B) <i>IIIB</i>
BV_SA3	Stone artefact scatters	32°58'04.57"S; 20°25'53.32"E	'General' Protection B (Field Rating IV B) <i>IIIB</i>
Stone walling features			
BV_SW1	Circular stone packed feature, Fortuin 74	32°57'16.25"S; 20°32'42.98"E	<i>Grade IIIC significance</i>
BV_SW2	Stone walling kraal, part of Ou Mure homestead	32°57'11.30"S; 20°30'21.14"E	<i>Grade IIIC significance</i>
Built Environment (structures, buildings, drinking troughs, reservoirs, etc.)			
BV_BE1	Staff house	33°57'12.29"S; 20°32'23.55"E	N/A
BV_BE4	Reservoir / 2 stone packed features	32°58'04.74"S; 20°25'56.18"E	N/A

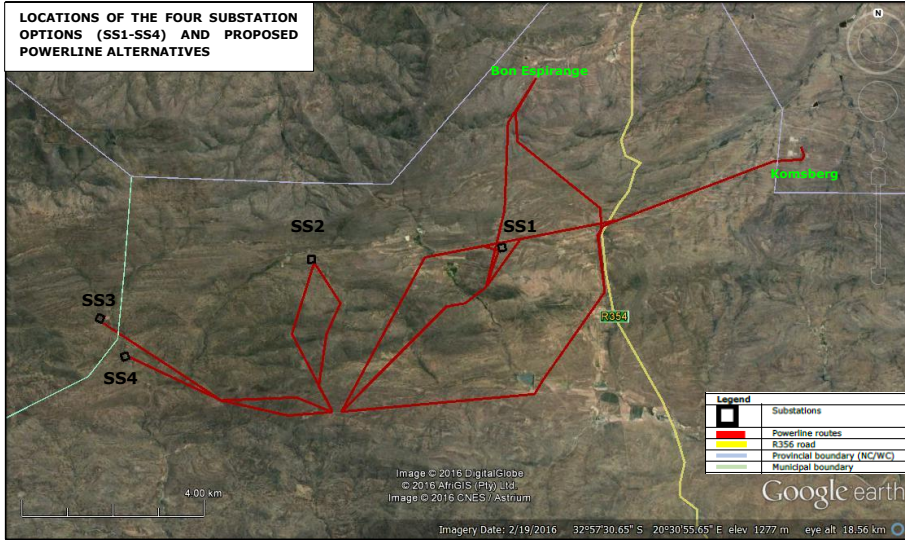


Figure 5: View of the locations of the four substation positions (SS1 – SS4) proposed within the Brandvalley WEF area

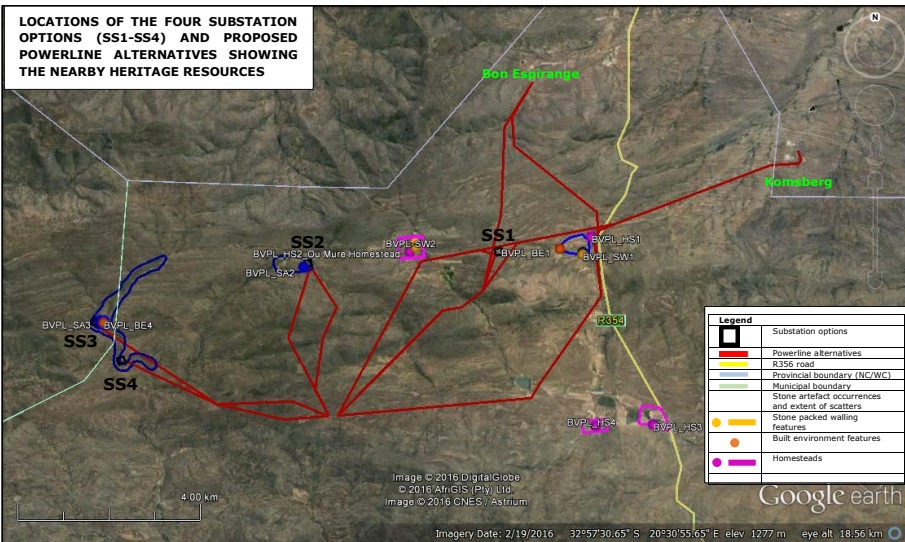


Figure 6: View of the locations of the four substation positions (SS1 – SS4) and proposed powerline alternatives showing the nearby heritage resources encountered during the survey.

