A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED 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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NOTE: The phase 1 archaeological impact assessment was conducted as a requirement of the National Heritage Resources Act 25 of 1999, Section 38 (8).

This report follows the minimum standard guidelines required by Heritage Western Cape (HWC) and the South African Heritage Resources Agency (SAHRA) for compiling a Phase 1 Archaeological Impact Assessment (AIA), including the built environment and other cultural heritage resources.

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 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 assessment is undertaken as per a written request from Heritage Western Cape (HWC) dated 1 March 2016 (case number 15110409AS0219E).

The survey and assessment 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 Environmental Impact Assessment (EIA) process for the proposed Brandvalley WEF to ensure that negative impacts are mitigated if avoidance is not possible and enhance any positive impacts.

Table 1: Description of Affected Farm Portions

Description of affected farm portions			
Farm Name and Number	21 digit SG Code	Municipality/ Province	Farm size (ha)
The Remainder of Barendskraal 76	C04300000000007600000	Laingsburg LM/ Central Karoo DM/ Western Cape	1,523.7
Portion 1 of Barendskraal 76	C04300000000007600001	Laingsburg LM / Central Karoo DM / Western Cape	2,828.6
The Remainder of Brandvalley 75	C04300000000007500000	Laingsburg LM / Central Karoo DM / Western Cape	1,981.9
Portion 1 of Brandvalley 75	C04300000000007500001	Laingsburg LM / Central Karoo DM / Western Cape	56.3
The Remainder of Fortuin 74	C04300000000007400000	Laingsburg LM / Central Karoo DM / Western Cape	2,454.98
Portion 3 Fortuin 74	C04300000000007400003	Laingsburg LM / Central Karoo DM / Western Cape	1,868.4
The Remainder of Kabeltouw 160	C01900000000016000000	Witzenberg (Ceres) LM/ Cape Winelands DM/ Western Cape	1,082.8
The Remainder of Muishond Rivier 161	C01900000000016100000	Witzenberg (Ceres) LM/ Cape Winelands DM/ Western Cape	4,051.8
Portion 1 of Muishond Rivier 161	C01900000000016100001	Witzenberg (Ceres) LM/ Cape Winelands DM/ Western Cape	3391
Portion 1 of Fortuin 74 (Ou Mure)	C04300000000007400001	Laingsburg LM / Central Karoo DM / Western Cape	408.9
The Farm Rietfontein 197	C07200000000019700000	Karoo Hoogland LM/ Namakwa DM/ Northern Cape	5,873.6
Total hectares			**25,521.98**

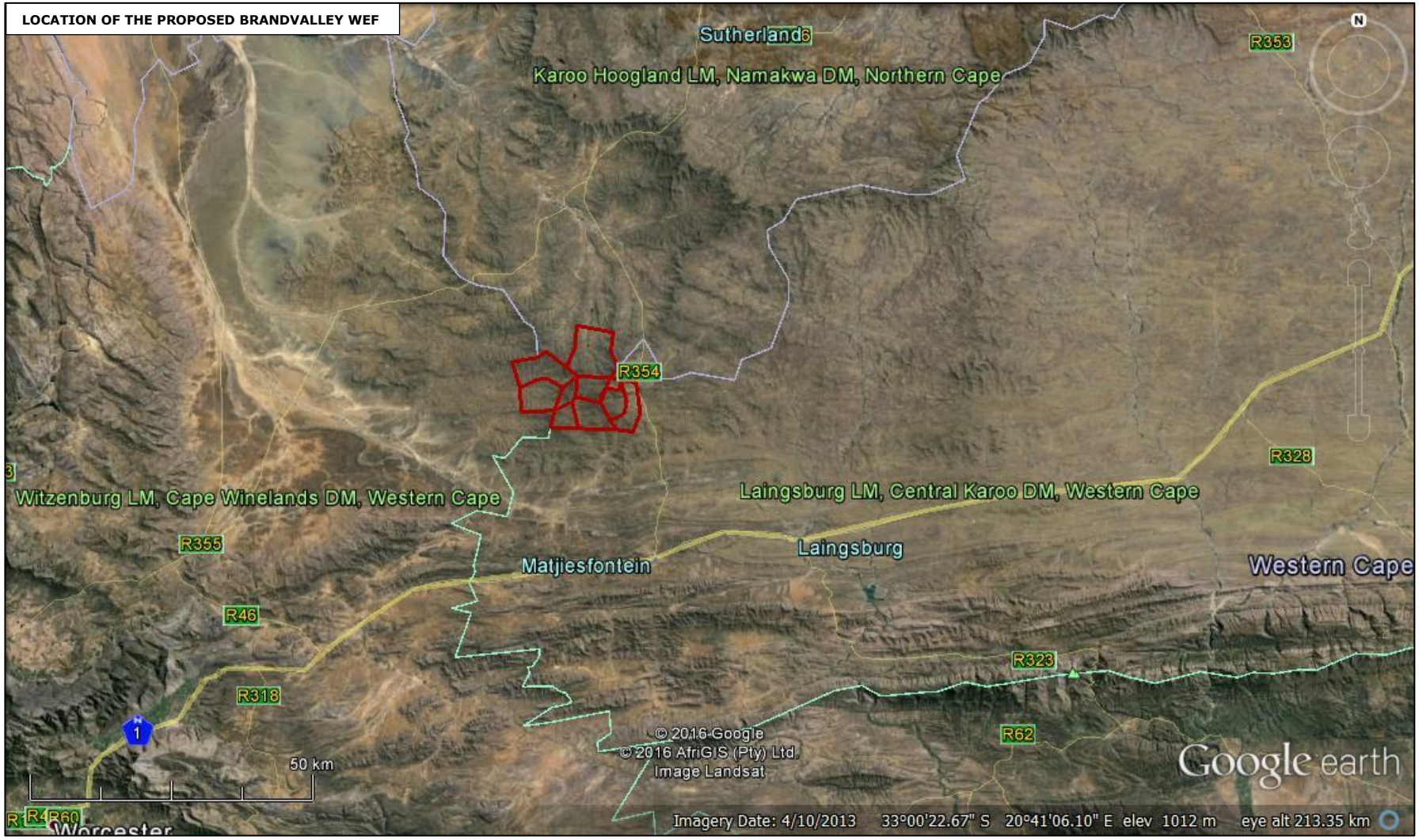

Figure 1: Aerial view showing the location of the proposed Brandvalley Wind Energy Facility including the surrounding areas mentioned in the report.

Brief Summary of Findings

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 (BV_SA1 – BV_SA7)**

Both Middle Stone Age and Later Stone Age stone artefact scatters (BV_SA1 – BV_SA5 and BV_SA7) 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 raw material as well as hornfels and local shale raw materials and comprised of a range of tool types, some showing evidence of retouch and utilization, such as flakes, chunks, cores and formal tools including scrapers and adzes.

No other cultural or organic archaeological heritage materials were observed 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 the water sources.

One Later Stone Age stone artefact (BV_SA6) was documented at the turning point of the proposed new access road that will extend to the middle of Turbine 19 and Turbine 20 within the higher altitude areas. Generally, no precolonial archaeological sites would occur within these areas as the area comprises steep hills and high summits with elevation ranges between 1 100 m and 1400 meters above sea level and would be deemed inhospitable for any long-term occupation.

- **Stone Walling Features (BV_SW1 - BV_SW17)**

Generally part of the built environment, these historical structures have been described separately in this report. Up to seventeen (17) 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.

- **Historical Artefact Scatters (BV_Hist1 – BV_Hist3)**

Historical artefacts scatters include fragments of glass, ceramics and metal material probably dating to the late 19th century. These scatters are mainly identified to be associated with the stone packed dwellings / cottages and / or stone packed kraals.

- **Built Environment Structures (BV_BE1 – BV_BE8)**

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).

- **Burial Grounds and Graves (formal and informal burials) (BV_G1 – BV_G2)**

One burial ground (BV_G1) is situated outside of the demarcation of the Barendskraal homestead on the farm Barendskraal 76. The fenced graveyard comprising both formal (built-up family graves) and informal burials (stone packed employees' burials) is situated along the access road north-west of the Barendskraal farmhouse.

Stone packed features resembling informal burials (BV_G2) were documented along one of the valleys on Barendskraal 76. The stone packed features are located within the vicinity of the ruins of a stone packed cottage with associated historical artefactual material close to a water source. No WEF development is proposed to take place within this area.

- **Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS6)**

Six homesteads / farm complexes were identified and demarcated within the proposed Brandvalley WEF area. 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. It is preferred that an alternative routing around the demarcated homestead BV_HS4 (Barendskraal) is established instead of upgrading the existing access road that currently follows through the demarcated homestead. The concerns have been highlighted in section that discusses the road upgrade and heritage resources that may be impacted along the route.

Recommendations

The overall area is considered as having a medium - high heritage significance. The following recommendations are summarised, see Section 10 for full and detailed recommendations with regards to the development of the proposed Brandvalley WEF and 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, unless the layout of these nine turbines and associated infrastructure and access roads change.
- The power lines routes were not assessed as part of this study, but is a separate study as part of the Basic Assessment Process. The recommendations of this report should not be read in isolation from the report prepared for the Basic Assessment.
- 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.
- Construction Camp 2 (CC2) situated on the Farm Fortuin 74 is the preferred option for the establishment of the construction camp.
- The upgrade /construction of the internal access roads should be limited to the existing internal roads as far as possible. Recommendations for routing and precautionary measures to avoid negative impact on heritage resources occurring along the route (stone and historical artefact scatters, stone walling features, graveyards, etc.) should be considered.

- If any of the old farm buildings are to intended for rehabilitation or re-use or demolition a qualified and experienced professional (historical archaeologist / historical architect) must be consulted.
- No turbines are to be located on Tafelkop or Spitskop.
- An archaeological heritage walk-through survey must be conducted if any changes to the positions of the wind turbines, associated infrastructure and roads outside the scope of this study are made for the final layout and further recommendations and mitigation measures be suggested if necessary.
- If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including burials and graves) are uncovered during construction, all work within close vicinity of the find must cease immediately and be reported the South African Heritage Resources Agency (SAHRA) (021 462 4502) or Heritage Western Cape (HWC) (021 483 5959) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities within the specific area can continue.
- Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

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 Brandvalley Wind Energy Facility (WEF) situated in the Karoo Hoogland Local Municipality (Namakwa District Municipality) and the Witzenburg Local Municipality (Cape Winelands District Municipality) and Laingsburg Local Municipality, (Central Karoo District Municipality). 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 WEF will have an energy generation capacity (at point of grid feed-in) of up to 140 megawatt (MW), and will include the following:

- Up to 70 potential wind turbine positions (between 1.5MW and 4MW in capacity each), each with a foundation of 25 m in diameter and 4 m in depth.
- The hub height of each turbine will be up to 120 m, and the rotor diameter of 140 m.
- Permanent compacted hard-standing laydown areas for each wind turbine (70 m x 50 m, total 24.5 ha) will be required during construction and for on-going maintenance purposes.
- Electrical turbine transformers (690v/33kV) adjacent to each turbine (typical footprint of 2 m x 2 m, but can be up to 10 m x 10 m at certain locations) would be required to increase the voltage to 33 kV.
- Underground 33kV cabling between turbines buried along access roads, where feasible.
- Internal access roads up to 12 m wide, including structures for storm-water control would be required to access each turbine location. Where possible, existing roads will be upgraded.
- 33kV overhead power lines linking groups of wind turbines to on-site 33/132kV substation(s).
- A number of potential 33/132kV on-site substation location(s) will need to be assessed. The footprint of these 33/132 kV substation(s) will need to be assessed in both this EIA and the Basic Assessment process for electrical infrastructure as the applicant will remain in control of the low voltage components of the 33/132kV substation (including isolators, control room, cabling, transformers, etc.) (assessed in this EIA) will likely be ceded to Eskom. The total footprint of this on-site substation will be approximately 200 m x 200 m. the exact coordinates of the low voltage components footprint (to be assessed in this IEA) and high voltage components footprint (to be assessed in the basic assessment process) will be provided in the EIA phase.
- Up to 4 x 120 m tall measuring lattice masts strategically placed within the wind farm development footprint to collect data on wind conditions during the operational phase.
- Temporary infrastructure including a large construction camp (~10 ha) and an on-site concrete batching plant (~1ha) for use during the construction phase.
- Borrow pits and quarries for locally sourcing aggregates required for construction (~4.5ha), in addition to on-site turbine excavations where required. All materials

excavated will eventually be used on the compacting of roads and hard-standing areas and no material will be sold to any third parties. The number and size of borrow pits depends on the suitability of the subsurface soils and the requirement for granular material for access road construction and other earthworks. Alternative borrow pit locations will be assessed in a separate BA process.

- Fencing will be limited around the construction camp/ substation and the entire facility would not necessarily be fenced off. The height of the fences around the construction camp are anticipated to be up to 4 m.
- Temporary infrastructure to obtain water from available local sources / new or existing boreholes. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the DWS will be applied for separately to this EIA process.

It is important to note that the number of turbines and grid connection options detailed above will be subject to an iterative process based on findings of the specialist reports and technical feasibility. A conceptual layout was provided by the applicant. It is important to note that this layout is preliminary and will be informed by the EIA process.

Grid Connection Infrastructure

The following infrastructure will likely be ceded to Eskom at a later stage and will therefore be assessed in a separate Basic Assessment process:

- A number of potential electrical 33/132kV substation locations on-site would be assessed depending on the electrical design, the on-site substation would have a footprint of 200 m x 200 m each that would also house on-site offices, storage areas, ablution facilities and the maintenance building. The high voltage components of these substation locations will be assessed in the Basic Assessment process whereas the low voltage components will be assessed in this EIA process as it will remain under the control of the applicant and will unlikely be ceded to Eskom.
- 132kV overhead distribution lines will be required to connect the WEF from the on-site 33/132kV substation to the Eskom 400kV Komsberg substation.
- Extension of the 400kV Komsberg substation with several electrical components to be defined by Eskom (e.g. additional feeder bay, transformer bay) on the existing substation property.

Potentially Shared Infrastructure

Depending on Eskom's requirements it might be feasible for both Brandvalley and Rietkloof WEFs to share an on-site 33/132kV substation which could then connect both facilities to the grid. This would be assessed as a potential connection alternative in a separate Basic Assessment process.

Access roads and laydown area, borrow pit locations and buildings and other infrastructure will also be shared as far as feasibly possible.

1.2. Applicant

Brandvalley Wind Farm (Pty) Ltd

1.3. Environmental 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) for the proposed 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).

- 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 based on the CES assessment methodology; and
- Identify mitigatory measures to protect and maintain any valuable heritage or archaeological sites and remains that may exist within the proposed site.

1.5. Cumulative impact assessment

Project induced cumulative impacts should be considered, along with direct and indirect impacts, in order to better inform the developer's decision making and project development process. The International Finance Corporation (IFC) Performance

Standards (PS) (2012) defines cumulative impacts as those *"that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted."* Cumulative impacts result from incremental changes caused by other past, present or reasonably foreseeable actions acting in concert with the project. Individually minor impacts from different developments can interact in various ways over time to become collectively significant. Barbour (2007: 39), adapting work by Cooper, 2004, describes cumulative impacts as impacts which "may be:

- **Additive:** the simple sum of all the effects (e.g. the accumulation of ground water pollution from various developments over time leading to a decrease in the economic potential of the resource);
- **Synergistic:** effects interact to produce a total effect greater than the sum of individual effects. These effects often happen as habitats or resources approach capacity (e.g. the accumulation of water, air and land degradation over time leading to a decrease in the economic potential of an area);
- **Time crowding:** frequent, repetitive impacts on a particular resource at the same time (e.g. multiple boreholes decreasing the value of water resources);
- **Neutralizing:** where effects may counteract each other to reduce the overall effect (e.g. infilling of a wetland for road construction, and creation of new wetlands for water treatment); and,
- **Space crowding:** high spatial density of impacts on an ecosystem (e.g. rapid informal residential settlement)."

Cumulative impacts are, however, difficult to accurately and confidently assess, owing to the high degree of uncertainty, as well as it often being based on assumptions. It is therefore difficult to provide as detailed an assessment of cumulative impacts as is the case for direct and indirect project induced impacts. This is usually because of the absence of specific details and information related to cumulative impacts. In these situations, the EAP ensured that any assumptions made as part of the assessment are made clear. Accordingly, the EIA Phase includes an overview and analysis of cumulative impacts related to a variety of project actions, and does not provide a quantitative significance rating for these impacts, as was done for direct project induced impacts. The objective is to identify and focus on potentially significant cumulative impacts so these may be taken into consideration in the decision-making process. It is important to realise these constraints, and to recognise that the assessment will not, and indeed cannot, be perfect. The potential for cumulative impacts will, however, be considered, rather than omitted from the decision making-process and is therefore of value to the project and the environment.

The following assumptions guided the cumulative assessments:

- All projects within a 30km radius were considered along with the existing Eskom 400kV and 765kV powerlines just north of Brandvalley.

- All projects will also require the establishment of a 132kV overhead powerline.
- It was assumed that all projects proposed (both energy generation and electrical infrastructure projects) will be implemented as a worst case scenario.

The numerous applications and proposed establishment of several wind energy and solar energy facilities (Figure 2) between Matjiesfontein and Sutherland as well as the adjacent regions have sparked a concern with regards to cumulative impacts that these projects may have on the heritage resources and the cultural landscape. Therefore it is of the utmost importance to provide a thorough documentation of the archaeological and historical heritage resources, sites and features within the specific project area. The archaeological and historical heritage resources must be appropriately mitigated at a project / site specific level so that there is less of a risk of losing the information after the construction of these alternative energy facilities. The loss of information at regional scale is at risk as these facilities cause an immense amount of surface disturbance and destruction where archaeological and historical heritage resource are at risk of being destroyed without justification.

