HERITAGE IMPACT ASSESSMENT: PROPOSED SUURPLAAT WIND ENERGY FACILITY NEAR SUTHERLAND, WESTERN CAPE AND NORTHERN CAPE

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act as part of an EIA.)

Prepared for

Savannah Environmental (Pty) Ltd

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Executive summary

ACO Associates CC have been appointed by Savannah Environmental (Pty) Ltd on behalf of the applicant, Moyeng Energy, to undertake a Heritage Impact Assessment, as part of the EIA process, for the establishment of a wind energy facility on Portion 0 of Farm 30 (Klipfontein Extension), Portion 0 of Remaining extent of Farm 31 (Klipfontein), Portion 0 and 1 of Farm 7 (Modderfontein), Portions 2 and 3 of Farm 14 (Dwars Rivier), Portions 2 and Remaining extent of farm 9 (Boschmans Kloof), Farm 145 (Klippekraal), Portions 3 of Farm 2 (Wilgebosch Kloof), Portion 0 (Remaining extent) of Farm 143 (Vinke Kuil), Portion 2 (Remaining extent) of Farm 144 (Vinke Kuil), Farm 8 (Sterboom Hoek), Portion 1 of Farm 219 and Remaining extent of farm 147 (Hartebeestefontein) south of Sutherland and stretching between the Western and Northern Cape Province.

Up to 400 wind turbines are planned for the 286km² site as well as the following associated infrastructure:

- Concrete foundations to support the turbine towers.
- Internal roads (approximately 6 m in width) linking the wind turbines and other infrastructure on the site. Existing farm roads will be used as far as possible, however, the dispersed distribution pattern of wind turbines will necessitate the construction of a number of new roads.
- Underground (~ 1m deep) 33 kV cabling, linking the wind turbines to 33/132 kV substations. In as far as possible, cabling will follow the internal access roads.
- Up to 13 x 33/132 kV substations. Each of these substations will have a high-voltage (HV) yard footprint of approximately 80m x 90m.
- Eight (8) overhead power lines (4 x 132 kV double circuit distribution lines) linking the substation at the wind energy facility to the 400kV substation.
- One 132kV/400kV substation and 400kV power line to connect to the either the Droerivier – Muldersvlei or Bacchus Droerivier 400 kV power line. The substation will require an HV yard of approximately 20-30 ha. This area includes provision for a 200 m buffer strip around the perimeter.
- An on-site operations and maintenance facility, including a storage building (40 m x 20 m), security office (10 m x 5 m) and a car park area (15 m x 7 m).

The findings of the heritage assessment have revealed that the study area is rich in a wide variety of both colonial and pre-colonial heritage sites. Parts of the study area enjoy very high aesthetic qualities and constitute a layered cultural landscape of remarkable intactness. The impact of the proposal is of moderate negative significance with respect to physical heritage, but of medium – high significance with respect to cultural landscape. No fatal flaws were identified.

Mitigation of physical heritage

It is recommended that the following mitigation measures are implemented.

- Existing farm tracks must be re-used or upgraded to minimise the amount of change to un-transformed landscape.
- In general terms, construction of turbines and roads in valley bottoms should be kept to a minimum. Archaeological sites close to the access roads at Hartebeestfontein and in the valley bottoms close to the roads between Klipfontein and Modderfontein will need active protective intervention and even archaeological sampling.
- Any pre-colonial kraal complexes that will be affected by the proposed activity should be mapped, and measures taken to protect the sites.
- During the detailed planning phase, drawings of proposed road alignments, infrastructure and near-final turbine positions should be submitted to an archaeologist for review and field-proofing. Micro-adjustment of alignments and turbine positions is likely to be sufficient to achieve adequate mitigation.
- A "walkdown" of final cable routes, and all power lines, substation sites and access roads will be required.
- If farm buildings at Louw se Plaas, Modderfontein are to be re-used, the middens should be protected.
- It is illegal at all times to destroy or change and archaeological site without a permit.

Buildings and structures

- Conserve old buildings, kraals, dams and wall alignments – do not demolish or damage.
- Do not demolish wind pumps. Some of these are protected structures as many are greater than 60 years of age.
- Follow a policy of non-intervention – old farm buildings such as those at Modderfontein should be conserved, or rehabilitated.
- Theft of fittings from buildings needs to be monitored and offenders fined and charged under NHRA.
- Seek guidance from a heritage consultant if any buildings are to be restored.
- Keep infrastructure at least 500 m away from all farm complexes as most contain elements that are of heritage value.
- Apply to the relevant provincial heritage authorities to demolish or alter and historic structures (buildings, historic passes, walls kraals etc).