5.3.1. POSITIONS OF THE SUBSTATIONS

Four potential 33/132kV onsite substation locations were assessed (Figure 3). The total footprint of this on-site substation will be approximately 200 m x 200 m. These substations have also been assessed in the report compiled for the proposed Brandvalley WEF project as part of the EIA process.

Substation 1 (SS1) (Figures 5-6) is situated south of the internal access road on the Farm Fortuin 74 is the preferred option for the establishment of the substation. No archaeological, historical or other heritage resources were documented within this area (Figures 6-7). This proposed substation site is the preferred alternative as it will not impact on any heritage resources as none were observed within the area during the survey. In addition, the proposed area is positioned very close to the recently constructed power lines which has already compromised a sense of place.

Substation 2 (SS2) (Figure 5) is situated south of the internal access road on the Farm Brandvalley 75 and is an alternative option to SS1 for the establishment of the substation (Figures 8-9). Middle Stone Age stone artefacts (BV_SA2, Figure 5) manufactured on hornfels raw materials and shale were identified within this area near the water course. No other cultural or organic archaeological, historical or other heritage resources were found to be associated the stone artefact scatter.

Substation 3 (SS3) (Figure 5) is situated west of the internal access road on the Farm Kabeltouw Outspan 160 (Figure 10) and Substation 4 (SS4) (Figure 5) is situated along the eastern side of the water course on the Farm Barendskraal 76. Stone artefact scatters were observed within the areas proposed for substations and it is predicted that these stone artefact scatters along the water course leading between the two proposed substation areas.

The stone artefact scatters include typical Middle Stone Age characteristic stone artefacts as well as relatively large flakes manufactured on local shale raw materials as well as Later Stone Age fine-grained microliths.

It is preferred that this area as part of the precolonial cultural landscape be preserved despite the stone artefacts only being recorded as surface scatters if other alternatives for the proposed onsite substation are available. However, if the preferred Substation option (SS1) is not feasible according to input from other studies conducted the appropriate mitigation measures should be followed with regards to the other three substation alternatives. It is suggested that a survey focusing on the area along the watercourse is conducted between Substation 2 (SS2) and Substation 4 (SS4) to establish the real extent of the artefact occurrences.



Figure 7: View of the area proposed for substation alternative SS1 facing north (Fortuin 74).



Figure 8: View of the area proposed for substation alternative SS1 facing west (Fortuin 74).



Figure 9: View of the area proposed for substation alternative SS2 facing west (Brandvalley 75).



Figure 10: View of the area proposed for substation alternative SS2 facing south-east (Brandvalley 75).



Figure 11: View of the area proposed for substation alternative SS3 facing north-west (Farm Kabeltouw Outspan 160).

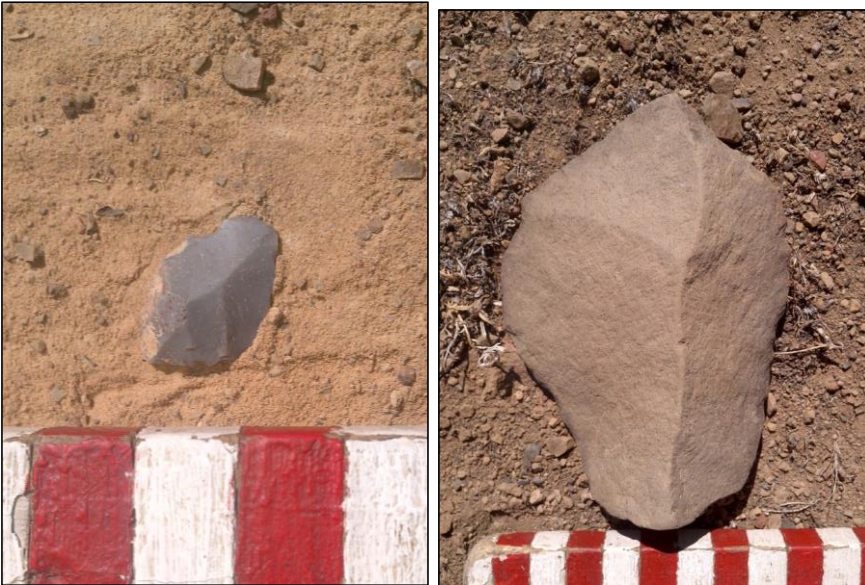


Figure 12 and Figure 13: Examples of stone artefacts observed within the vicinity of the Substation 3 (SS3).