In addition, the cultural landscape of the wider region is inhibited by mass industrialisation of the landscape that changes the character of the landscape and hence impacts on the sense of place and aesthetic value negatively. The Karoo has been considered as a wilderness landscape whereby the cumulative impact will involve significant sterilisation of the aesthetic qualities of the landscape, the Karoo heritage and its character and sense of place.

2. HERITAGE LEGISLATIVE REQUIREMENTS

Parts of sections 3(1)(2)(3), 34(1), 35(4), 36(3) and 38(8) of the National Heritage Resources Act 25 of 1999 apply and are repeated below for ease of reference. The applicability of these sections are that no heritage features may be disturbed without obtaining the required approval.

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 m^2 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 m^2 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.

38. (8) The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

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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 Brandvalley WEF. 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 and 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 Olduwan Industry originating from stone artefacts recorded at Olduvai Gorge, Tanzania. The Acheulian Industry, the predominant southern African Early Stone Age Industry, replaced the Olduwan 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 facetted 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

Brandvalley Wind Farm (Pty) Ltd proposes to develop a WEF within the Northern Cape and Western Cape Provinces of South Africa. In the Northern Cape, the proposed project falls within the Karoo Hoogland Local Municipality and within the Namakwa District

Municipality. In the Western Cape the WEF falls within the Witzenburg Local Municipality and the Laingsburg Local Municipality and within the Cape Winelands and the Central Karoo District Municipalities, respectively.

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 proving access within the project area.

The proposed Brandvalley WEF falls across eleven (11) farm portions (Table 1). These land portions are currently used for animal husbandry, game farming and agriculture including grazing of sheep.

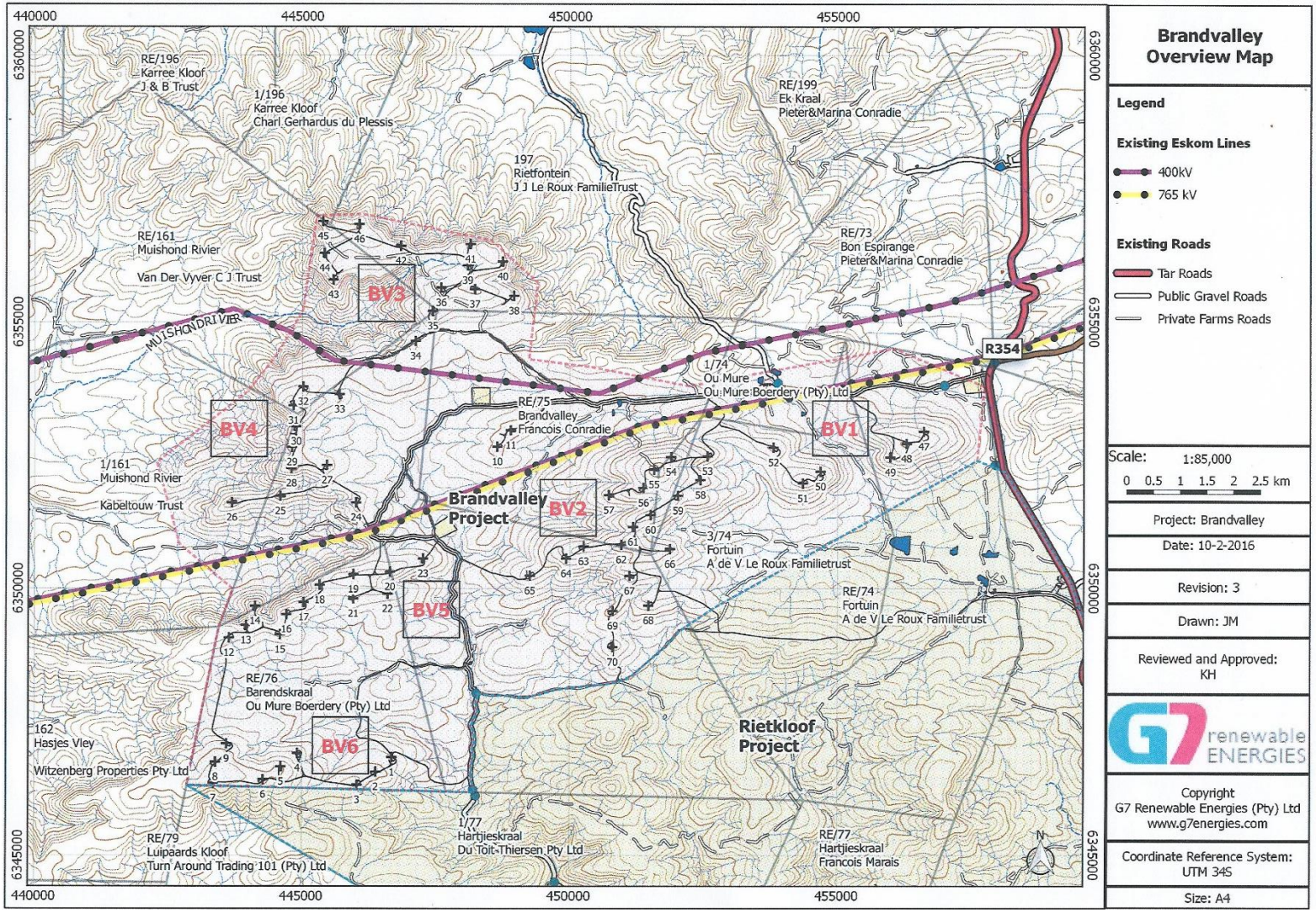

Figure 2: Map showing the location of the proposed Brandvalley Wind Energy Facility (courtesy of EOH Coastal and Environmental Services).

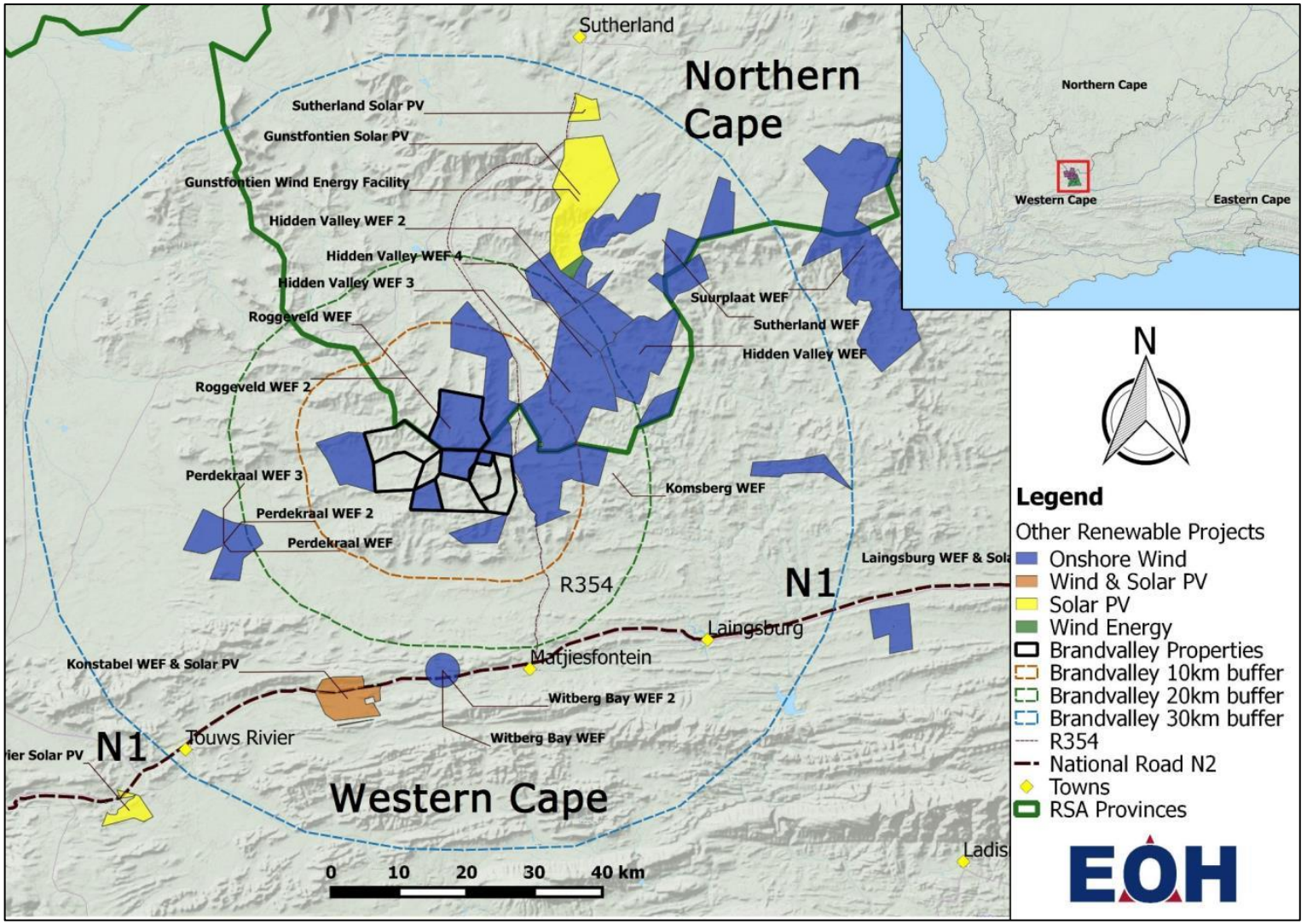

Figure 3: Map showing the location of the proposed Brandvalley Wind Energy Facility and nearby Wind and Solar Energy projects (courtesy of EOH Coastal and Environmental Services).

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 shave been conducted within close proximity to the study area and were included as part of the literature review.

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.

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.

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 was 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 (25 521.980 ha) 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 2: 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 graded
BV_HS2	Ou Mure homestead situated on the Farm Fortuin 74	32°57'14.15"S; 20°30'16.61"E	Not graded
BV_HS3	Barendskraal homestead situated on the Farm Barendskraal 76.	33°00'14.80"S; 20°26'45.57"E	Not graded
BV_HS4	Fortuin situated on the Farm Fortuin 74	32°59'17.78"S; 20°33'43.82"E	Not graded
BV_HS5	Nuwerus situated on the Farm Fortuin 74	32°59'18.64"S; 20°32'54.70"E	Not 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) *IIIB*
BV_SA2	Stone artefact scatters	32°57'25.22"S; 20°28'46.86"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_SA3	Stone artefact scatters	32°57'18.67"S; 20°28'31.57"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_SA4	Stone artefact scatters	32°57'51.71"S; 20°25'59.09"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_SA5	Stone artefact scatters	32°58'04.57"S; 20°25'53.32"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_SA6	Stone artefact scatters	32°58'46.81"S; 20°25'39.60"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_SA7	Stone artefact scatters	33°00'33.31"S; 20°28'59.88"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_SA_RS1	Notable rock shelter in the Barendskloof valley	33°00'43.70"S; 20°26'45.23"E	'General' Protection B (Field Rating IV B) *IIIB*
Graves / Burials			
BV_G1	Formal fenced cemetery situated on the Farm Barendskraal 76	33°00'05.72"S; 20°26'42.52"E	High Significance
BV_G2	Informal stone packed burials that will not be affected by the proposed development located in one of the valleys on the Farm Barendskraal 76	33°00'34.48"S; 20°29'01.98"E	High Significance
Stone walling features			
BV_SW1	Circular stone packed feature, Fortuin 74	32°57'16.25"S; 20°32'42.98"E	*Grade IIIC significance*
BV_SW2	Stone walling kraal, part of Ou Mure homestead	32°57'11.30"S; 20°30'21.14"E	*Grade IIIC significance*
BV_SW3	Stone packed circular feature	32°57'51.83"S; 20°25'57.06"E	*Grade IIIC significance*

BV_SW4	Remains of stone packed dwelling	32°57'54.30"S; 20°25'54.25"E	*Grade IIIC significance*
BV_SW5	3x roughly packed stone features, Kabeltouw Outspan 160	32°58'04.09"S; 20°25'54.23"E	*Grade IIIC significance*
BV_SW6	Circular stone packed feature	32°59'17.75"S; 20°26'30.11"E	*Grade IIIC significance*
BV_SW7	Stone walling kraal, Barendskraal 76	33°00'12.31"S; 20°26'37.96"E	*Grade IIIC significance*
BV_SW8	Stone walling kraal, Barendskraal 76	33°00'13.09"S; 20°26'46.55"E	*Grade IIIC significance*
BV_SW9	Stone walling kraal, Barendskraal 76	33°00'16.21"S; 20°26'46.60"E	*Grade IIIC significance*
BV_SW10	Stone walling kraal, Barendskraal 76	33°00'16.38"S; 20°26'51.91"E	*Grade IIIC significance*
BV_SW11	Stone walling kraal, Barendskraal 76	33°00'17.86"S; 20°26'48.14"E	*Grade IIIC significance*
BV_SW12	Stone packed dwelling with corrugated roofing and additions, Barendskraal 76	33°00'09.24"S; 20°28'33.42"E	*Grade IIIC significance*
BV_SW13	Stone packed wall, Barendskraal 76	33°00'35.50"S; 20°29'00.70"E	*Grade IIIC significance*
BV_SW14	Stone packed dwelling, Barendskraal 76	33°00'33.00"S; 20°28'59.46"E	*Grade IIIC significance*
BV_SW15	Stone packed dwelling / complex, Barendskloof Valley	33°01'15.76"S; 20°26'43.77"E	*Grade IIIC significance*
BV_SW16	Remains of stone wall	33°59'17.82"S; 20°33'40.72"E	*Grade IIIC significance*
BV_SW17	Stone packed kraal	32°59'20.92"S; 20°32'48.77"E	*Grade IIIC significance*
Historical Artefacts Occurrences, Scatters and Sites			
BV_Hist1	Historical artefact scatter	32°57'52.02"S; 20°25'56.96"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_Hist2	Historical artefact scatter	32°59'16.89"S; 20°26'29.76"E	'General' Protection B (Field Rating IV B) *IIIB*
BV_Hist3	Historical artefact scatter	33°00'33.09"S; 20°28'59.67"E	'General' Protection B (Field Rating IV B) *IIIB*
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_BE2	Reservoir	32°57'11.54"S; 20°32'05.21"E	N/A
BV_BE3	Reservoir / kraal	32°57'19.51"S; 20°28'31.02"E	N/A
BV_BE4	Reservoir / 2 stone packed features	32°58'04.74"S; 20°25'56.18"E	N/A
BV_BE5	Reservoir / kraal	33°59'12.84"S; 20°26'27.97"E	N/A
BV_BE6	Reservoir / stone packed dam	32°59'57.18"S; 20°26'44.10"E	N/A
BV_BE7	Drinking trough	33°00'11.17"S; 20°28'26.56"E	N/A
BV_BE8	Reservoir / kraal	32°59'17.54"S; 20°33'24.38"E	N/A

5.3.1. POSITIONS OF THE WIND TURBINES

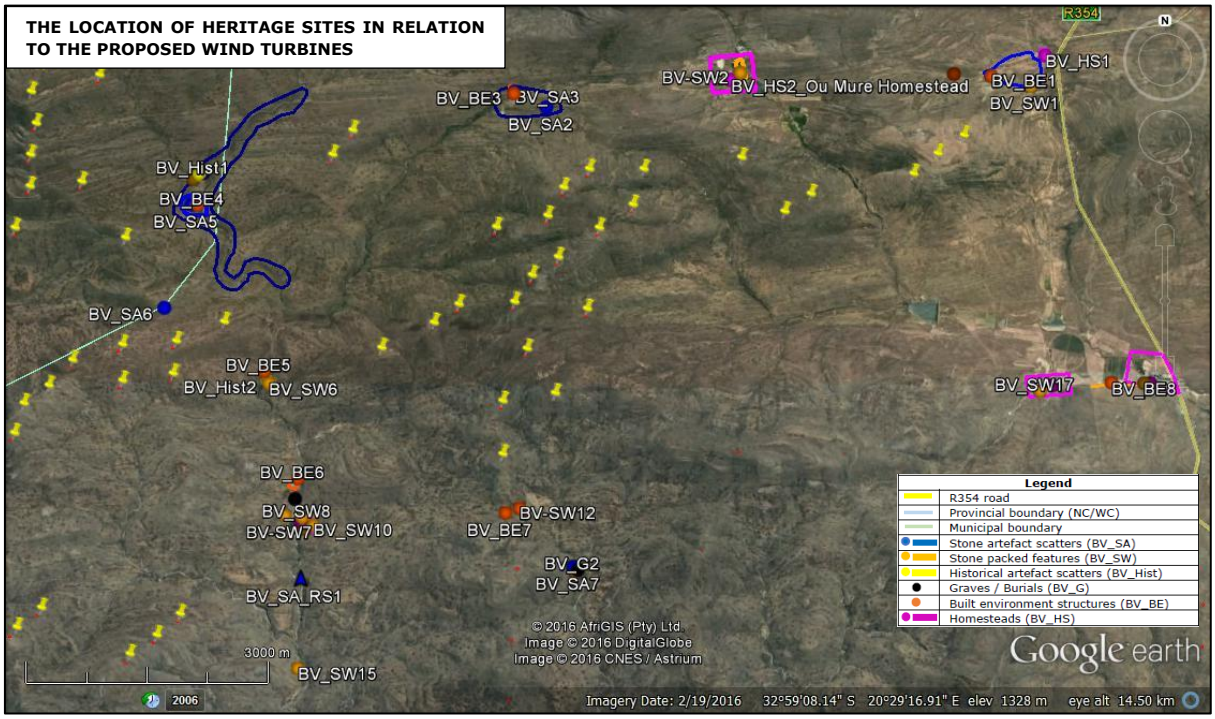

Figure 4: View of the proposed wind turbine positions (yellow pins) showing the heritage sites encountered during the survey.