Landscape

- Turbines must be positioned in such a way that they are at least 500m away from farm complexes.

- Turbines must be positioned in such a way that shadow flicker does not affect any farm complexes.
- Road alignments must be planned in such a way that the minimum of cut and fill operations are required.

Declaration:

Tim Hart, Lita Webley, David Halkett of ACO Associates CC are independent specialist consultants who are in no way connected with the proponent, other than delivery of consulting services.

Tim Hart (MA) is an archaeologist with 23 years of working experience in heritage throughout southern Africa. He is accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

Lita Webley (Phd) is an archaeologist with 30 years of working experience. Having served previously as Director of the Albany Museum, she is familiar with the history of the area and local heritage issues. She is also accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

David Halkett (MA) is an archaeologist with 23 years of working experience in heritage throughout southern Africa. He is accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

Kyla Bluff (BA Hons) is an intern with the ACO.

GLOSSARY

Archaeology: *Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

Cultural landscape: *A distinct geographical area or property uniquely represent[ing] the combined work of nature and of people.*

Early Stone Age: *The archaeology of the Stone Age between 700 000 and 2500 000 years ago***.**

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

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

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

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

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

National Estate: *The collective heritage assets of the Nation*

Palaeontology: *Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.*

Pleistocene: *A geological time period (of 3 million – 20 000 years ago).*

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

Structure (historic:) *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

Wreck (protected): *A ship or an aeroplane or any part thereof that lies on land or in the sea within South Africa is protected if it is more than 60 years old.*

Acronyms

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

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1. Introduction

ACO Associates CC have been appointed by Savannah Environmental (Pty) Ltd on behalf of the client, Moyeng Energy, to undertake a Heritage Impact Assessment, as part of the EIA process, for the establishment of a wind energy facility on Portion 0 of Farm 30 (Klipfontein Extension), Portion 0 of Remaining extent of Farm 31 (Klipfontein), Portion 0 and 1 of Farm 7 (Modderfontein), Portions 2 and 3 of Farm 14 (Dwars Rivier), Portions 2 and Remaining extent of farm 9 (Boschmans Kloof), Farm 145 (Klippekraal), Portions 3 of Farm 2 (Wilgebosch Kloof), Portion 0 (Remaining extent) of Farm 143 (Vinke Kuil), Portion 2 (Remaining extent) of Farm 144 (Vinke Kuil), Farm 8 (Sterboom Hoek), Portion 1 of Farm 219 and Remaining extent of farm 147 (Hartebeestefontein) south of Sutherland and stretching between the Western and Northern Cape Province. The study area spans the great escarpment between the upper and lower Karoo (Fig 1).

The study area falls within both the Hoogland District (North Western Cape) and the Laingsburg District (South Western Cape) straddling both provinces. The closest towns are Sutherland (40 km to the northwest), Matjiesfontein (south), Laingsburg (south east) and Merweville directly east. The proposed location may be described as remote and is more than 20 km from any regional roads of significance.

1.1 The need for the project

Greenhouse effects and the national energy crisis have prompted the development of renewal energy systems to compliment the national power supply which is mainly based on the combustion of coal – a carbon producing activity. South Africa has good wind resources which can provide clean renewable energy. Eskom (the national power supplier) has indicated that it will support the development of private energy initiatives and purchase power from private companies. The applicant is a private wind energy company.

1.1.1 The proposal

An area of approximately 286 km^2 is being considered within which the facility is to be constructed. The proposed wind energy facility will include:

- up to 400 wind turbines producing 2-3 MW each.
- Concrete foundations to support the turbine towers.
- Internal roads (approximately 6 m in width) linking the wind turbines and other infrastructure on the site. Existing farm roads will be used as far as possible, however, the dispersed distribution pattern of wind turbines will necessitate the construction of a number of new roads.

- Underground (~ 1m deep) 33 kV cabling, linking the wind turbines to 33/ 132 kV substations. In as far as possible, cabling will follow the internal access roads.
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- An on-site operations and maintenance facility, including a storage building (40 m x 20 m), security office (10 m x 5 m) and a car park area (15 m x 7 m).