5.3.2. POSITIONS OF THE POWER LINES

It must be noted that the layout for the final power line alternatives were not finalised by the time of the survey conducted for the Brandvalley Wind Energy Facility and associated infrastructure and access roads. It must be emphasized that once the final layout for the power lines has been confirmed an archaeological heritage walk-through must be conducted to determine the positioning of the pylons and make further recommendations.

Heritage resources located nearby, within 200 m, of the proposed powerline route have been identified and included in this report. Very few heritage resources were recorded within this area and none have been recorded in the direct path of the powerline routes.

Scatters of Later Stone Age (BVPL_SA1) stone artefacts occur within the vicinity of a circular stone packed features (BVPL_SW1) occur of the Farm Fortuin 74 west of the proposed powerline (Figure 4). It is possible that the stone artefact scatter may extend south of the documented area into the buffer zone of the proposed powerline route. The powerline would have no negative impact on the currently documented stone packed walling feature as it fall outside of the buffer zone.

Scatters of Middle and Later Stone Age stone artefacts were documented within the vicinity of the proposed Substation alternatives 2 – 4 (SS2 – SS4) on the flat floodplains and along the valley bottoms. It is therefore possible that the stone artefact scatters would occur within the buffer zone of the proposed powerline route extending to these Substations.

The proposed powerline routes would pass two homesteads situated on the Fam Fortuin 74 including the Ou Mure homestead (BVPL_HS1), which are both situated within the buffer zone. It is however unlikely that these homesteads would be negatively affected by the powerlines. There are currently 400kV and 765kV powerlines passing to the north of these homesteads.

Some of the locations of the proposed powerlines occur on the hilltops where the potential of finding any precolonial archaeological heritage remains is very unlikely. The hill and mountain tops have elevation ranges between 1 100 and 1 400 meters. It is unlikely that pre-colonial communities would have considered the top of the mountain range an attractive occupation area owing to the elevation range of the site and steep hills to access the top of the mountain range as well as a lack of easily accessible water and food resources. The Substation 1 (SS1) alternative is the preferred alternative situated south of the internal access road on the Farm Fortuin 74 is the preferred alternative for the establishment of the substation.

The preferred alternative for the proposed powerline routes falls under the Substation 1 alternative and includes the: BV_SS1 – central switching station and the BV SS1 –

Komsberg powerline alternatives. This route is preferred as no heritage features occur within the footprint of the proposed Substation 1 (SS1) and similarly it is expected that this powerline route would have the least negative impact to any heritage resources. It is the shortest line that would also have the least visual impact on the landscape.

6. CULTURAL LANDSCAPE

Cultural landscapes have become a significant considering factor when conducting various archaeological and heritage impact assessments for proposed developments. Proposed project area situated in the Karoo Hoogland Local Municipality, Namakwa District Municipality and the Witzenburg Local Municipality and Laingsburg Local Municipality, Cape Winelands and Central Karoo District Municipalities, is considered as having a *medium - high* cultural heritage significance.

This section gives a brief introduction to the concept of cultural landscape and its relation to various aspects of the dynamic interaction of humans as cultural agents and the landscape as a medium. A description of the interwoven relationships of humans with the landscape over time will be given including the archaeological, historical, and contemporary connections. Lastly, the living heritage makes up a small part of the study undertaken, its significance will be highlighted in relation to the communities who still identify with the area and retain a sense of identity to the landscape.