The proposed areas for the wind turbines and are situated on the hill and mountain tops. The elevation ranges between 1 100 and 1 400 meters above sea level with steep hills and high summits (Figures 5-10). Several water courses occur within the area. These water courses are fed by numerous streams draining off the surrounding slopes.

The area was surveyed by conducting spot checks along the existing roads where exposed surface areas allowed for investigation. Only one stone artefact (BV_SA6), a flake, probably of Later Stone Age origin manufactured on a fine-grained raw material, was located at the proposed turning point of the proposed new access road leading to the middle of Turbine 19 and Turbine 20. No other archaeological and heritage remains were observed within the proposed wind turbine areas investigated during the survey.

It is unlikely that pre-colonial communities would have considered the hill and mountain tops 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. Therefore, it is unlikely that archaeological heritage remains and sites would be uncovered during the construction of the wind turbines.

Generally, cave sites that may have the potential for occupation are limited to the areas along rivers and at the foot of the mountains although some painting site are known to occur in isolated areas. Rock art painting sites are known to occur, although rarely, within the wider region, especially south of Matjiesfontein and Laingsburg in the

Swartberg Mountains and to the north. No sites have been reported within the proposed project area.

The areas proposed for the wind turbines are considered as having a low cultural significance. No further mitigation is recommended for these areas.

Figure 5: View of the general landscape and the mountain top areas proposed for the location of the wind turbines (Fortuin 74).

Figure 6: View of the general landscape and the mountain top areas proposed for the location of the wind turbines (Fortuin 74).

Figure 7: View of the general landscape and the mountain top areas proposed for the location of the wind turbines (Muishond Rivier 161).

Figure 8: View of the general landscape and the mountain top areas proposed for the location of the wind turbines (Kabeltouw Outspan 160).

Figure 9: View of the general landscape on the mountain top areas proposed for the location of the wind turbines (Fortuin 74).

Figure 10: View of the general landscape on the mountain top areas proposed for the location of the wind turbines (Barendskraal 76).

5.3.2. POSITIONS OF THE SUBSTATIONS

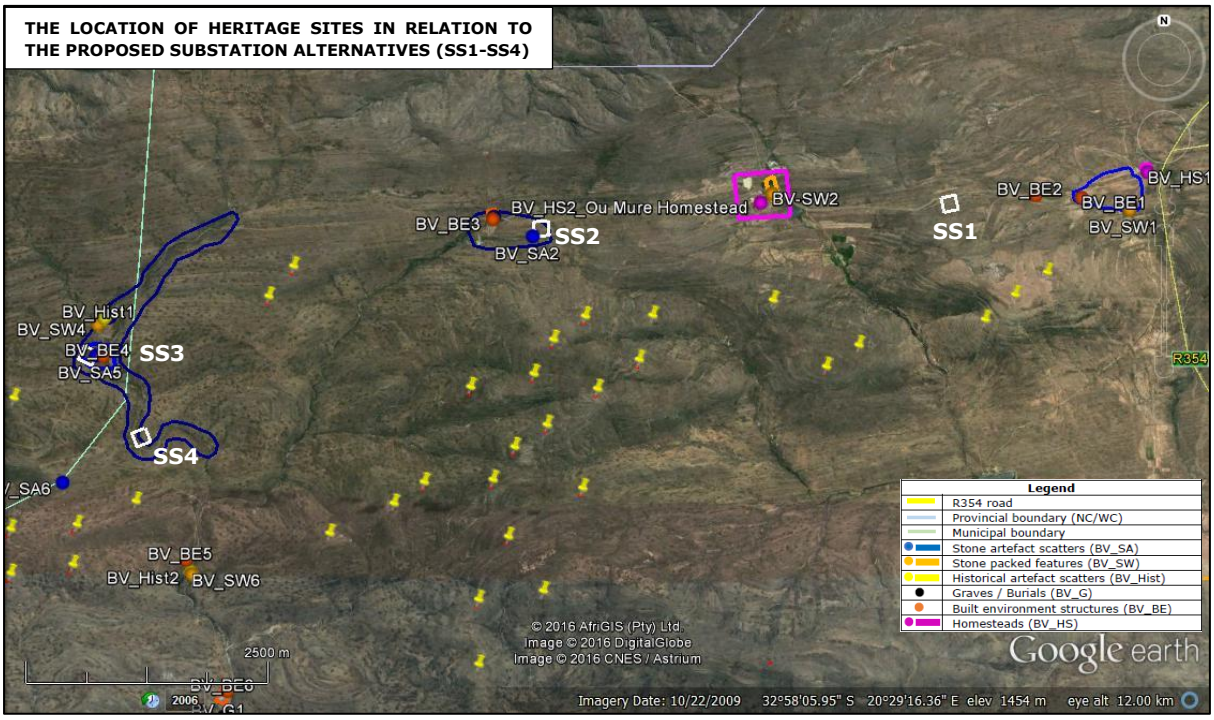

Figure 11: View of the locations of the four substation positions (SS1 – SS4) proposed within the Brandvalley WEF area in relation to the heritage sites encountered during the survey.

Three potential 33/132kV on-site substation locations were assessed (Figure 11). The total footprint of this on-site substation will be approximately 200 m x 200 m.

Substation 1 (SS1) (Figure 11) 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 12-13). 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 (Figure 12).

Substation 2 (SS2) (Figure 11) 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 14-15). Middle Stone Age stone artefacts (BV_SA2, Figure 11) 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 11) is situated west of the internal access road on the Farm Kabeltouw Outspan 160 (Figure 16) and Substation 4 (SS4) (Figure 11) is situated along

the eastern side of the water course on the Farm Barendskraal 76 (Figure 17). 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 on-site 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 12: View of the area proposed for substation alternative SS1 facing north (Fortuin 74).

Figure 13: View of the area proposed for substation alternative SS1 facing west (Fortuin 74).

Figure 14: View of the area proposed for substation alternative SS2 facing west (Brandvalley 75).

Figure 15: View of the area proposed for substation alternative SS2 facing south-east (Brandvalley 75).

Figure 16: View of the area proposed for substation alternative SS3 facing north-west (Farm Kabeltouw Outspan 160).

5.3.3. POSITIONS OF THE CONSTRUCTION CAMPS

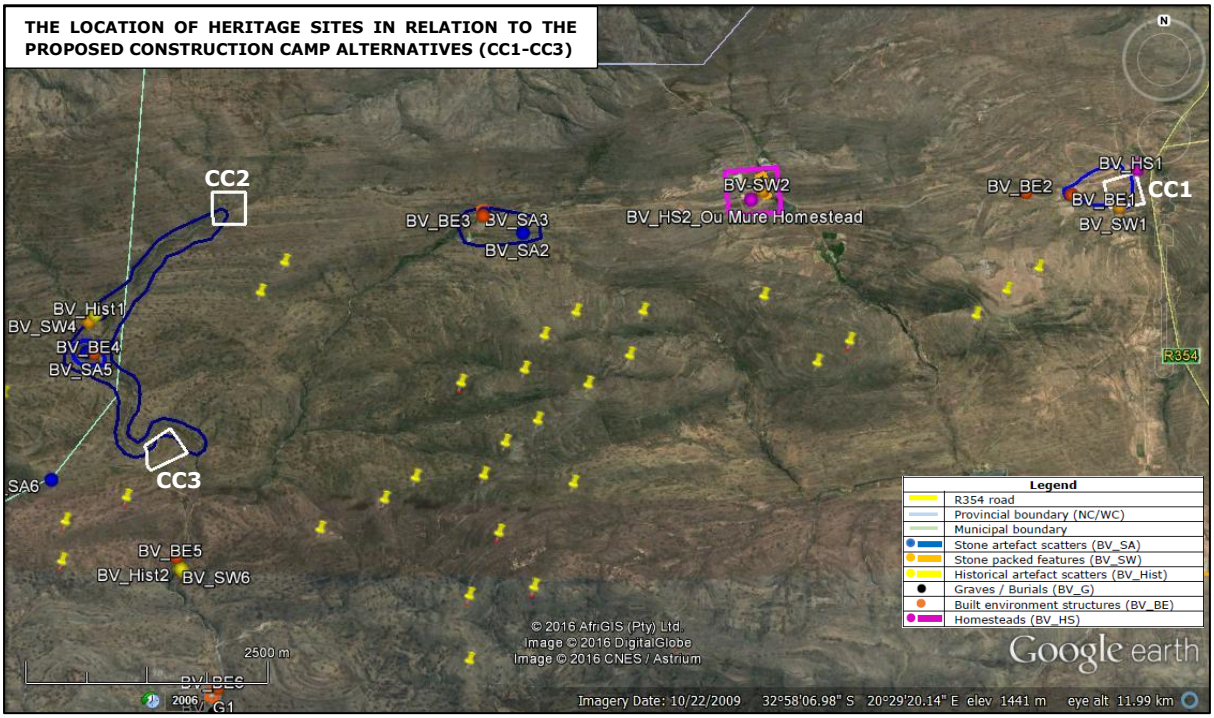

Figure 17: View of the locations of the three construction camp (CC1 – CC3) positions proposed within the Brandvalley WEF area in relation to the heritage sites encountered during the survey.

Temporary infrastructure including a large construction camp (~10 ha) and an on-site concrete batching plant (~1ha) for use during the construction phase. Fencing will be limited around the construction camp and the entire facility would not necessarily be fenced off. The height of the fences around the construction camp are anticipated to be up to 4 m. Three potential construction camp locations were assessed (Figure 17).

Construction Camp 2 (CC2) (Figure 17) is situated north of the existing internal access road on the Farm Fortuin 74 is a preferable option for the establishment of the construction camp. No archaeological, historical or other heritage resources were documented within this area. This proposed substation site is the preferred alternative as it will not impact on any heritage resources as none could be observed within the area during the survey. This, however, does not dismiss the potential of uncovering possible stone artefact scatters within this area as it is situated near the water course where surface scatters of stone artefacts have been documented. The vegetation cover was relatively dense that made archaeological visibility and surface investigation relatively difficult. (Figures 18-19)

Construction Camp 1 (CC1) (Figure 17) is situated south of the existing internal access road at the entrance of the R354 road between Matjiesfontein and Sutherland on the Farm Fortuin 74 (Figures 18-19). It is preferred that this area is not used for the

establishment of the construction camp. A small stone walled feature was recorded on the proposed southern boundary of the construction camp area (Figure 20). Later Stone Age stone artefacts were found exposed within water washed and eroded areas as well as on the surface north and south of the internal access road (Figures 21-23). The microlithic stone artefacts were manufactured on a fine-grained chalcedony raw material and comprised of cores, flakes, chips, as well as formal tools that showed evidence of retouch and utilization (Figures 24-25). It is unlikely that the stone artefacts within the water washed and eroded areas (BV_SA1) occur *in situ* and are regarded as being in a secondary and out of context position as it seems that they have been washed into the exposed areas. It is possible that stone artefacts may occur below the vegetation cover between the surface and 50 – 80 cm below the ground.

Construction Camp 3 (CC3) (Figure 17) is immediately south opposite the proposed Substation 4 (SS4) on the Farm Barendskraal 71. Stone artefact scatters were observed within the area and it is predicted that these stone artefact scatters would occur along the extent of the water course.

It is preferred that this area (proposed for CC3 and SS4) 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 construction camps are available. However, if the preferred Construction Camp 2 option (CC2) is not feasible according to input from other studies conducted the appropriate mitigation measures should be followed with regards to the other two substation alternatives. As suggested in discussion of the Substation options, a survey focusing on the area along the watercourse be conducted between the proposed Substation 2 (SS2) and Substation 4 (SS4) which would include Construction Camp 2 (CC2) to establish the real extent of the artefact occurrences.

Although the Construction Camp 1 option (CC1) is not the preferred option, several mitigation measures could be considered, similarly if the proposed area for Construction Cape 2 (CC2) is not feasible. One suggestion is that a 30 m buffer be established around the stone packed walling feature (BV_SW1) situated on the southern boundary and clearly demarcated to avoid any damage by the construction camp activities and other possibly negative human impact. Another suggestion is that, if relevant to an archaeological repository (usually a museum or university) in the Western Cape, the real extent of the stone artefact scatters and types could be recorded in detail and collected prior to development activities. A third suggestion is that the location of the proposed Construction Camp 1 (CC1) be shifted to an alternative area, possible west along the existing access road.

Figure 18: View of the area proposed for construction camp alternative CC2 facing east (Brandvalley 75).

Figure 19: View of the area proposed for the construction camp alternative CC2 facing east (Brandvalley 75).

Figure 20: View of the area proposed for construction camp alternative CC1 facing north-east (Fortuin 74).

Figure 21: View of the area proposed for construction camp alternative CC1 facing south (Fortuin 74).

Figure 22: View of the stone walling feature (BV_SW1) located within the proposed area for CC1 Fortuin 74.

Figure 23: View of the area that yielded the Later Stone Age stone artefacts (BV_SA1) within the proposed area for CC1 (Fortuin 74).

Figure 24 and Figure 25: Examples of the stone artefacts documented within the proposed CC1 area (Fortuin 74).

5.3.4. UPGRADING AND CONSTRUCTION OF THE PROPOSED INTERNAL ACCESS ROADS

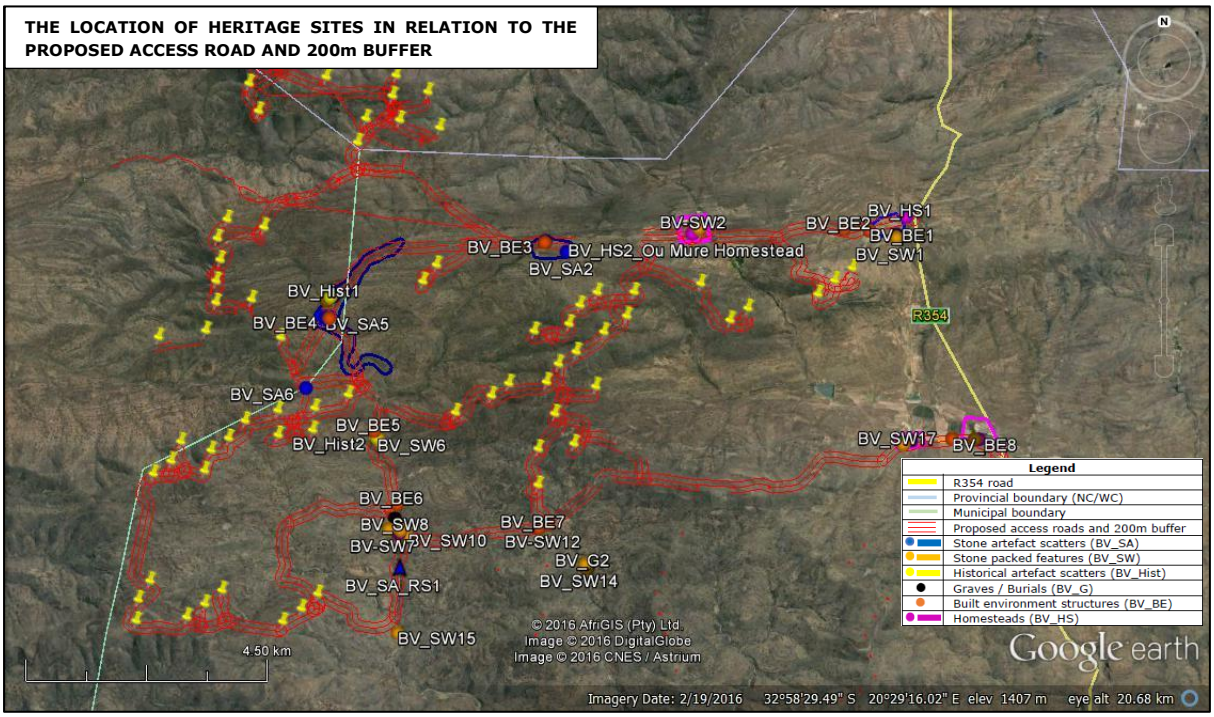

Figure 26: View of the access roads and 200 m buffer proposed within the Brandvalley WEF area in relation to the heritage sites encountered during the survey.

Internal access roads up to 12 m wide, including structures for storm-water control would be required to access the turbine locations. Where possible, existing roads will be upgraded.

The existing roads were followed for the survey to establish the impact on any heritage resources occurring along the road and within a 200 m buffer area (100 m on either side the existing road) to allow for layout planning.

Several heritage resources were identified to occur along this route within the 200 m buffer area. Several of the heritage resources have already been referenced in regards to the proposed development of other infrastructure (Substation and Construction Camp alternatives) in this report. This section identifies the heritages resources that may be negatively affected and / or impacted upon during the construction of the road and continuous use of the road during the WEF's construction phase and offer recommendations for possible establishment of buffer zones around heritage resources or rerouting to avoid negative impact on these resources as well as the general cultural landscape. Each area that has been identified will be described separately.

It is suggested that the existing internal access roads be upgraded up to the 12 m wide limit except in the cases that heritage resources (including archaeological, historical and

palaeontological) as well as the other studies conducted may be negatively impacted and recommend differently.