1.1.2 Scoping Study

The following heritage indicators were identified during the scoping study:

Palaeontology: The nature of the substrate in the Sutherland – Laingsburg area suggests that it is highly likely that fossil plants, fishes and even mammal-like reptiles may exist. The impacts of the proposed activity on palaeontological material are to be addressed in a separate study.

Pre-colonial archaeology: the scoping study predicted the likely existence of Early, Middle and Later Stone age artefacts near fountains and water courses. The study also raised the possibility that stone walling, including stone walled enclosures would exist in the study area. These represent the livestock kraals of Khoekhoen pastoralists.

Colonial period: Historical records indicate that the area was settled since the 1830s, however prior to that time the early *Trekboers* (transhumant European stock farmers) waged a bitter war against remnant Bushmen groups who had retreated to the valleys and mountains of the escarpment. The area was the last frontier of San groups who were ultimately suppressed by government authorised *Kommando* action. The few who survived worked on European farms as stock keepers and gradually became acculturated. The scoping study indicated the likely existence of contact period sites and buildings greater than 60 years of age.

2. Methodology for study

This study has been commissioned as the heritage component of an EIA. It assesses the identified range of impacts in terms of accumulated knowledge of the area. The source of information that is used for this process is based on scientific publications related to archaeological work undertaken in the Great Karoo and other unpublished reports on the history of the region. A survey of heritage resources has been conducted and *heritage indicators* (conservation-worthy buildings and places

celebrated as heritage) identified and mapped. Definitions of heritage and criteria for assessment of heritage are indicated in the National Heritage Resources Act while the Provincial Guidelines for assessing heritage in the Western Cape applies, but is appropriate to the Northern Cape as well.. Both the NHRA and Provincial Guidelines require that cultural landscapes and areas of particular aesthetic and or cultural heritage significance are included in the assessment.

The study reported on here has been significantly reliant on a labour intensive physical survey of the study area as generally the upper Karoo has never been well described.

2.1 Assessing heritage in the context of wind energy developments

Wind Energy facilities have grown exponentially throughout the world in response to the international energy crisis. Initially communities enthusiastically accepted the presence of wind energy facilities, however web-based research has indicated that they are not without controversy. The impacts of clusters of massive wind turbines on cultural landscape can be severe, both in physical terms and with respect to the intangible and aesthetic qualities of a given locality. The study area has in recent months become the subject of a number of at least 3 substantial wind energy proposals. Characteristically a number of the proposals involve more than 50 large turbines which in international terms places them among the larger wind energy facilities in use around the world. A pilot study commissioned by the Provincial Government of the Western Cape "Towards a Regional Methodology for Wind Energy Site Selection in the West Coast region" (2006) considered landscape character rather than the cultural landscape but they concluded that wind energy facilities have a profound impact on the surrounding landscape in terms of the natural qualities of places. In terms of landscapes and heritage, there are no pro-active detailed local regional studies that can be consulted, however the pilot study recognises that severe impacts can occur and suggests a buffer zone of 500 m from heritage sites to avoid physical impacts..

Wind energy facilities are big developments. Turbines (some facilities with several hundred turbines are proposed in parts of RSA) can be up to 100m high with blades up to 50m in radius. The structure has to be counterweighted by a concrete block (up to 675 cubic meters) sunk deep into the ground. Each turbine site needs road access that can be negotiated by a heavy lift crane which means that in undulating topography deep cuttings and numerous roads may be made into a landscape to create workable gradients. Due to their size the visual impacts are immitigable (they are easily visible from 10 km) in virtually all landscapes, however indications are (PGWC 2006) that they are perceived to be aesthetically more acceptable in agricultural or manicured landscapes.

The point at which a wind turbine may be perceived as being "intrusive" in terms of the aesthetics of an area is a subjective judgment, however it can be anticipated that

the presence of such facilities close to wilderness and heritage areas will destroy many of the intangible and aesthetic qualities for which an area is valued, or could be potentially valued in the future. In addition, the degree of physical landscape disturbance is such that the destruction of archaeological and palaeontological heritage is a very high likelihood. Hence, in the assessment of impacts of wind energy proposals it is necessary to assess both physical damage to heritage caused by the establishment of infrastructure, as well as focus on the way that such a facility can change the aesthetic and intangible values of the cultural landscapes in which the physical heritage resources exist.