6.1. Concept of Cultural Landscape

Cultural landscapes can be interpreted as complex and rich extended historical records conceptualised as organisations of space, time, meaning, and communication moulded through cultural process. The connections between landscape and identity and, hence, memory are fundamental to the understanding of landscape and human sense of place. Cultural landscapes are the interface of culture and nature, tangible and intangible heritage, and biological and cultural diversity. They represent a closely woven net of relationships, the essence of culture and people's identity. They are symbol of the growing recognition of the fundamental links between local communities and their heritage, human kind, and its natural environment. In contemporary society, particular landscapes can be understood by taking into consideration the way in which they have been settled and modified including overall spatial organisation, settlement patterns, land uses, circulation networks, field layout, fencing, buildings, topography, vegetation, and structures. The dynamics and complex nature of cultural landscapes can be regarded as text, written and read by individuals and groups for very different purposes and with very many interpretations. The messages embedded in the landscape can be read as signs about values, beliefs, and practices from various perspectives. Most cultural landscapes are living landscapes where changes over time result in a montage effect or series of layers, each layer able to tell the human story and relationships between people and the natural processes.

The impact of human action on the landscape occurs over time so that a cultural landscape is the result of a complex history and creates the significance of place in shaping historical identities by examining a community's presence or sense of place. The deeply social nature of relationships to place has always mediated people's understanding of their environment and their movements within it, and is a process which continues to inform the construction of people's social identity today. Social and spatial relationships are dialectically interactive and interdependent. Cultural landscape reflects social relations and institutions and they shape subsequent social relations.

Cultural landscapes tell the story of people, events, and places through time, offering a sense of continuity, a sense of the stream of time. Landscapes reflect human activity and are imbued with cultural values. They combine elements of space and time, and represent political as well as social and cultural constructs. Culture shapes the landscape through day-to-day routine and these practices become traditions incorporated with a collective memory the ultimate embodiments of memorial consciousness', examples such as monuments, annual events and, archives. As they have evolved over time, and as human activity has changed, they have acquired many layers of meaning that can be analysed through archaeological, historical, geographical, and sociological study.

Indigenous people, European explorers, missionaries, pastoralists, international and domestic travellers all looked or look at similar landscapes and experience different versions of reality. Regardless of the power of different cultural groups, however, all groups create cultural landscape and interpret them from their own perspectives. This gives rise to tensions and contradictions between groups, invariably expressed in landscape forms as well.

The dynamics and complex nature of cultural landscapes can be regarded as text, written and read by individuals and groups for very different purposes and with very many interpretations. The messages embedded in the landscape can be read as signs about values, beliefs, and practices from various perspectives.

Most cultural landscapes are living landscapes where changes over time result in a montage effect or series of layers, each layer able to tell the human story and relationships between people and the natural processes. A common theme underpinning the concept of ideology of landscape itself is the setting for everything we do is that of the landscape as a repository of intangible values and human meaning that nurture our very existence. Intangible elements are the foundation of the existence of cultural landscapes, and that are still occupied by contemporary communities, Landscape, culture and collective memory of a social group are intertwined and that this binds the individuals to their community. Culture shapes their everyday life, the values bind gradually, change slowly, and transfer from generation to generation – culture is a form of memory. We see landscapes as a result of our shared system of beliefs and ideologies. In this way landscape is a cultural construct, a mirror of our memories and

myths encoded with meanings which can be read and interpreted. Pivotal to the significance of cultural landscapes and the ideas of the ordinarily sacred is the realisation that it is the places, traditions, and activities of ordinary people that create a rich cultural tapestry of life, particularly through our recognition of the values people attach to their everyday places and concomitant sense of place and identity.

Living heritage means cultural expressions and practices that form a body of knowledge and provide for continuity, dynamism, and meaning of social life to generations of people as individuals, social groups, and communities. It also allows for identity and sense of belonging for people as well as an accumulation of intellectual capital current and future generation in the context of mutual respect for human, social and cultural rights.

Protection of these cultural landscapes involves some management issues such as successful conservation is based on the continuing vital link between people and their landscapes. This link can be disrupted or affected by for instance economic reasons. Other threats can also be attributed to urban expansion and development, tourism, war and looting and something beyond our human intervention: natural disasters and climate change. Cultural landscape management and conservation processes bring people together in caring for their collective identity and heritage, and provide a shared local vision within a global context. Local communities need, therefore, to be involved in every aspect of identification, planning and management of the areas as they are the most effective guardians of landscape heritage.