5.3.4.1. Proposed access road upgrade between BV_HS1 (Fortuin 74) and BV_HS2 (Ou Mure) (Fortuin 74)

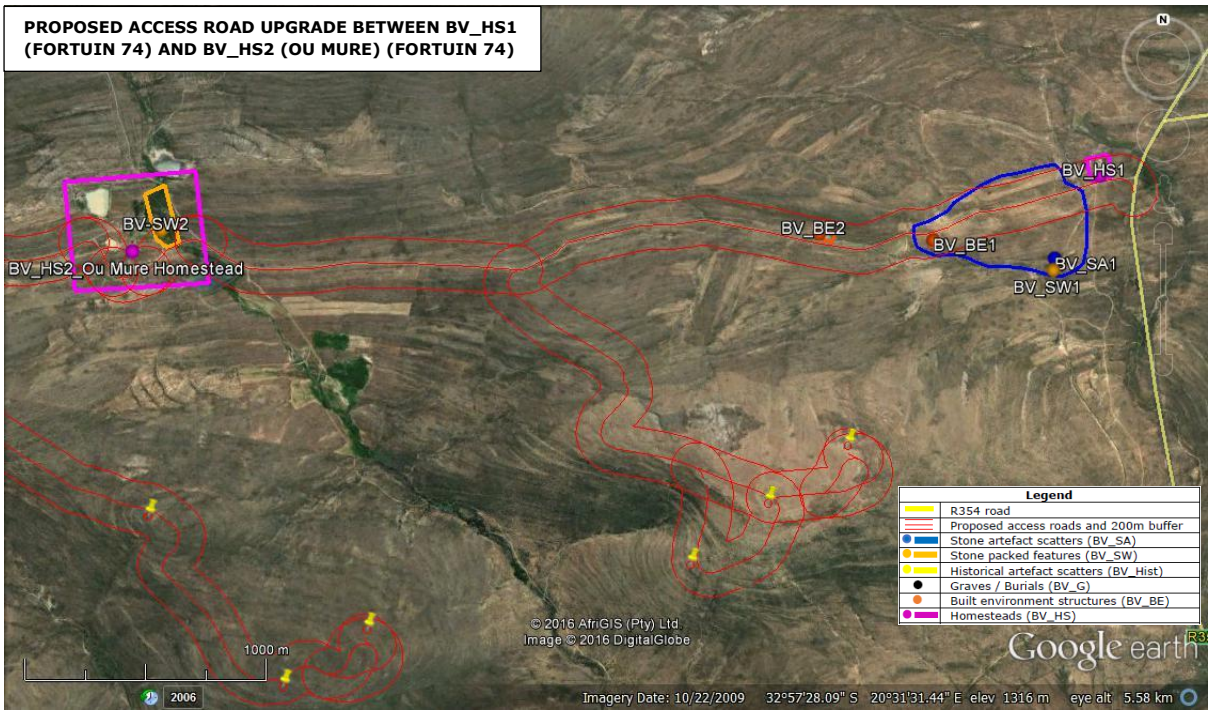

Figure 27: View of the internal access road proposed for upgrade between BV_HS1 and BV_HS2 (Ou Mure) within the Brandvalley WEF area in relation to the heritage sites encountered during the survey.

It is suggested that the proposed upgrade of the proposed access road be limited to the existing road by extending the access road (up to 12 m) to the south. Later Stone Age stone artefacts (BV_SA1) (Figure 27) were found to occur over a wide area at the entrance off the R354. The stone artefact scatter occurs on both sides and within the road. It is likely that stone artefacts may be uncovered during the upgrading activities of the access road. As suggested in the section discussing the alternatives for the proposed construction camps, Construction Camp 1 (CC1) being relevant here, a suggestion is that, if relevant to an archaeological repository (usually a museum or university) in the Western Cape, the real extent of the stone artefact scatters and types could be recorded in detail and collected prior to development activities.

BV_BE1 (Figure 27) is a white cottage and is located about 35 m south of the existing internal road and is unlikely to be negatively affected during the upgrading of the access road.

BV_BE2 (Figure 27) is a reservoir and associated drinking trough situated about 30 m north of the existing road. These built environment structures are likely to be less than

60 years and/or have been continously maintained and changed over time, therefore, holding no heritage significance, but should be avoided during the upgrading of the access road. If the upgrading of the road extends (up to 12 m) south the structures should not be negatively affected.

5.4.3.2. Proposed access road upgrade through BV_HS2 (Ou Mure Homestead)

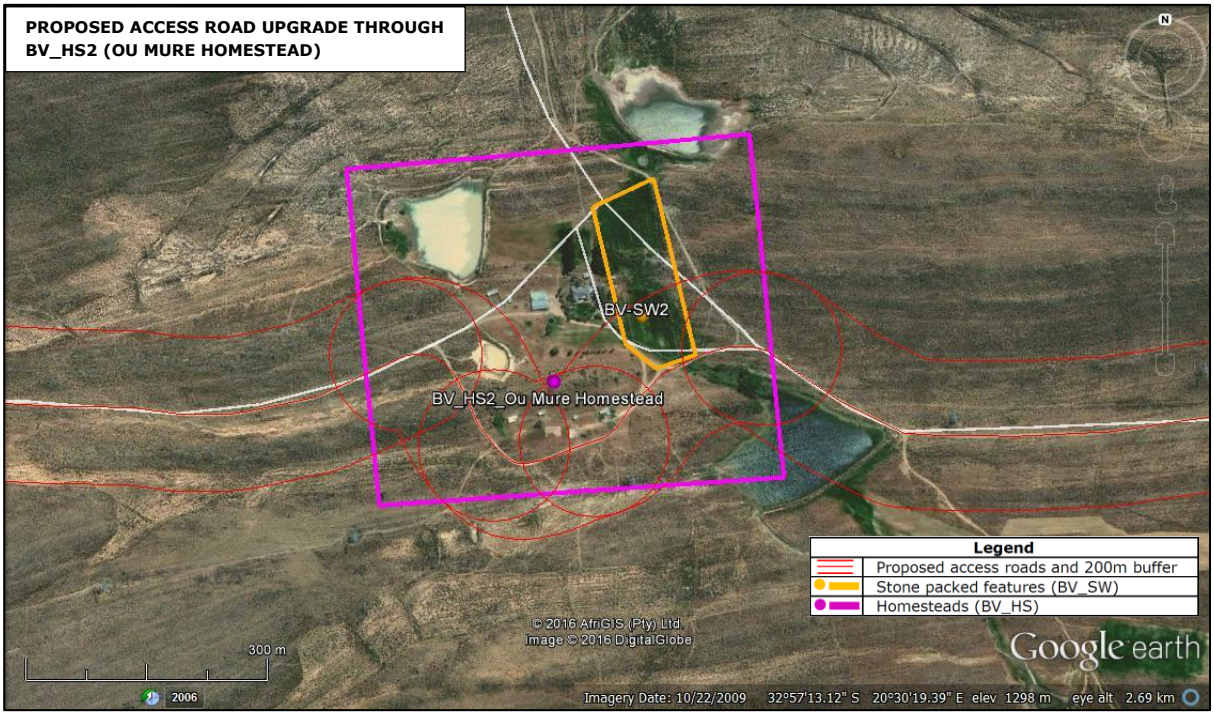

Figure 28: View of the internal access road proposed for upgrade through BV_HS2 (Ou Mure) within the Brandvalley WEF area in relation to the heritage sites encountered during the survey.

The description of the Ou Mure homestead (Figure 28) has previously been included in two heritage impact assessments (Hart & Webley 2011; Hart & Webley 2013). It has been described as consisting of a complex of structures, the late 19th century / early 20th century farmstead, with its associated dry stone walled garden area and lands. It was noted that although originally built of stone extensive changes had been made in the early 20th century.

The existing internal access road passing through the homestead will be upgraded for use during the construction of the WEF development. In agreement with Hart & Webley (2011, 2013) the farm and surrounds are of heritage interest, the presence of the 400 kV and 765 kV power lines, situated about 380 m from the house, has negatively impacted the heritage and aesthetic qualities of the setting.

The main concern with regard to negative impact on heritage features is the stone walling kraal (BV_SW2) that is situated immediately next to the existing internal access road (Figure 29). It would be difficult to establish a 30 m buffer as it would shift the road further east, therefore precaution must be taken to avoid any negative impact on the kraal as well as other structures

Figure 29: View of the access road proposed to be upgraded passing through the Ou Mure homestead.

5.3.4.3. Proposed access road upgrade affecting the stone artefact scatters (BV_SA2 and BV_SA3) and the built environment (BV_BE3)

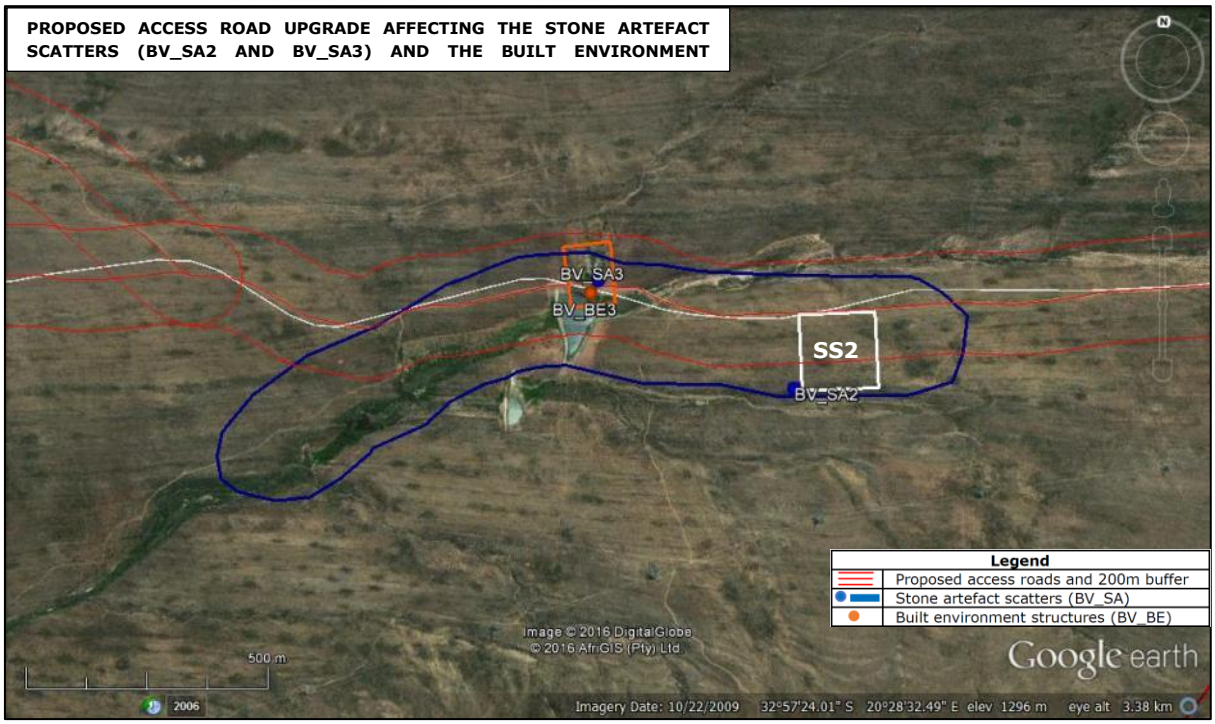

Figure 30: View of the stone artefact occurrences (BV_SA2 and BV_SA3) and predicted stone artefact occurrences (demarcated blue area) along the proposed access road within the Brandvalley WEF area.

Middle Stone Age stone artefacts (BV_SA2, Figure 30) manufactured on hornfels raw materials and shale as well as Later Stone Age stone artefacts (BV_SA3, Figure 30) 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. It is therefore predicted that these stone artefacts would occur along the water course to the south of the existing access road and that more would be uncovered during the expansion of the access road.

As has been suggested in the above section discussing the substation alternatives that a survey focusing on the area along the water course is conducted between Substation 2 (SS2) (Figure 30) and Substation 4 (SS4) to establish the real extent of the artefact occurrences.

BV_BE3 is a functional reservoir situated near the internal farm gate. Care should be taken to avoid any damage to the structure.

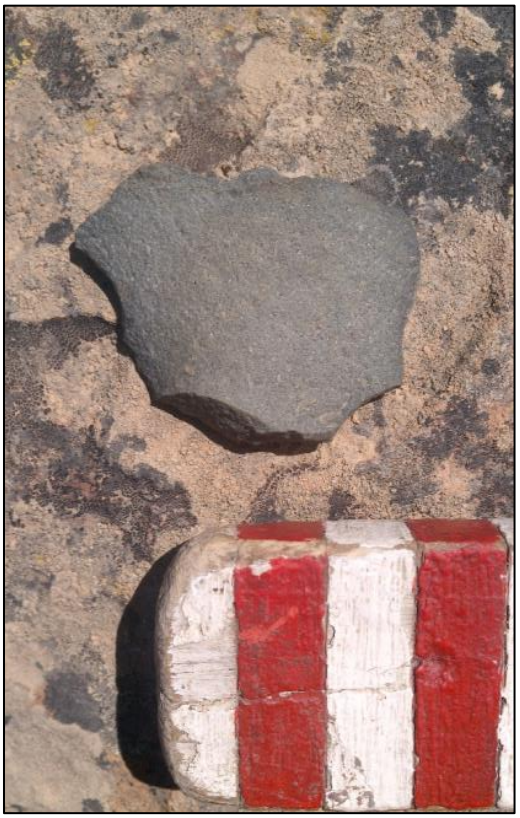

Figure 31 and Figure 32: Examples of Middle Stone Age stone artefacts occurring along the water course.

5.3.4.4. Proposed access road upgrade affecting the stone packed walling features and associated historical artefactual material (BV_SW3, BV_SW4 and BV_Hist1) and stone artefact scatter (BV_SA4).

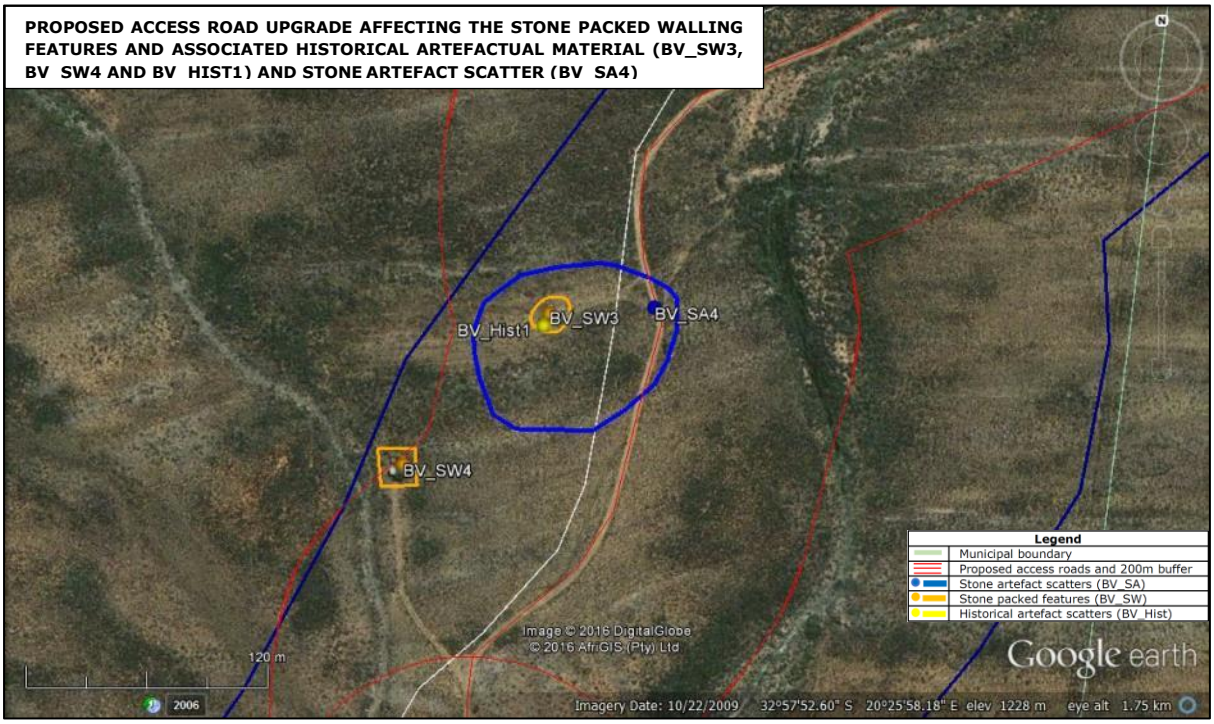

Figure 33: View of the proposed access road within the proximity of the stone walling features (BV_SW3 and BV_SW4) and associated historical artefactual material (BV_Hist1) and stone artefact scatter (BV_SA4) within the Brandvalley WEF area.

A circular stone walling feature (BV_SW3) possibly used for keeping stock (Figures 35-36) is situated about 40 m west of the existing internal road and a stone packed dwelling with some modern looking structures (BV_SW4) (Figures 37-38) situated on the border of the 100 m proposed road upgrade buffer. BV_SW3 is a circular stone packed feature surrounded by a scatter historical artefacts, probably dating to the late 1800's (Figure 39). BV_SW4, located along the 100 m road upgrade buffer is the remains of relatively well preserved cottage. Modern structures comprising out of corregated iron have since been constructed within the area. Both are abandoned. The remains of bone and ceramics occurred within this area.

Later Stone Age stone artefacts were also found to occur within the vicinity of BV_SW3 and alongside the road (Figure 40). The artefacts observed within theexisting internal access road are most probably in a disturbed context owing to the construction and maintenance of the this road. It is possible that stone artefacts may be uncovered during the upgrade of the access road.
It is suggested that the upgrading be limited to existing access road. As the stone packed feature (BV_SW3) is situated 40 m from the existing access road that any expansion (up to 12 m) should be done to the east. The heritage feature, BV_SW4, is situated on the border of the 100 m buffer considered for the road upgrade and would, therefore, not be negatively impacted if upgrading of the road is limited to existing internal road as suggested.

Figure 34: View of the stone walling feature (BV_SW3) facing north.

Figure 35: View of the stone walling feature (BV_SW3) facing west.

Figure 36: View of the stone walling cottage (BV_SW4) facing north.

Figure 37: Close-up view of the stone walling cottage (BV_SW4) facing east.

Figure 38 and Figure 39: View of the historical artefacts (BV_Hist1) and stone artefacts located within the vicinity of the stone walling feature (BV_SW3).

5.3.4.5. Proposed access road upgrade affecting the stone packed features (BV_SW5) and stone artefact scatter (BV_SA5) at the reservoir (BV_BE4) on the Farm Kabeltouw Outspan 160.

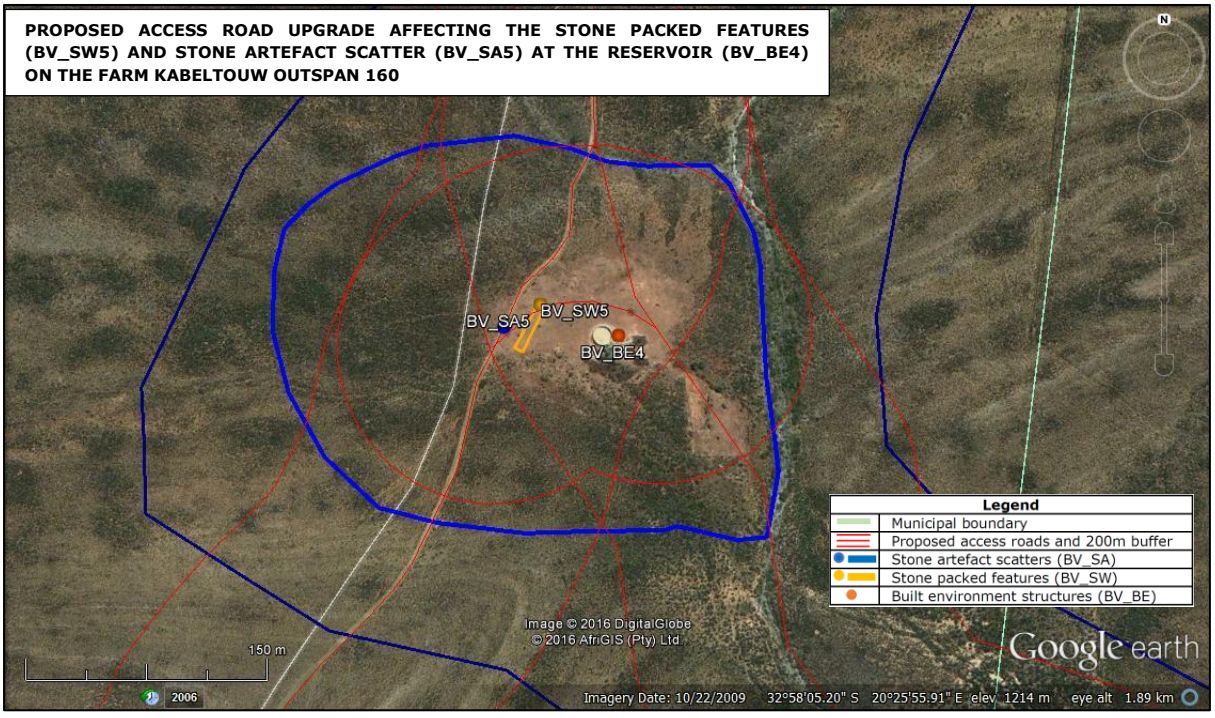

Figure 40: View of the proposed access road upgrade affecting the stone packed features (BV_SW5) and stone artefact scatter (BV_SA5) at the reservoir (BV_BE4) on the Farm Kabeltouw Outspan 160.

Three stone packed features were documented within the vicinity of reservoir (BV_BE4) (Figures 41-42). These types of features generally indicate informal burials, however, it is unlikely that these may be graves.

Scatters of Middle Stone and Later Stone Age stone artefacts (BV_SA5), extent of scatter is shown by the blue demarcated area (Figure 40), were documented around the reservoir (BV_BE4), these included microliths as well as exceptionally larger flakes (Figures 43-44). It is unlikely that these artefacts occur *in situ*, but would be worth conducting a systematic study on the types of stone artefacts that occur on the landscape.

It is suggested that the upgrading and expanding of the road be limited to the existing internal road (up to 12 m) and extended to the west to avoide negative impact on the stone packed features. It is expected that stone artefacts would occur along the water course. This has been established by observance and recording the extent of stone artefacts occuring along this route.

Figure 41: View of the reservoir (BV_BE4) facing east.

Figure 42: View of the three stone packed features (BV_SW5) situated next to the reservoir (BV_BE4).

Figure 43 and Figure 44: Examples of stone artefacts observed within the vicinity of the reservoir (BV_BE4).

5.3.4.6. Proposed access road upgrade affecting the stone packed feature (BV_SW6) and and associated historical artefactual material (BV_Hist2)

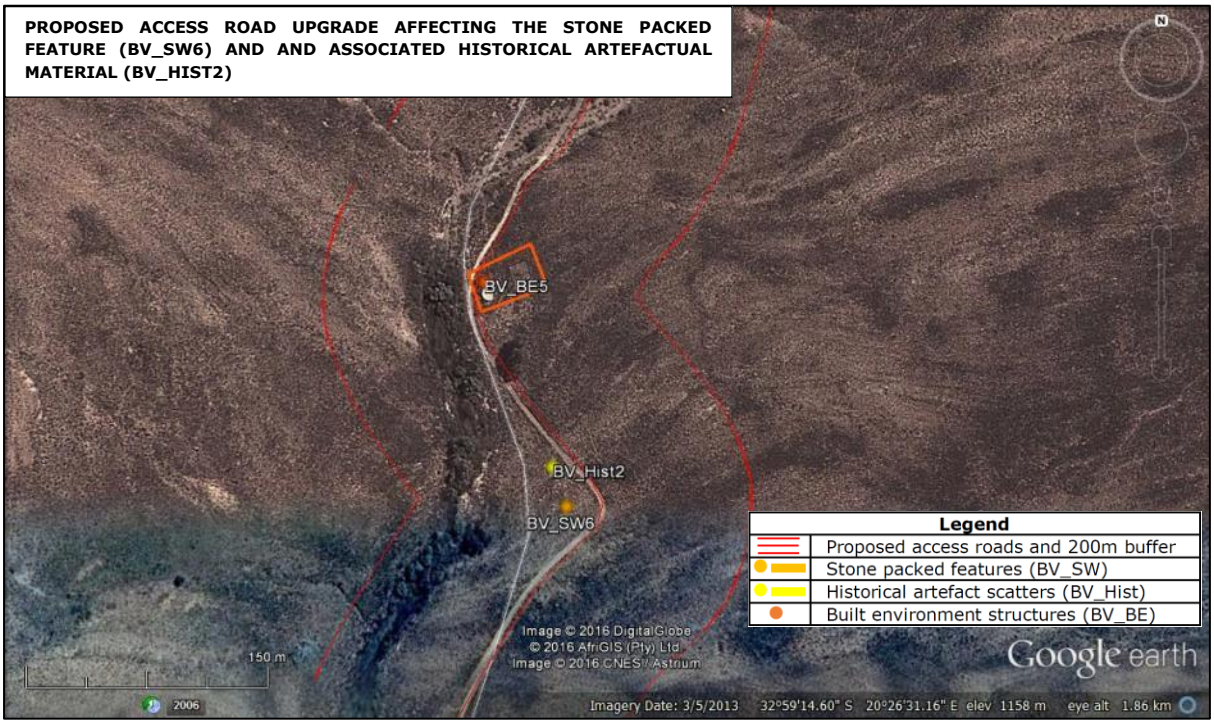

Figure 45: View of the locations of the reservoir (BV_BE5) and the stone walling feature (BV_SW6) and associated historical artefactual material (BV_Hist2) along the proposed road for upgrade.

BV_BE5 is a reservoir, drinking trough and kraal, and these structures are likely to be less than 60 years and / or have been maintained over time and therefore do not hold any cultural heritage significance.

BV_SW6 is the remains of a circular stone walling feature probably used for keeping stock (Figure 51). Several historical artefacts such as metal, glass and ceramics were documented within the vicinity of stone packed feature.

It is suggested that the proposed road upgrade be limited to the existing internal road (up to 12 m) and extended to the east of BV_SW6. BV_SW6 is situated slightly more than 20 m west of the existing internal road.

Figure 46: View of stone walling feature (BV_SW6).

5.3.4.7. Proposed access road upgrade through the Barendskraal homestead (BV_HS3)

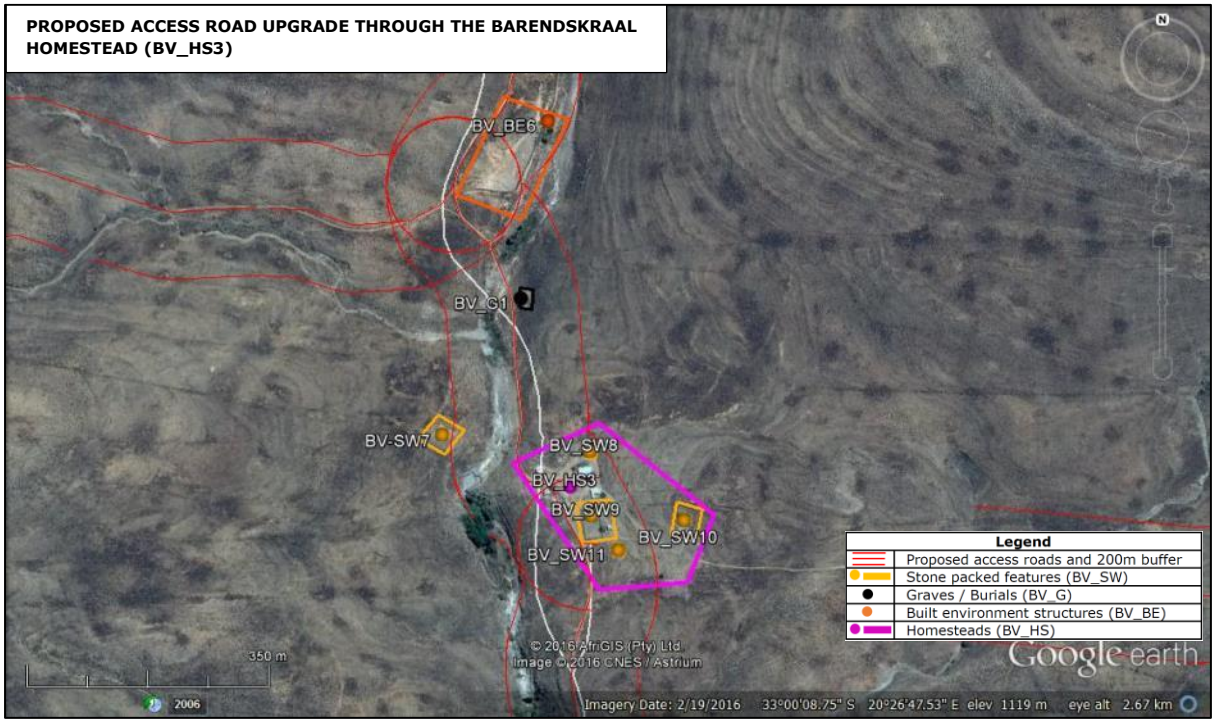

Figure 47: View of the Barendskraal Homestead (BV_HS3) showing the locations of the stone walling features (BV_SW7-BV_SW11) and graveyard (BV_G1) within proximity of the existing road to be upgraded.

The access road is proposed to follow the existing road passing south through the Barendskraal homestead. It was observed during the site visit that the existing access road is very narrow with not much space to manouver past the farmhouse, outbuildings and stone walling kraals (BV_SW9), that still seems to be used to for stock farming activities (Figure 53). Stone walling kraals (BV_SW10) also occur in the eastern half of the homestead 25 m north of the road to be upgraded that would link to proposed turbines in the east (Turbines 30 and 70) (Figure 54).

The Barendskraal family graveyard (BV_G1) is siuated about 210 m to the north of the homestead and 15 m east of the existing internal road. The fenced graveyard has two sections, one containing formal built-up graves (Figure 55) and the other containing informal burials (Figure 56) with only stones packed upright to serve as headstones. It is possible that the upgrade of the road may have a negative impact on the graveyard owing to the close proximity to the road and very little space to manouver.

It suggested that the upgrade to the access route extend to the west or an alternative route be established that would avoid the graveyard and deter from passing through the homestead (BV_HS3) and possibly negatively impacting on the stone packed features and other built environment.

Figure 48: View of the stone walling kraal next to the existing road proposed for upgrade (BV_SW9).

Figure 49: View of the stone walling kraals situated east of the Barendskraal homestead (BV_SW10).

Figure 50: View of the formal built-up graves in the one section of the graveyard (BV_G1).

Figure 51: View of the informal graves in the other section of the graveyard (BV_G1).

5.3.4.8. Proposed access road upgrade affecting the stone packed dwelling (BV_SW12) situated on the Farm Barendskraal 76.

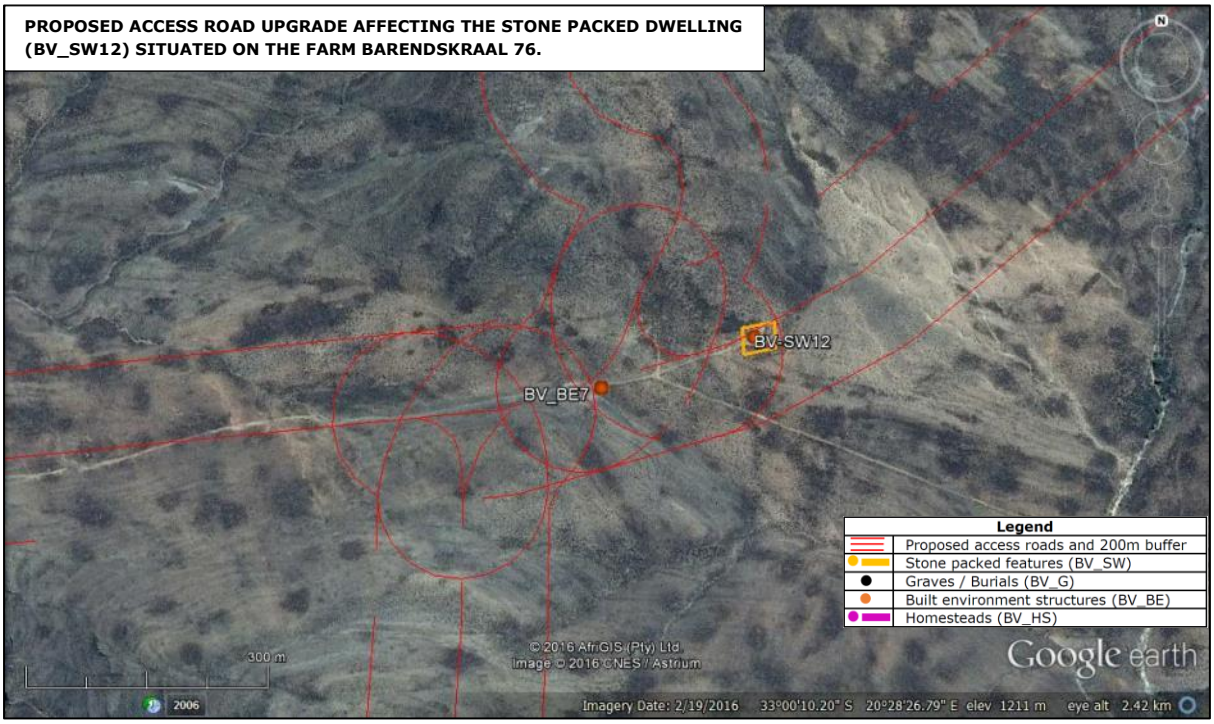

Figure 52: View of the location of the stone walling cottage (BV_SW12) situated within the route proposed for the upgrade of the access road.

The stone walling cottage (BV_SW12) (Figure 54) is in very good condition and may have been maintained and modified over time. Sheets of corrugated iron have been added as a roof and to close one side of the cottage.

BV_BE7 is a drinking trough is likely to be less than 60 years and / or have been maintained over time and therefore does not hold any cultural heritage significance.

It is suggested that the a 30 m buffer of be established around the stone packed dwelling (BV_SW12) and clearly demarcated prior to the commencement of development activities.

Figure 53: View of the modified stone walling cottage (BV_SW12) situated within the route proposed for the upgrade of the access roads.

5.3.4.9 Proposed access road upgrade affecting the rock shelter (BV_SA_RS1) and the stone packed dwelling (BV_SW15) in the Barendskloof valley.