Most elements of living heritage are under threat of extinction due to neglect, modernisation, urbanisation, globalisation, and environmental degradation. Living heritage is at the centre of people's culture and identity, it is important to provide space for its continued existence. Living heritage must not be seen as merely safeguarding the past, but it must be seen as safeguarding the logic of continuity of what all communities or social groups regard as their valuable heritage, shared or exclusive.

In some instances, villages may capitalise on local landscape assets in order to promote tourism. Travel and tourism activities are built around the quest for experience, and the experience of place and landscape is a core element of that quest. It is a constant desire for new experiences that drives tourism, rather than a quest for authenticity. It is, therefore, important to engage actively with the tourism industry so that aspects of life and landscape important to cultural identity, including connection with place are maintained.

6.2. Archaeological Landscape

Very little is known about the pre-colonial archaeology of this area owing to the lack of systematic research in the area and the lack of finding any evidence of occupation according to previous impact assessments conducted. Therefore it was assumed that the archaeological landscape was sparse and almost non-existent. This study has however

brought to light that this area was once part of an ancient landscape inhabited by various families of the genus *Homo*. With the identification of the Middle Stone Age stone artefacts and Later Stone Age stone artefacts occurring on the flat floodplains and near to water courses shows evidence of these precolonial communities' movement and possible occupation and interaction with the landscape. No sites showing clear periods of long-term occupation were identified during the survey, however, it is not to say that these sites do not occur and could be found with a rigorous and intensive investigation of the attractive areas for occupation.

Pre-colonial human remains are mostly unmarked and invisible on the landscape, however, in some instances, they may be marked by organised piles of stones.

6.3. Historical and Contemporary Landscape

The archaeological interpretation of the cultural landscape relies solely on the presence and surface visibility of artefacts left behind on the landscape by the populations who occupied and migrated through the proposed development area. A more comprehensive historical layer is able to be fitted onto the cultural landscape owing to the availability of written documents and the continuing existence of the traces left behind by European Settlers and the moulding of these traces used to shape the contemporary communities that occupies and regards itself attached to its present cultural landscape.

The contemporary cultural landscape is the product of centuries of human interaction, more so when the European Settlers entered the area. Remnants of these cultural interactions remain on the landscape, such as the built environment, features, artefacts, and marked and unmarked graves / burials with only oral histories and stories handed down from one generation to the next to remain in the collective memory of the community/ies living on the landscape.

7. SUMMARY OF SITES AND GRADING

A brief summary of findings during the survey for the proposed Brandvalley WEF has been described in the Executive Summary, this section focuses on heritage resources that have been recorded nearby, within 200 m. Further heritage resources may be encountered during the recommended walk-through for the final power line layout which was not finalised by the time of conducting the site visit

7.1. Precolonial / Stone Age material (BV_SA1 – BV_SA3)

Both Later Stone Age and Middle Stone Age stone artefact scatters were identified mainly on the flat floodplains up to the foot of the mountains as well as within the valleys along water courses. The artefacts were manufactured from fine-grained chalcedony material as well as hornfels and local shale raw materials.

No other cultural or organic archaeological heritage materials were assumed to be directly related or associated with the stone artefact scatters. In several instances stone artefacts would occur within the same vicinity as historical built environment structures, stone walling features as well as historical artefact scatters, similarly situated on the flat floodplains and within the valleys close to water courses.

The grading of the stone artefacts has been determined due to the lack of systematic research the documentation of precolonial evidence in this area, therefore, the stone artefact scatters (BV_SA1 – BV_SA3) are considered as having a *medium* cultural significance and have been allocated a heritage grading of:

'General' Protection B (Field Rating IV B) (IIIB, HWC 2016): These sites should be recorded before destruction (usually *Medium significance*).

7.2. Stone Walling Features (BV_SW1 - BV_SW2)

Generally part of the built environment, these historical structures have been described separately in this report. Up to three (3) stone walling features were documented along the access routes on the flat floodplains and in the valleys. These features include historical stone packed dwellings / cottages as well as kraals and pens. Historical artefacts were also located within the vicinity of some of the stone packed dwellings and kraals.