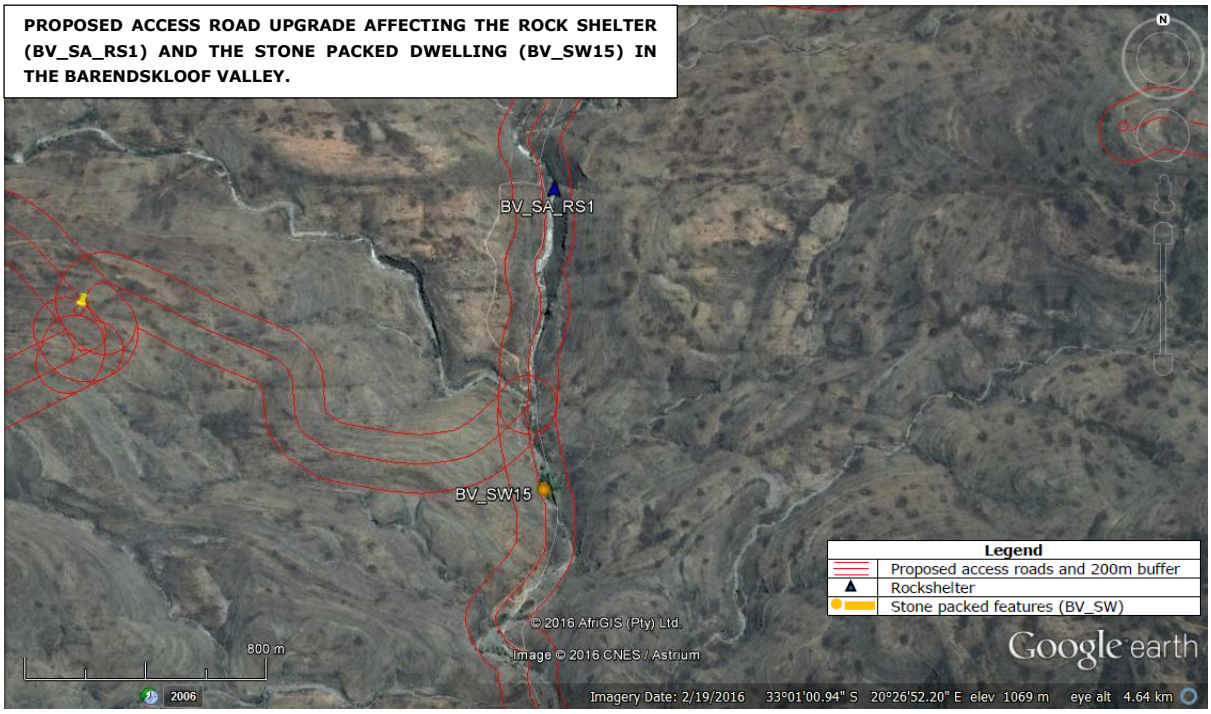

Figure 54: View of the Barendskloof south of the Barendskloof homestead showing the location of heritage resources of the location of the rockshelter (BV_SA_RS1) and the stone packed dwelling (BV_SW15).

Barendskloof is the narrow valley extending south from the Barendskloof homestead (BV_HS3). It was expected that stone arteact scatters would occur along the existing road through the valley. The exposed rocky outcrops along the valley were also scoured for the potential to identified possible rock shelters or overhangs.

One potential rock shelter was identified (BV_SA_RS1) about half-way between the BV_HS3 and southern end of the farm and WEF boundary (Figure 54). A few Later Stone Age stone artefacts and fragments of ostrich eggshell (OES) were documented within the rock shelter (Figures 55-57). It cannot be confirmed whether the OES fragments are associated with the stone artefacts or may be of more recent occurrence. A very ephemeral deposit may also occur within the rock shelter. It did seem as if an attempt at chiseling out a section of the rock shelter wall may have had paintings on it. This is speculative at present, as there were no clear paintings, but only possible weathered smudges of red ochre.

The rock shelter is situated on the opposite side of the river proposed for upgrade of the access road therefore no negative impact is expected to be incurred.

The remains of a stone walling cottage (BV_SW15) was documented on the southern Brandvalley WEF boundary. The remains are overgrown with trees and bush, but remain in a relatively good condition (Figure 58). This feature (BV_SW15) is located immediately off the existing, narrow, internal road. It usually recommended that development should not take place within 20 m - 30 m of archaeological / historical stone walling features and built environment structures. It is therefore suggested that the road be diverted to between 20 m – 30 m either east or west of this site owing to site being right next to the existing internal access road.

Figure 55: View of a rock shelter situated along the Barendskloof (BV_SA_RS1).

Figure 56 and Figure 57: Examples of the stone artefacts and OES fragments observed within the rockshelter.

Figure 58: View of the remains of stone walling cottage (BV_SW15) situated along the route proposed for the upgrade of the access roads.

5.3.4.10. Proposed access road upgrade affecting the homesteads (BV_HS4 and BV_HS5)

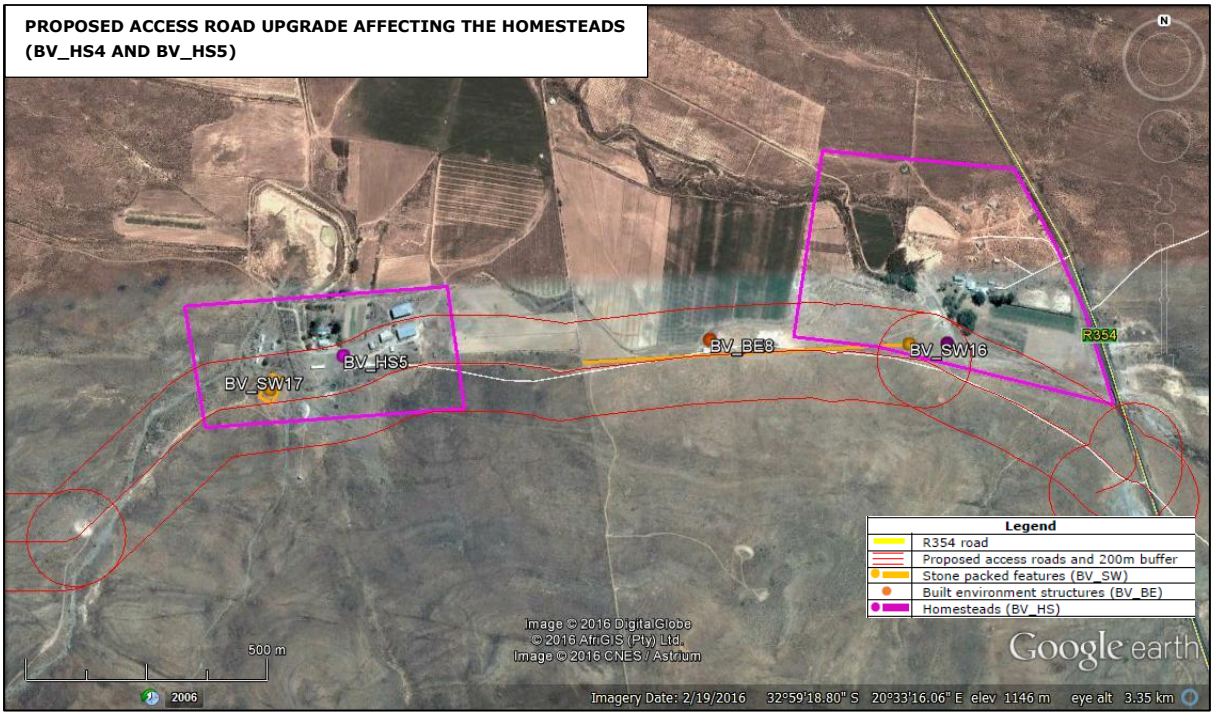

Figure 59: View of the internal road proposed for upgrade between the homesteads BV_HS4 (Nuwerus) and BV_HS5 (Fortuin) showing the extent of the remains of the stone walling running parallel to existing internal road (BV_SW16).

The remains of stone walling, probably an early boundary wall, is located immediately north of the existing internal access road (BV_SW16) within the 'road reserve'. Although it is no longer in tact there is no reason for it to be destroyed if alternatives are available. It is therefore suggested that the upgrade of the internal access road be expanded (up to 12 m) to the south and the remains of the stone walling be clearly demarcated so as to avoid any negative impact.

A 20 m – 30 m buffer should be established around the stone wall feature (BV_SW17) to avoid any negative impact passing south of the Fortuin homestead (BV_HS5)

6. CULTURAL LANDSCAPE

Cultural landscapes have become a significant considering factor when conducting various archaeological and heritage impact assessments for proposed developments. The area investigated 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, ranges from low is considered as having a *medium - high* cultural heritage significance.

The cultural significance of the heritage resources occurring on the proposed Brandvalley WEF landscape range from low according to its current state whether as a ruin, in a collapsed or in a deteriorating state, modification over time or occurs in disturbed *ex situ* context to medium / high depending on state of preservation or rarity and the occurrence of graves and burials. These heritage resources together tell a multitude of stories of the dynamics of the cultural landscape spanning thousands of years.

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 may 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 symbolic 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 dynamic 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 of 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.

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 general 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. However with increase in proposed Wind and Solar Energy developments this has changed and more of the landscape is being documented as far afield as Sutherland to north, Matjiesfontein and Laingsburg to the south respectively and the Moordenaars Karoo to the east and the Tankwa Karoo to the west.

This study has however brought to light that this area was once part of an early cultural landscape inhabited during two very different Stone Age periods namely the Middle Stone Age and the Later Stone Age that may occurred thousands of years apart. 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.

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 / trekboere 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.

The contemporary cultural landscape, affected by several outside factors such as the political, the economic, the social and the environment all play a part in moulding the contemporary cultural landscape. The need for renewable energy resources to release the pressure off the electrical grid and the use of non-renewable sources changes the cultural landscape from what it was and is and adds a different dimension of 'cultural'. It is almost impossible to preserve the pristine cultural landscape. However, despite the necessity for change there is also a need to preserve aspects of the past that have survived on this landscape for thousands or hundreds of years and will continue to do so for hundreds to thousands of years from now and it must be borne in mind that in some instances the change does not justify the destruction.

It has been mentioned in previous studies conducted for the proposed Roggeveld WEF (Hart & Webley 2011, 2013) that the general area is considered a highly scenic route as the area is viewed as a remote wilderness that has been sparsely inhabited in precolonial and colonial times. Currently large areas are required for successful commercial stock farming therefore retaining the sparse inhabitation of the region. The proposed Brandvalley WEF is aesthetically appealing emulation beautiful scenic views from the hill and mountain tops. However, this experience is limited to the farming community with very little tourism endeavours and tourist visiting the area within the Brandvalley WEF boundary.

7. SUMMARY OF SITES AND GRADING

7.1. Precolonial / Stone Age material (BV_SA1 – BV_SA7)

One Later Stone Age stone artefact (BV_SA6) was documented within the proposed turbine areas investigated, this occurred near to the access road. Generally, no precolonial archaeological sites would occur within these areas as the area comprises steep hills and high summits with elevation ranges between 1 100 m and 1400 meters above sea level and would be deemed inhospitable for any long-term occupation.

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. The artefacts occurred at the surface and eroding at about 20 cm - 30 cm below the surface, therefore, it possible that artefacts may occur further below the surface when excavations for construction begins. No other cultural or organic archaeological heritage materials were assumed to be directly related or associated with the stone artefact scatters.

It is unlikely that the stone artefacts occur *in situ* and are regarded as being in a secondary and out of context position as they have been washed into the exposed areas and have been disturbed by domestic animal and human activities. It is also possible that stone artefact may occur below the vegetation cover between the surface and 50 – 80 cm below the ground.

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_SA9) 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_SW17) and Historical Artefact Scatters (BV_Hist1 – BV_Hist3)

Up to 17 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 historical artefacts scatters include fragments of glass, ceramics and metal material probably dating to the late 19th century. These scatters are mainly identified to be associated within the vicinity of stone packed dwellings / cottages and/or stone packed kraals.

It is difficult to grade the historical artefact scatters in isolation from their association within the areas they were documented, therefore, the grading of the stonewalling features includes the historic artefact scatters as a unit.

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-BVSW17) 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 IIIC significance* (IIIC, HWC 2016). It could be mitigated and (part) retained as a heritage register site (*Medium - 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_BE8)

These include all structures that are not constructed by stone packing and are typically younger than 60 years including abandoned buildings, used and unused reservoirs and drinking troughs. These structures occur across the landscape along the access roads. These structures typically do not hold any current cultural significance and therefore have not been allocated a grading.

7.4. Graves (formal and informal burials) (HV_G1 – BV_G2)

The historical family cemeteries are usually situated within close proximity or a part of the homestead. Some of these graveyards / informal burials fall outside of the identified homesteads in this study. One fenced formal graveyard is situated along the access road (BV_G1) near the Barendskraal homestead. BV_G2 will not be affected by the proposed development.

The graves / burials are considered as having a *high cultural significance* and has been allocated a heritage grading of:

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.

7.5. Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS6)

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

Six homesteads / farm complexes were identified within the proposed Brandvalley WEF area. The homesteads are situated either adjacent to the proposed access roads or in

some cases the proposed internal access roads are expected pass through the homesteads to follow the existing roads.

These homesteads include the farm house and associated staff accommodation, outbuildings and stone walling features and built environment structures. These have not been allocated grading.

7.6. Landscape Grading

It has been noted that the general area of the Brandvalley WEF 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_SA7)

The Destruction of Precolonial / Stone Age material (BV_SA1 – BV_SA7):

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 Brandvalley WEF area. The existing internal roads run through these areas and close to water courses. On such areas, artefacts have been found to become exposed within the internal gravel farm roads. Therefore it is likely that more stone artefacts and possibly other material and organic material may be uncovered during the construction of infrastructure and upgrade of the roads situated with these areas. The stone artefacts are considered as being irreplaceable heritage resources, once the artefact or the sire has been destroyed so has the information for interpretation.

Mitigation Measures: It would be difficult to avoid encountering these artefact scatters within areas they occur. Once the final layout of the Brandvalley WEF has been established a more intensive survey of these areas should be conducted and further recommendations and further mitigatory be made.

Table 3: 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_SW17) and associated Historical Artefact Scatters (BV_Hist1 – BV_Hist3)

The Destruction of Stone Walling Features (BV_SW1 - BV_SW17) and associated Historical Artefact Scatters (BV_Hist1 – BV_Hist3):

Cause and Comment: It has been established in this report that several stone walling features and associated historical artefacts scatters occur on the flat floodplains and along water courses within the proposed Brandvalley WEF area. The existing internal roads run through these areas and close to water courses and artefacts have found to become exposed within the internal gravel farm roads. These features may be damaged by the construction of infrastructure and roads if not mitigated appropriately. Some of these features occur very close to existing roads proposed for upgrading resulting in a serious loss of the cultural landscape.

Mitigation Measures: No development should occur within 20 m – 30 m of these features. The features should be clearly demarcated before any development activities begin to avoid any negative impact. The layout of any infrastructure should be reconsidered to preserve these heritage resources.

Table 4: 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)	Definite (4)	Very High (18)
With mitigation	Long term (3)	Study site (2)	Slight (1)	Definite (4)	Moderate (10)

8.3. Graves (formal and informal burials) (HV_G1 – BV_G2)

The Destruction of Graves (formal and informal burials) (HV_G1 – BV_G2):

Cause and Comment: Only one of the two areas with graves / burials encountered are within close proximity of any development activities. These family graves are mostly older than 60 years protected and should be respected.

Mitigation Measures: The graveyard is already fenced off, however, the area should be clearly demarcated and the upgrade of the road be to the west or the road be diverted further away to avoid any possible negative impact to the graveyard.

Table 5: Impact assessment of the destruction of graves

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. Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS6)

The Destruction of Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS6):

Cause and Comment: Six homesteads / farm complexes were identified within the proposed Brandvalley WEF area. 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.

Mitigation Measures: It is strongly recommended that any proposed access roads avoid using these homesteads as a thoroughfare for the proposed wind energy facility.

Table 6: 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 (3)	Very severe (8)	Definite (4)	Very High (18)
With mitigation	Long term (3)	Study site (3)	Slight (1)	Definite (4)	Moderate (10)

8.5. 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 7: The impact of the construction of the proposed Brandvalley WEF 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)	Very Severe (8)	Definite (4)	Very High (17)
With mitigation	Medium term (2)	Study site (2)	Moderate (2)	Definite (4)	Moderate (10)

8.6. Cumulative Impacts:

The construction of the proposed Brandvalley WEF and cumulative impacts on heritage resources:

Cause and Comment: The numerous applications and proposed establishment of several wind energy and solar energy facilities between Matjiesfontein and Sutherland as well as the adjacent regions have sparked a concern with regards to cumulative impacts that these projects may have on the heritage resources and the cultural landscape. Therefore it is of the utmost importance to provide a thorough documentation of the archaeological and historical heritage resources, sites and features within the specific project area. The archaeological and historical heritage resources must be appropriately mitigated at a project / site specific level so that there is less of a risk of losing the information after the construction of these alternative energy facilities. The loss of information at regional scale is at risk as these facilities cause an immense amount of surface disturbance and destruction where archaeological and historical heritage resource are at risk of being destroyed without justification.

In addition, the cultural landscape of the wider region is inhibited by mass industrialisation of the landscape that changes the character of the landscape and hence

impacts on the sense of place and aesthetic value negatively. The Karoo has been considered as a wilderness landscape whereby the cumulative impact will involve significant sterilisation of the aesthetic qualities of the landscape, the Karoo heritage and its character and sense of place.

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

Table 8: The construction of the proposed Brandvalley WEF and cumulative impacts on heritage resources:

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)	Very Severe (8)	Definite (4)	Very High (17)
With mitigation	Medium term (2)	Study site (2)	Moderate (2)	Definite (4)	Moderate (10)

9. CONCLUSION

The survey was conducted by following the positions and routes for the various infrastructure within the areas outlined for the Brandvalley WEF and associated infrastructure as part of the Environmental Impact Assessment process. The power lines were not assessed as part of this study and have been included in a separate report prepared for the Basic Assessment Process.

Only one Later Stone Age stone artefacts was documented within areas proposed for the turbines this likely due to the inaccessibility of area comprising of steep hills and high elevations ranging between 1 100 m and 1 400 m above sea level. Surface scatters of Middle Stone Age and Later Stone Age stone artefacts were recorded in some low lying areas within exposed surface and disturbed donga areas. It is unlikely that the stone artefact surface scatters that occur on the exposed surface areas are positioned *in situ*; however, stone artefacts may occur between 50 – 80 cm below the surface.

Several stone walling features were identified. 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 historical artefacts scatters include fragments of glass, ceramics and metal material probably dating to the late 19th century. These scatters are mainly identified to be associated with within the vicinity of stone packed dwellings / cottages and/or stone packed kraals.

The proposed development would have negative implications on the archaeological heritage remains documented within the proposed area as well as the cultural landscape during all phases of the development. The negative implications include the destruction of the surface scatters of stone artefacts and further occurrences that are not immediately visible and the visual impact of the turbines on the aesthetic that currently exists. The recommendations must be considered as appropriate mitigation measures to protect and conserve the archaeological heritage remains observed within the proposed development area and further archaeological remains that may occur and are not immediately visible on the surface.

10. RECOMMENDATIONS

The overall area is considered as having a *medium - high heritage significance*. The proposed development of the Brandvalley WEF may proceed, however, the following recommendations must be considered prior to the development activities:

1. 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.

2. 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, unless the layout of these nine turbines and associated infrastructure and access roads change.

3. The power lines routes were not assessed as part of this study, but is a separate study as part of the Basic Assessment Process. The recommendations of this report should not be read in isolation from the report prepared for the Basic Assessment.

4. **Substations:** 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. 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 recommended that a survey focusing on the area along the watercourse be conducted between Substation 2 (SS2) and Substation 4 (SS4) to establish the real extent of the artefact occurrences prior to development. Consultation with local Western Cape archaeological repositories (generally museums and universities) can be made to determine whether it would be necessary for to make a collection of artefacts.

5. **Construction Camps:** Construction Camp 2 (CC2) situated on the Farm Fortuin 74 is the preferred option for the establishment of the construction camp. However, if the preferred Construction Camp 2 option (CC2) is not feasible according to input from other studies conducted the appropriate mitigation measures should be followed with regards to the other two substation alternatives. Similarly to the recommendation made for the substation option, a survey focusing on the area along the watercourse be conducted between the proposed Substation 2 (SS2) and Substation 4 (SS4) which would include Construction Camp 2 (CC2) to establish the real extent of the artefact occurrences. Consultation with local Western Cape archaeological repositories (generally museums and universities) can be made to determine whether it would be necessary for to make a collection of artefacts

    - Although the Construction Camp 1 option (CC1) is not the preferred option, several mitigation measures could be considered, similarly if the proposed area for Construction Cape 2 (CC2) is not feasible.
        i. One suggestion is that a 30 m buffer be established around the stone packed walling feature (BV_SW1) situated on the southern boundary and clearly demarcated to avoid any damage by the construction camp activities and other possibly negative human impact.
        ii. Another suggestion is that, if relevant to an archaeological repository (usually a museum or university) in the Western Cape, the real extent of the stone artefact scatters and types could be recorded in detail and collected prior to development activities.
        iii. A third suggestion is that the location of the proposed Construction Camp 1 (CC1) be shifted to an alternative area, possible west along the existing access road.

6. **Upgrading of the internal access roads:** The existing internal access roads be upgraded up to the 12 m wide proposed expansion except in the cases that heritage resources (including archaeological, historical and palaeontological) as well as the other studies conducted may be negatively impacted and recommend differently. Recommendations for the establishment of 20 m – 30 m buffer zones that are clearly demarcated and in some instances the possible rerouting of the proposed road to avoid negative impact and promote the implementation of precautionary measures be adopted for heritage resources occurring along the route (stone and historical artefact scatters, stone walling features, graveyards, etc.) have been detailed in the report and repeated below:

    - The internal farm road between BV_HS1 and BV_HS2 (Ou Mure) (Fortuin 74): the proposed upgrade of the be limited to the existing road by extending the access road (up to 12 m) to the south BV_HS2 (Ou Mure Homestead). BV_SA2, BV_SA3 and BV_BE3: The upgrade be limited to the existing internal road.

- Proposed access road upgrade through BV_HS2 (Ou Mure Homestead): The main concern with regard to negative impact on heritage features is the stone walling kraal (BV_SW2) that is situated immediately next to the existing internal access road (Figure 29). It would be difficult to establish a 30 m buffer as it would shift the road further east, therefore precaution must be taken to avoid any negative impact on the kraal as well as other structures.BV_SW6 and BV_Hist2: The proposed road upgrade be limited to the existing internal road and extended to the east.

- Proposed access road upgrade affecting the stone artefact scatters (BV_SA2 and BV_SA3) and the built environment (BV_BE3): a survey focusing on the area along the water course is conducted between Substation 2 (SS2) (Figure 30) and Substation 4 (SS4) to establish the real extent of the artefact occurrences. BV_BE3 is a functional reservoir situated near the internal farm gate. Care should be taken to avoid any damage to the structure.

- Proposed access road upgrade affecting the stone packed walling features and associated historical artefactual material (BV_SW3, BV_SW4 and BV_Hist1) and stone artefact scatter (BV_SA4): the upgrading be limited to existing access road. As the stone packed feature (BV_SW3) is situated 40 m from the existing access road that any expansion (up to 12 m) should be done to the east.

- Proposed access road upgrade affecting the stone packed features (BV_SW5) and stone artefact scatter (BV_SA5) at the reservoir (BV_BE4) on the Farm Kabeltouw Outspan 160: a suitable buffer around the reservoir be established the upgrading and expanding of the road be limited to the existing internal road (up to 12 m) where possible.

- Proposed access road upgrade affecting the stone packed feature (BV_SW6) and associated historical artefactual material (BV_Hist2): It is suggested that the proposed road upgrade be limited to the existing internal road (up to 12 m) and extended to the east.

- Proposed access road upgrade through the Barendskraal homestead (BV_HS3): the upgrade to the access route extend to the west or an alternative route be established that would avoid the graveyard and deter from passing through the homestead (BV_HS3) and possibly negatively impacting on the stone packed features and other built environment.

- Proposed access road upgrade affecting the stone packed dwelling (BV_SW12) situated on the Farm Barendskraal 76: It is suggested that the a 30 m buffer of be established around the stone packed dwelling (BV_SW12) and clearly demarcated prior to the commencement of development activities.

- Proposed access road upgrade affecting the rock shelter (BV_SA_RS1) and the stone packed dwelling (BV_SW15) in the Barendskloof valley: the road be diverted to between 20 m – 30 m either east or west of BV_SW15 owing to site being right next to the internal access road.

- Proposed access road upgrade affecting the homesteads (BV_HS4 and BV_HS5): It is therefore suggested that the upgrade of the internal access road be expanded (up to 12 m) to the south and the remains of the stone walling (BV_SW16) be clearly demarcated so as to avoid any negative impact. A 20 m – 30 m buffer should be established around the stone wall feature (BV_SW17) to avoid any negative impact passing south of the Nuwerus homestead (BV_HS5)

7. If any of the old farm buildings are to intended for rehabilitation or re-use or demolition a qualified and experienced professional (historical archaeologist / historical architect) must be consulted.

8. No turbines are to be located on Tafelkop or Spitskop.

9. An archaeological heritage walk-through survey must be conducted if any changes to the positions of the wind turbines, associated infrastructure and roads outside the scope of this study are made for the final layout and further recommendations and mitigation measures be suggested if necessary.

10. If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including burials and graves) are uncovered during construction, all work within close vicinity of the find must cease immediately and be reported the South African Heritage Resources Agency (SAHRA) (021 462 4502) or Heritage Western Cape (HWC) (021 483 5959) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities within the specific area can continue.

11. Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

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12. RELEVANT ARCHAEOLOGICAL AND HERITAGE IMPACT ASSESSMENTS

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13. 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: HERITAGE WESTERN CAPE COMMENTS OF THE PROPOSED

Our Ref: HM/CENTRAL KAROO/LAINGSBURG/MATJIESFONTEIN/ROGGEVELD WIND ENERGY FACILITY

Enquiries: Justin Bradfield
Tel: 021 483 9543
Email: justin.bradfield@pgwc.gov.za

Date: 07/11/2011
Case No: 111020JB18
Auto IDs: 1232 - 1591

INTERIM COMMENT
In terms of section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

Attention: Ms Claire Alborough
ERM, Silverwood House, Block A
Steenberg Office Park
Steenberg
7945

CASE NUMBER: 111020JB18
DSR: PROPOSED ROGGEVELD WIND FARM, NORTHERN CAPE AND WESTERN CAPE.

The matter above has reference.

Your draft EIR dated 20 October was tabled at the Impact Assessment Committee meeting held on 02 November 2011 and the following was discussed:

1. The proposal is for 250 turbines to be located in the Klein Roggeveldberge;
2. The visual impact assessment noted that the proposed turbines will have high visual impact on the sensitive mountainous Karoo landscape although the impact would be reduced if turbines are removed from the koppie peaks and are set back at least 3 km from the R354.
3. There is little opportunity for further mitigation in this landscape;
4. The cumulative impact of similar wind farms within a 30 km radius of this area is a concern;
5. An archaeological impact assessment identified several early trekboere settlement remains and some nineteenth century farm houses;
6. Palaeontologically sensitive formations occur in the area;
7. The consultants recommend monitoring of borrow pits, road construction and bulk excavations for turbine footing.

Decision:

The committee endorses the recommendations of all the consultants contained in the draft EIR and further comments that:

1. No turbines are to be located on Tafelkop or any other mountain ridgelines in the Western Cape;
2. A suitably qualified palaeontologist must determine what palaeontological monitoring is necessary and must monitor bulk earthwork activities;
3. A suitably qualified and experienced professional must be consulted if any of the old farm buildings are intended for rehabilitation or re-use.

ROGGEVELD WIND FARM (CASE NO. 111020JB18, 2011 AND 2013)

Our Ref: HM\CENTRAL KAROO\LAINGSBURG\MATJIESFONTEIN\ROGGEVELD WIND ENERGY FACILITY

Enquiries: Troy Smuts
Tel: 021 483 9543
Email: justin.bradfield@pgwc.gov.za

Date: 23/01/2013
Case No: 111020JB18
Auto IDs: 1232 - 2280

iLifa leMveli leNtshona Kolopi
Erfenis Wes-Kaap
Heritage Western Cape

FINAL COMMENT
In terms of section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

Attention: Ms Claire Alborough
ERM, Silverwood House, Block A
Steenberg Office Park
Steenberg
7945

CASE NUMBER: 111020JB18
HIA: PROPOSED ROGGEVELD WIND FARM, NORTHERN CAPE AND WESTERN CAPE.

The matter above has reference.

Heritage Western Cape is in receipt of your correspondence on the above matter, dated 16 January 2013 and the following was discussed:

1. Site located west of the R354, ~45 km south of Sutherland and 30 km north of Matjiesfontein, in both Western and Northern Cape Provinces.
2. Turbines: max 100m hub height, 117m rotor diameter (3 blades of 58.5m)
3. The Department of Environmental Affairs in December 2011 requested that some changes be effected to this the wind energy Farm.
4. The recommendations of Heritage Western Cape were that no turbines are to be located on Tafelkop or any other mountain ridgelines in the Western Cape.
5. The HIA notes that: Although this is a high scenic area, it is very remote and not celebrated as a place with visual heritage qualities.
6. The revised proposal is to have no turbines on Tafelkop or Spitskop.

Decision

1. Heritage Western Cape resolved to support the proposal as currently proposed without turbines on Tafelkop or on Spitskop.

www.capegateway.gov.za/culture_sport

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Straatadres: Protea Assuransie-gebou, Groentemarkplein, Kaapstad, 8000 • **Posadres:** Privaatsak X9067, Kaapstad, 8001 • **Fax:** +27 (0)21 483 9842 • **E-pos:** hwc@pgwc.gov.za

APPENDIX B: 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 by 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 C: 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 m^2 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 in the close vicinity of the area 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 be identified and include foundations of buildings or other construction features and items from domestic and military activities.

APPENDIX D: 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

APPENDIX E: ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?		**NO**	Please explain
The majority of the land within the project area is currently zoned for agricultural, with the exception of the existing 400kV servitude and 765kV servitude for the Eskom distribution line running just north of the project region. There's no current permits in place for the onsite substations, overhead distribution lines or the central hub substation. Once the 132kV distribution line is finalised a servitude would be registered. The Bon Espirange Substation was previously authorised (DEA Ref Number: 12/12/20/1988/1/AM1) The proposed activity is therefore permitted in terms of the property's land use rights. The Komsberg footprint is zoned for authority zone and is therefore permitted in terms of the property's current land use rights			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	**YES**		Please explain
According to the Northern Cape PSDF[1], one goal of the PSDF is to ensure and promote Economic Efficiency within the province. This is understood as the optimisation of benefit at the lowest cost. It includes the innovative and efficient use of available resources. The evacuation of energy from this project will allow for greater energy availability throughout the country, allowing for greater consumption and stimulation of the economy. The NCPSDF furthermore stresses the importance of the renewable energy sector to promote economic opportunity within the province. In addition, the plan also calls for close co-operation between the public and private sectors to improve economic development. The Western Cape provincial spatial development framework[2] further targets the renewable energy sector as one key growth sector for the province, of which this development will form part of, recognising the need for support and encouragement for Independent Power Producers. Through these sorts of statements it is clear that the PSDF includes sustainable renewable energy development within the province.			
(b) Urban edge / Edge of Built environment for the area		**NO**	Please explain
The project area is located between Matjiesfontein and Sutherland within the Cape Winelands District Municipality, the Central Karoo District Municipality and the Namakwa District Municipality. The site does not fall within the urban edge and will not impact on the urban edge in any way.			

[1] Northern Cape Provincial Spatial Development Framework 2012. NCPSDF Final Document - 22 August 2012 (25 MB) [online]. Available from http://northerncapepsdf.co.za/wp-content/uploads/Northern_Cape_PSDF_22_August_2012.pdf [Accessed 25 May 2016].

[2] Western Cape Provincial Spatial Development Framework 2014. Western Cape Provincial Spatial Development Framework [online]. Available from https://www.westerncape.gov.za/eadp/sites/eadp.westerncape.gov.za/files/your-resource-library/2014%20Provincial%20Spatial%20Development%20Framework%20%28PSDF%29_0.pdf] Accessed 25 May 2016.

c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES		Please explain

By virtue of the fact that this project will be evacuating power generated by the Brandvalley WEF, the need and desirability of the power line extends from that of the Wind Farm. Should the wind farm not be authorised, there will be no need for this project, however, should this project not proceed, the wind farm will have no means of evacuating the power produced. As such, this project's need and desirability is inextricably linked to that of the associated Brandvalley WEF. The following thus applies to this project as well as the WEF:

Local Planning Guide	Relevance
Cape Winelands District Municipality (CWDM) IDP (2012/13-2016/17)	The overarching vision and mission statement of the CWDM IDP promotes both sustainable development and job creation. The key stakeholder priorities highlighted in the strategic objectives includes the promotion of renewable energy projects. The IDP furthermore calls for an increase in employment opportunities through the green economy, and more specifically, through green energy initiatives.
Central Karoo District Municipality (CKDM) IDP (2012-2017)	The CKDM IDP promotes sustainability through the integration of social, economic and ecological components. The planning document highlights the increasingly importance of sustainable energy, emphasising the national vision to focus on renewable energy as a movement towards less carbon-intensive electricity production. The CKDM IDP and SDF make provision for wind farms within the Central Karoo as an alternative energy source.
Namawka District Municipality (NDM) IDP (2012-2016)	The NDM commits to sustainable development and the transition to a low-carbon economy through the expansion of renewable energy. The IDP calls for the development and implementation of a Renewable Energy Strategy to achieved their infrastructure objectives. Although such a strategy is not in place, the establishment of a 140MW WEF are in line with the commitment to move towards a low-carbon economy by increasing renewable energy generation capacity.
Witzenberg Local Municipality IDP (2012/2017)	The Witzenberg LM IDP promotes renewable energy and the management and use of natural resources as an opportunity to stimulate growth and achieve sustainable development. The environmental policy of the LM calls for environmental projects that ensure environmental sustainability and contribute to job creation. The Brandvalley WEF aims to be environmentally sustainable and to contribute to local job opportunities.
Laingsburg Local Municipality (LLM) IDP (2012/2017)	The key strategies proposed by the LLM IDP within the Strategic Infrastructure and the Environmental and Spatial Development approaches include the support and promotion of wind, solar and bio-gas developments as a source of alternative energy.
Karoo Hoogland Local Municipality IDP (2015-2016)	The mission statement of the Karoo Hoogland LM IDP is to provide leadership on environmental sustainability and climate change response. The Environmental and Spatial Analysis includes the promotion and diversification of renewable energy projects in accordance with the Integrated Resource Plan (IRP) for Electricity 2010-2030 in addition to the creation of job opportunities through the Green Economy.

(d) Approved Structure Plan of the Municipality	YES		Please explain

All the municipalities are aware of the ongoing authorisation application for the Brandvalley WEF and will be notified of this Basic Assessment process. Should the WEF project succeed, the development of a distribution line would be required. The proposed substation and distribution line feeding into the grid connection options support this project and do not compromise the structure of the municipal plan.