The grading of the stone walling features has been determined by their existence as part of a wider cultural landscape, therefore, the stone walling features (BV_SW1-BVSW2) are considered as having a medium-high cultural significance and have been allocated a heritage grading of:

Local: This site is suggested to be *Grade IIIB significance* (IIIB, HWC 2016). It could be mitigated and (part) retained as a heritage register site (*High significance*). However, recommendations to avoid negative impact to these features in terms of 20-30m buffer have been made.

7.3. Built Environment Structures (BV_BE1 – BV_BE2)

These include structures that have not been as being constructed by the historical stone packing method. The structures may be younger than 60 years and with very little or no heritage significance. These include abandoned buildings, used and unused reservoirs and drinking troughs. These structures occur across the landscape along the existing access roads of Brandvalley WEF.

The farm houses and associated buildings situated on the homestead / farm complex have been outlined and as a whole are considered as homesteads (described below).

7.5. Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS4)

Four homesteads / farm complexes were identified and demarcated where the proposed powerline routes will pass. These have been demarcated purely for ease of reference, description and mitigation measures. Most of these homesteads / farm complexes include historically stone packed features including kraals and dwellings as well as nineteenth century farmhouses, modern buildings and typically historical graveyards. These earlier buildings and features have most likely been modified over time for maintenance purposes for continued and contemporary occupation. The homesteads are situated either adjacent to the proposed access roads or in some cases the proposed internal access roads are expected to go through the homesteads.

These homesteads include the farm house and associated staff accommodation, outbuildings and stone walling features and built environment structures.

BVPL_HS3 and BVPL_HS4 have been merely highlighted to show the location of the homesteads and do not occur nearby, within 200 m, the proposed powerline routes.

7.6. Landscape Grading

It has been noted that the general area of the project landscape is considered a remote wilderness, sparsely inhabited and seldom visited by tourists. The landscape has not yet been impacted by large developments or industry and therefore retains its aesthetic qualities.

In keeping with previous grading assessments of the area (Hart & Webley 2013), the landscape is considered as having a high cultural significance and has been allocated a heritage grading of:

IIIA - with views down the valleys from the southern ridges reaching Grade II.

8. IMPACT ASSESSMENT

8.1. Precolonial / Stone Age material (BV_SA1 – BV_SA2)

The Destruction of Precolonial / Stone Age material (BV_SA1 – BV_SA2)

Cause and Comment: It has been established in this report that precolonial / archaeological heritage remains occur on the flat floodplains and along water courses within the proposed project area. Therefore it is likely that more stone artefacts and possibly other material and organic material may be uncovered during the construction of Substations 2-4 (SS2-SS4) within these areas. The stone artefacts are considered as being irreplaceable heritage resources, once the artefact or the site has been destroyed so has the information for interpretation.

Mitigation Measures: A walk-through of the final layout of the preferred powerline alternative should be conducted before any final mitigation measures can be established.

Table 2: Impact assessment of destruction of precolonial / stone age material

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Planning and Design Phase					
Without mitigation	Permanent (4)	Regional (3)	Very severe (8)	Definite (4)	Very High (19)
With mitigation	Permanent (4)	Regional (3)	Slight (1)	Definite (4)	Moderate (12)

8.2. Stone walling features (BV_SW1 – BV_SW2)

The Destruction of Stone Walling Features (BV_SW1 - BV_SW2)

Cause and Comment: Only two stone packed features occur within 200 m of the proposed powerline alternatives. It is unlikely that these features will be negatively impacted by the proposed project.

Mitigation Measures: A walk-through of the final layout of the preferred powerline alternative should be conducted before any final mitigation measures can be established.

Table 3: Impact assessment of the destruction of stone walling features

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Planning and Design Phase					
Without mitigation	Permanent (4)	Study site (2)	Very severe (8)	May occur (2)	Very High (16)
With mitigation	Long term (3)	Study site (2)	Slight (1)	May occur (2)	Moderate (8)

8.3. Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS4)

The destruction of the Homesteads / Farmhouse Complexes (BVPL_HS1 – BVPL_HS4)

Cause and Comment: Two homesteads / farm complexes (BVPL_HS1 and BVPL_HS2) were identified 200 m of the proposed powerline alternatives. The homesteads are situated adjacent to the proposed powerline alternatives, however, it is unlikely that they will be negatively impacted by the proposed project. BVPL_HS3 and BVPL_HS4 have merely been shown in the report for their positions and do not occur nearby, within 200m, of the proposed powerline routes.