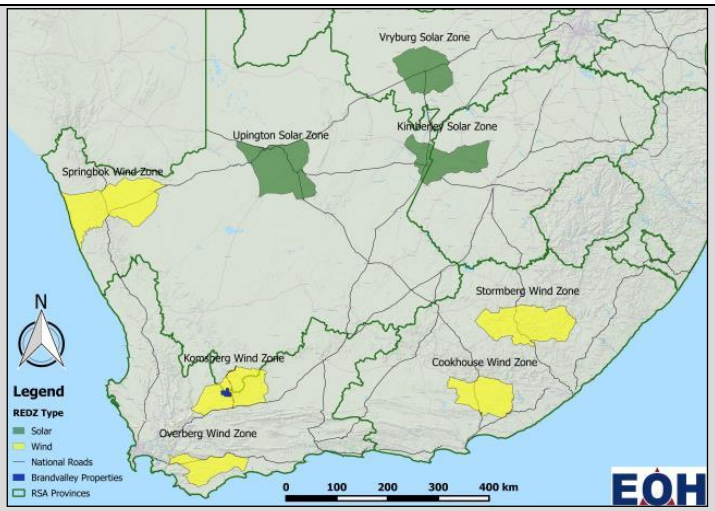
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	**YES**		Please explain
Only one EMF exists for the project region, that of the Cape Winelands DM[3]. According to this plan, no wetland sensitivity regions occur within the project area. Additionally, the project area falls within a moderate river sensitivity region, a fish support area, various low-high biodiversity sensitivity areas, and no wetland management zones. The central Karoo IDP[4] calls for the development into renewable energy sources as a means of securing greater energy supply for current and future needs. Renewables such as solar and wind are thus prioritised, to which this development will contribute.			
f) Any other Plans (e.g. Guide Plan)		**NO**	Please explain
The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013[5]) supports of the Strategic Integration Project (SIP) 8 which focuses on the implementation of sustainable green energy initiatives. The SEA integrates environmental, economic and social factors to identify eight (8) Renewable Development Zones (REDZs). The identified REDZs included areas where large scale wind energy facilities can be developed in in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The SEA process and the determination of the REDZs provided an opportunity for government authorities, the private sector and the public to provide input and agree on appropriate development areas. The SEA additionally identified priority areas for investment opportunities into the electricity grid, providing a solution to the current limitations of existing grid infrastructure and the challenges faces in expanding the grid. The proposed Brandvalley WEF and this associated and necessary infrastructure thus falls within the Komsberg Wind REDZ. The REDZs are considered areas of the highest development potential on land that is technically suitable for wind and solar developments. Proposed projects that fall within these areas are thus incentivised and streamlined. Cabinet approved the gazetting of REDZs on 17 February 2016[6].			

[3] Cape Winelands EMF 2011. Cape Winelands EMF [online]. Available from http://www.capewinelands.gov.za/DocumentsDownload/Cape%20Winelands%20Environmental%20Management%20Framework/CWDM%20EMF_Status%20Quo_Non-tech%20Summary_Eng.pdf [Accessed 25 May 2015].

[4] Central Karoo IDP 2014. Central Karoo Integrated Development Plan [online]. Available from https://www.westerncape.gov.za/text/2012/11/central-karoo-dm-idp-2012-2017.pdf [Accessed 25 May 2016].

[5] CSIR. (2013). Strategic Environmental Assessment for wind and solar PV energy in South African – Renewable Energy Development Zones (REDZs). Available: https://redzs.csir.co.za/. (Accessed: 11/01//2016).

[6] South African Government, 2016. http://www.gov.za/speeches/statement-cabinet-meeting-17-february-2016-18-feb-2016-0000.



There are other wind energy developments and electrical infrastructure proposed and existing in close proximity to the Brandvalley WEF. These facilities are in various stages of development ranging from application phase to authorisation (environmental authorisation and preferred bidder). Although each location has its own wind patterns, the close proximity of wind farms in an area does have environmentally preferred advantages such as limiting certain impacts to that location as opposed to impacting a number of areas. It also confirms the region/locality as a high wind resource and a suitable area for renewable energy development.

Furthermore, there are Eskom high voltage transmission lines (one 786kV and two 400kV power lines) running immediate south of the project area, running between the Komsberg station and the Kappa substation.

The recently built 765kV line runs from the Gamma substation near Victoria West past the Kappa substation near Touwsriver (southwest of the project site) to connect to the Omega substation near Koeberg. This is part of Eskom's grid strengthening project for power transmission and distribution in South Africa. The Komsberg capacitor station located northeast of the project site has two 400 kV lines running through its capacitor banks from the Droerivier substation to the Bacchus and Muldersvlei substations, respectively, via the Kappa substation.The approved renewable energy projects located in the vicinity are intended to be connected to the Komsberg or Kappa substations. The Komsberg substation will be upgraded to connect more projects to the grid.

3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	**YES**		Please explain

Although the specific project is not considered in the SDF, the broader region surrounding the project area has been specifically earmarked for development of solar and onshore wind projects, under the auspices of the REIPPP Programme. As such, this project (and the land use it represents) is in agreement with the development goals of the IDP.

4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	**YES**		Please explain
Electricity provision in South Africa is currently a critical issue, and has direct impact on the economic growth of the country, as South Africa is an energy intensive economy. The project region is currently being serviced sufficiently through the existing electrical infrastructure. However, there's a big need for employment opportunities which this project along with the WEF will respond to. An immediate local benefit in terms of electricity supply is not expected, however, short term increase in locally sourced labour from the construction activities associated with the electrical infrastructure and a significant increase in employment opportunities associated with the WEF are expected. A percentage of the revenue per annum from the operational WEF will be made available to the community through a social beneficiation scheme, in accordance with the DoE bidding requirements of the REIPPPP. Therefore, the potential for creation of employment and business opportunities, and the opportunity for skills development for the local community is significant.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES**		Please explain
The project is outside of the normal municipal service areas and therefore no services will be required from the local municipality. Contractors will be appointed to provide the required services for sewage and refuse removal. No effluent other than normal sewage are anticipated. A contractor will be appointed to manage it according the management measures included in the Environmental Management Programme (EMPr). It is expected that portable ablution facilities will be used during the construction phase, which will be managed by the appointed contractor. Although low quantities of waste are anticipated, a contractor will be appointed to manage recycling activities and final disposal of waste that cannot be recycled. Electricity will be provided via a 11kV line servicing at least the construction camp and batching plant (associated with the WEF). Where required and no electricity is available onsite temporary generators will be used instead.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES**		Please explain
The project proponent is a private developer under the REIPPP programme, and will not require any services from the local or district municipalities. The project will not impact infrastructure planning of the municipality.			
7. Is this project part of a national programme to address an issue of national concern or importance?	**YES**		Please explain
This project in its contribution to the renewable energy sector forms part of the National Development Plan.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	**YES**	NO	Please explain
Yes, please see the motivation for selecting this project location described under the alternatives section. The Karoo, and more specifically the proposed location, is identified as a feasible area for wind energy in terms of the Wind Atlas for South Africa (WASA) for the Western Cape and parts of the Northern, Western and Eastern Cape Provinces. WASA is a tool for identifying areas suitable for large-scale wind power generation and to provide more accurate wind resource data to identify potential off-grid wind generation location opportunities, using high climatological (30-year) annual mean wind speed (m/s) 100m above ground level. Figure 14 below indicates the proposed location in relation to the WASA.			

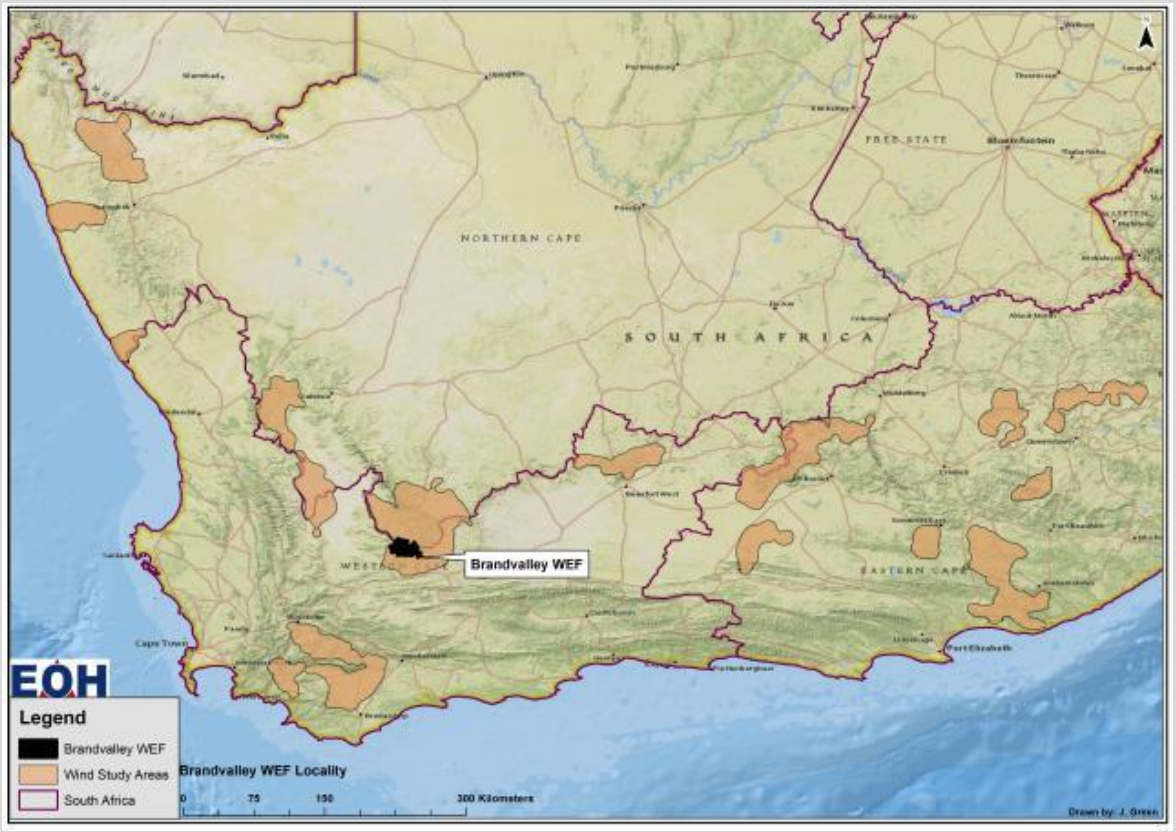


Figure 14: The proposed project area in relation to the WASA.

Brandvalley WEF is located in an area where three wind projects were selected as preferred bidders under the Round 4 REIPPPP. This is a good indication that the area has high wind resources and the projects are competitive for succeeding in the REIPPPP. Grid access is deemed favourable for this site due to the close proximity of the existing Eskom Capacitor station, which is planned to be upgraded to a 400kV substation. The current Komsberg substation area is currently proposed to be expanded as a hub for connecting future developments in the area. The distance from a substation directly affects construction costs and losses associated with power transmission over a distance. The existing Eskom Komsberg Substation has sufficient grid capacity for the proposed project to connect. The same is true for the planned Bon Espirange substation.

Similar to the Renewable Energy SEA, Eskom's Electricity Grid Infrastructure Strategic Environmental Assessment (Grid SEA) is also underway. The SEA is in accordance with the government's commitment to implement the NDP and improve on infrastructure. More specifically, the Grid SEA is in support of SIP 10, which aims to achieve "Electricity and distribution for all". The area in which the Rietkloof Wind Farm is proposed is currently within the corridor planned to be strengthened by Eskom as part of the Grid SEA. The Grid SEA aims to provide widespread distribution of electricity throughout South Africa and to initialise economic development within areas limited to electricity access to meet the country's economic and social development needs.

9. Is the development the best practicable environmental option for this land/site?	**YES**		Please explain
Yes, the current agricultural activities can continue as it is not mutually exclusive with the proposed electrical infrastructure and associated WEF. While variation in the micro-siting of the distribution lines are still expected in line with environmental and technical specifications, the overall project location cannot be altered, as this project would feed into the fixed or authorised location of the associated Brandvalley WEF. The specialist studies undertaken as part of this Basic Assessment conclude that the development of the substation and power lines will have medium - low environmental impacts. Should the infrastructure not be constructed as proposed, the wind energy facility would not be connected to the electricity grid. The implementation of the proposed project is therefore the best practicable environmental option.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	**YES**		Please explain
Yes, the specialist studies undertaken to inform this Basic Assessment concluded that the development of the electrical infrastructure will have medium - low environmental impacts. Should the infrastructure not be constructed as proposed, the proposed WEF would not be connected to the national grid which will have a negative impact at a local, regional and national level. Localised positives such as an increased job creation, in addition to the national supply of renewable energy and the moderate to low environmental risk (as per specialist reports) combine to provide support that this project which will result in greater benefit than negative impact.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?		**NO**	Please explain
The region is declared as a REDz and there are numerous wind and solar developments already authorised or being proposed. Please see section (f) above for the detailed map.			
12. Will any person's rights be negatively affected by the proposed activity/ies?		**NO**	Please explain
No. Landowners already provided consent to proceed with the proposed development on their properties. Local labour will be employed as far as possible, thus reasonably promoting job creating in the short term, and the improved electrical supply and infrastructure will nurture economic growth and reduced electricity prices in the national context. All landowners and neighbours were notified of the proposed project through the circulation of a Background Information Document (BID) as included in Appendix E. No concerns were raised to date. If the project is not authorised, the rights of the developer will be severely affected as the WEF will not be able to connect to the National Grid.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?		**NO**	Please explain
No. the property is not located near the urban edge, and will not impact thereon. Private landowners (mainly farming) will be affected by the proposed project and these landowners and neighbours have been consulted by the environmental team and are aware of the proposed project. See proof of communication included in Appendix E.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	**YES**		Please explain
Although not strictly designated a strategic integrated project in and of itself, this project will contribute to a few subcomponents of the Strategic Integrated Projects goals, namely that of promoting balanced economic development, unlocking economic opportunities, addressing socio-economic needs, promoting job creation, helping integrate human settlements and economic development and SIP8: green energy in support of South African economy. The construction of the proposed electrical infrastructure will provide local residents opportunities to gain short term employment, which would contribute towards the socio economic needs of individuals and the community.			

15. What will the benefits be to society in general and to the local communities?	Please explain

Society in general:

- Contributing to reach the goals set out in the National Development Plan, Integrated Energy Plan for the Republic of South Africa, IRP 2010.
- Increased generation capacity from a renewable resource that will be feed into the national grid;
- Additional grid connection options to allow for more flexible distribution locally in the future; and
- A small reduction in employment needs;

Local communities:

- Community upliftment through additional employment opportunities within the project area and economic development contributions in terms of the REIPPPP.

16. Any other need and desirability considerations related to the proposed activity?	Please explain

A further motiving factor is the proximity of the project to the N1 highway. This enables easy access to and from site for all staff members in the nearby communities, and will simplify the transport of components to site, thus avoiding large scale access road requirements. This project will also make use of the access roads provided for with the Brandvalley Wind Energy Facility, further reducing access road requirements.

17. How does the project fit into the National Development Plan for 2030?	Please explain

The National Development Plan (NDP) is aimed at reducing and eliminating poverty in South Africa by 2030. It promotes sustainable and inclusive development in South Africa, in favour of a decent standard of living for all. The proposed distribution line fulfils 3 of the 12 key focus areas namely contributing to an economy that will create more jobs; improving infrastructure and transition to a low carbon economy. The NDP outlines the need for South Africa to increase production of electricity by 40,000 MW by 2030, 20,000 MW of this capacity has been proposed for production from renewable sources. The proposed project aims to be a contributor towards such target, by forming a vital link in the feasibility of the associated Brandvalley WEF, and by being the only means of beneficiating the energy produced from the associated WEF.

Integrated Energy Plan

Furthermore, the proposed distribution line project is in line with the Integrated Energy Plan for the Republic of South Africa (2003) commissioned by then Department of Minerals and Energy (now the Department of Energy (DoE)) in response to the requirements of the National Energy Policy. The framework is intended to create a balance between energy demand and resource availability so as to provide low cost electricity for social and economic development, while taking into account health, safety and environmental parameters. This project would contribute to diversification of energy supply and the promotion of universal access to clean energy, by allowing for evacuation and beneficiation of the energy produced by the associated WEF.

Integrated Resource Plan

The Integrated Resource Plan (IRP 2010) for South Africa illustrates a clear need for renewable energy projection. The IRP was initiated by the DoE and lays the foundation for the country's energy combination up until 2030, and seeks to find an appropriate balance between the expectations of different stakeholders considering a number of key constraints and risks, including the reduction of carbon emissions; security of supply; Southern African regional development and integration and localisation and job creation. The Policy-Adjusted IRP includes recent development prices and issues allocations of 17.8GW for renewable energies, of the total 42.6GW new-build up to 2030 distributed to wind (8.4GW), concentrated solar power (1.0GW) and photovoltaic (8.4GW).

REIPPPP

Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), aims to promote and procure electricity generated by the private-sector from renewable energy sources. DoE has placed a target of 10 000 Gigawatt hours (GWh) of renewable energy power generation for the country. The REIPPPP initially aimed to procure 3725MW renewable energy by 2016, however in 2012 it was announced that an additional

3200MW of renewable energy would be procured and in August 2015, this allocation further increased by a renewable energy generation capacity of 6300 MW gazetted in a Ministerial determination (DoE, 2015).

As demonstrated above there is a need for renewable energy in South Africa. If the project is deemed feasible, Brandvalley Wind Farm intends to bid this wind farm under the REIPPP programme in order to supply the electricity generated to Eskom. This project (this application) would serve as ancillary infrastructure to the WEF project and would be indispensable in order to make use of the energy produced.

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

This proposed 132kV distribution line development has been adequately assessed by competent Environmental Assessment Practitioners and a team of specialists. All potential impacts that may have a significant impact on the receiving environment have been identified and adequately assessed as required by the NEMA 2014 EIA regulations and mitigation measures developed and the impact significance assessed. The conclusions of the Basic Assessment have been concisely summarised to adequately inform decision-making by the competent authority. A comprehensive Public Participation Process was also undertaken which conformed to requirements of the 2014 EIA Regulations. Furthermore, all Interested and Affected Parties were given ample time (as per the requirements of the EIA Regulations) to review and comment on all documents and reports and the affected landowners will be empowered to be able to state their concerns and issues adequately.

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

The principles of NEMA have been considered in this assessment through compliance with the requirements of the relevant legislation in undertaking the assessment of potential impacts, as well as through the implementation of the principle of sustainable development where appropriate mitigation measures have been recommended for impacts which cannot be avoided.

In addition, the successful implementation and appropriate management of this proposed project will aid in achieving the principle of minimisation of pollution and environmental degradation. This process has been undertaken in a transparent manner and all effort have been made to involve interested and affected parties, stakeholders and relevant Organs of State such that an informed decision regarding the project can be made by the Regulating Authority.