Mitigation Measures: A walk-through of the final layout of the preferred powerline alternative should be conducted before any final mitigation measures can be established.

Table 4: Impact assessment of the destruction of homesteads/ farmhouses

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Planning and Design Phase					
Without mitigation	Permanent (4)	Study site (2)	Very severe (8)	Definite (4)	Very High (18)
With mitigation	Long term (3)	Study site (2)	Slight (1)	Definite (4)	Moderate (10)

8.4. Cultural Landscape

The impact of the construction of the proposed Brandvalley WEF on the cultural landscape:

Cause and Comment: It has been stipulated by Heritage Western Cape (HWC) that the impact on the cultural landscape is necessary. The construction of these immense wind turbines and associated infrastructure required completely changes the character of the landscape and hence impacts on the sense of place and aesthetic value negatively as well as impedes and threatens untouched heritage resources.

Mitigation Measures: Effective rehabilitation of the landscape after decommissioning.

Table 5: The impact of the construction of the proposed Substation and Powerlines on the cultural landscape

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Planning and Design Phase					
Without mitigation	Long term (3)	Study site (2)	Severe (4)	Definite (4)	Very High (13)
With mitigation	Long term (3)	Study site (2)	Severe (4)	Definite (4)	Moderate (13)

9. RECOMMENDATIONS

The overall area is considered as having a medium - high heritage significance. The following recommendations must be followed:

1. This report must be submitted to Heritage Western Cape (HWC) the heritage authority for any Western Cape developments.

2. Substation 1 (SS1) situated south of the internal access road on the Farm Fortuin 74 is the preferred option for the establishment of the substation.
3. The preferred power line route runs from the Komsberg Substation (no. 105, figure 4) along the existing 400 kV and 765 kV power lines to connect with Substation 1 (SS1) (no. 15, Figure 4) which then connects at the Central Hub (no. 14).
4. An archaeological heritage walk-through survey of the final layout of the power lines must be conducted to assess the changes where further recommendations and mitigatory measures may be made if necessary.

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12. GENERAL REMARKS AND CONDITIONS

NOTE: This report is a phase 1 archaeological impact assessment (AIA) only and does not include or exempt other required specialist assessments as part of the heritage impact assessments (HIAs).

The National Heritage Resources Act (Act No. 25 of 1999, Section 35 [Brief Legislative Requirements]) requires a full Heritage Impact Assessment (HIA) in order that all heritage resources including all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic, or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.

It must be emphasized that the conclusions and recommendations expressed in this phase 1 archaeological impact assessment (AIA) are based on the visibility of archaeological remains, features and, sites and may not reflect the true state of affairs. Many archaeological remains, features and, sites may be covered by soil and vegetation and will only be located once this has been removed. In the event of such archaeological heritage being uncovered (such as during any phase of construction activities), archaeologists or the relevant heritage authority must be informed immediately so that they can investigate the importance of the sites and excavate or collect material before it is destroyed. The onus is on the developer to ensure that this agreement is honoured in accordance with the National Heritage Resources Act No. 25 of 1999 (NHRA 25 of 1999).

Archaeological Specialist Reports (desktops and AIA's) will be assessed by the relevant heritage resources authority. The final comment/decision rests with the heritage

resources authority that may confirm the recommendations in the archaeological specialist report and grant a permit or a formal letter of permission for the destruction of any cultural sites.

APPENDIX A: GRADING SYSTEM

The National Heritage Resources Act 25 of 1999 stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act and the South African Heritage Resources Agency:

- National: This site is suggested to be considered of Grade 1 significance and should be nominated as such. Heritage resources with qualities so exceptional that they are of special national significance.
- Provincial: This site is suggested to be considered of Grade II significance and should be nominated as such. Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region
- Local: This site is suggested to be Grade IIIA significance. This site should be retained as a heritage register site (High significance) and so mitigation as part of the development process is not advised.
- Local: This site is suggested to be Grade IIIB significance. It could be mitigated and (part) retained as a heritage register site (High significance).
- 'General' Protection A (Field Rating IV A): This site should be mitigated before destruction (usually High/Medium significance).
- 'General' Protection B (Field Rating IV B): This site should be recorded before destruction (usually Medium significance).
- 'General' Protection C (Field Rating IV C): This site has been sufficiently recorded (in the Phase 1). It requires no further recording before destruction (usually Low significance).

APPENDIX B: IDENTIFICATION OF ARCHAEOLOGICAL FEATURES AND MATERIAL FROM INLAND AREAS: guidelines and procedures for developers

1. Human Skeletal material

Human remains, whether the complete remains of an individual buried during the past, or scattered human remains resulting from disturbance of the grave, should be reported. In general the remains are buried in a flexed position on their sides, but are also found buried in a sitting position with a flat stone capping and developers are requested to be on the alert for this.

2. Freshwater mussel middens

Freshwater mussels are found in the muddy banks of rivers and streams and were collected by people in the past as a food resource. Freshwater mussel shell middens are accumulations of mussel shell and are usually found close to rivers and streams. These shell middens frequently contain stone tools, pottery, bone, and occasionally human remains. Shell middens may be of various sizes and depths, but an accumulation which exceeds 1 m² in extent, should be reported to an archaeologist.

3. Stone artefacts

These are difficult for the layman to identify. However, large accumulations of flaked stones which do not appear to have been distributed naturally should be reported. If the stone tools are associated with bone remains, development should be halted immediately and archaeologists notified

4. Fossil bone

Fossil bones may be found embedded in geological deposits. Any concentrations of bones, whether fossilized or not, should be reported.

5. Large stone features

They come in different forms and sizes, but are easy to identify. The most common are roughly circular stone walls (mostly collapsed) and may represent stock enclosures, remains of wind breaks or cooking shelters. Others consist of large piles of stones of different sizes and heights and are known as *isisivane*. They are usually near river and mountain crossings. Their purpose and meaning is not fully understood, however, some are thought to represent burial cairns while others may have symbolic value.

6. Historical artefacts or features

These are easy to identified and include foundations of buildings or other construction features and items from domestic and military activities.

APPENDIX C: LIST OF ACRONYMS AND GLOSSARY

ACRONYMS

AIA: Archaeological Impact Assessment
 EIA: Environmental Impact Assessment
 ESA: Early Stone Age
 GPS: Global Positioning System
 ECO: Environmental Control Officer
 HIA: Heritage Impact Assessment
 HWC: Heritage Western Cape
 LSA: Later Stone Age
 MSA: Middle Stone Age
 NEMA: National Environmental Management Act
 NHRA: National Heritage Resources Act 25 of 1999
 OES: Ostrich Eggshell
 PHRA: Provincial Heritage Resources Agency
 SAHRA: South African Heritage Resources Agency
 SEF: Solar Energy Facility
 WEF: Wind Energy Facility

GLOSSARY

Archaeology: The scientific study and reconstruction of past communities through the systematic recovery of the remains (organic and material) older than 100 years.

Bored Stone: A rounded stone of various sizes with a bored / drilled hole in the middle. Some were used as weights on digging sticks.

Cultural Landscape: Cultural landscapes can be interpreted as complex and rich extended historical records conceptualised as organisations of space, time, meaning, and communication moulded through cultural process.

Early Stone Age: The Early Stone Age from between 2.5 million and 250 000 years ago refers to the earliest that *Homo sapiens sapiens* predecessors began making stone tools.

Historical Archaeology: Historical archaeology refers to the last 500 years when European settlers and colonialism entered into southern Africa.

Later Stone Age: The Later Stone Age (LSA) spans the period from about 20 000 years ago until the colonial era, although some communities continue making stone tools today.

Middle Stone Age: The Middle Stone Age spans a period from 250 000 - 30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art and symbolism.

National Estate: Heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations

Protected Structures, Features and Buildings: Structure or part of a structure which is older than 60 years