2.2 Site survey

Data collection took place mainly during the physical site inspection which took place over a seven day period in August 2010. The proposed locations of as many turbines, substations as possible were inspected on foot, large areas of landscape were traversed and every accessible track was driven with off-road vehicles. The team used to conduct the field survey consisted of 6 fully qualified staff divided into 2-3 teams equipped with two-way radios and a Garmin GPS each. Proposed routes of power lines were not walked at this time (2x3 lengthy alternatives) but an educated assessment was made with respect to their sensitivity.

Farm buildings were visited and assessed for heritage significance; archaeological sites were recorded, mapped and photographed. No archaeological material was removed from the study area, but recorded and photographed *in situ*.

Data analysis involving mainly the assessment of the spatial distribution of archaeological sites on the landscape to determine which areas held the highest potential for heritage material. Indications are that strong trends exist in the study area. The analysis of archaeological material on individual sites is based upon the experience of the team members who are familiar with the standard classification systems for artefactual material in use to the degree that they can roughly date and characterise an archaeological site based on its content. Built environment is considered in terms of the grading system for structures that is presently employed by a number of SAHRA offices and some provincial compliance offices.

2.3 Restrictions and assumptions

The physical survey of the study area proved demanding. While ideally each turbine, substation and services alignment should have been inspected, this was not possible due to the considerable amount of time it took to reach many of the localities which are very remote, and in many cases not even accessible with an ORV (if one hour was dedicated to each locality, the study would require more than 50 days of survey time). Locked gates on one farm (Klippekraal) restricted the amount of work that could be done, while the lack of access roads on certain farms also proved a problem.

Given the low level of detail at this stage of the project, the ACO team focused on carrying out a general survey of the study area to determine the rough density of heritage occurrences and the relative sensitivity of the range of topography involved and sample searched turbine sites that lay in areas deemed to be sensitive.

2.4 Legislative context

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed

Loosely defined, *heritage is that which is inherited*. The National Heritage Resources Act 25 of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- Cultural landscapes and intangible heritage associated with them
- Buildings and structures (greater than 60 years of age)
- Archaeological sites (greater than 100 years of age)
- Palaeontological sites and specimens
- Shipwrecks and aircraft wrecks
- Graves and grave yards.

Section 38 of the NHRA requires that Heritage Impact Assessments (HIAs) are required for certain kinds of development such as rezoning of land greater than 10 000 sq m in extent or exceeding 3 or more sub-divisions, or for any activity that will alter the character or landscape of a site greater than 5000 sq m. "Standalone HIAs" are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils Section 38 provisions.

The study area lies under the jurisdiction of three heritage compliance bodies.

- In the Western Cape, Heritage Western Cape is responsible for the management of all archaeological and palaeontological sites (grade 2), built environment and structures (grade 3a-grade 3c apart from National and Grade 1 sites).

- The Northern Cape Provincial Heritage Authority is responsible for the management and protection of all provincial heritage sites (grade 2), built environment and structures (grade 3a-grade 3c) in the Province.

- SAHRA Archaeology Unit based in Cape Town is responsible for the management of all archaeological and palaoentological sites in the Northern Cape. In terms of this particular project both the Northern Cape Heritage Authority, Heritage Western Cape and SAHRA are important commenting authorities but are not responsible for final compliance as this study forms part of an EIA process for which the Department of Environment Affairs is the compliance authority (in terms of section 38.10 of the National Heritage Resources Act).

Wind energy policy and heritage: A pilot study commissioned by the Provincial Government of the Western Cape "Towards a Regional Methodology for Wind Energy Site Selection in the West Coast region" (May 2006) is the only locally available policy guideline. The study considered landscape character rather than the "cultural landscape or heritage" but they concluded that wind energy facilities can have a profound impact on the surrounding landscape in terms of the natural qualities of places. In terms of landscapes and heritage, there are no pro-active detailed local regional studies that can be consulted, however the Western Cape pilot study recognizes that severe impacts can occur and suggests a buffer zone of 500 m from heritage sites. Neither SAHRA nor any other heritage compliance organization has developed a specific policy with respect to heritage and renewable energy, although the issue has received considerable attention in European countries (Joberta Laborgneb and Mimberg 2007, Clark 2009).

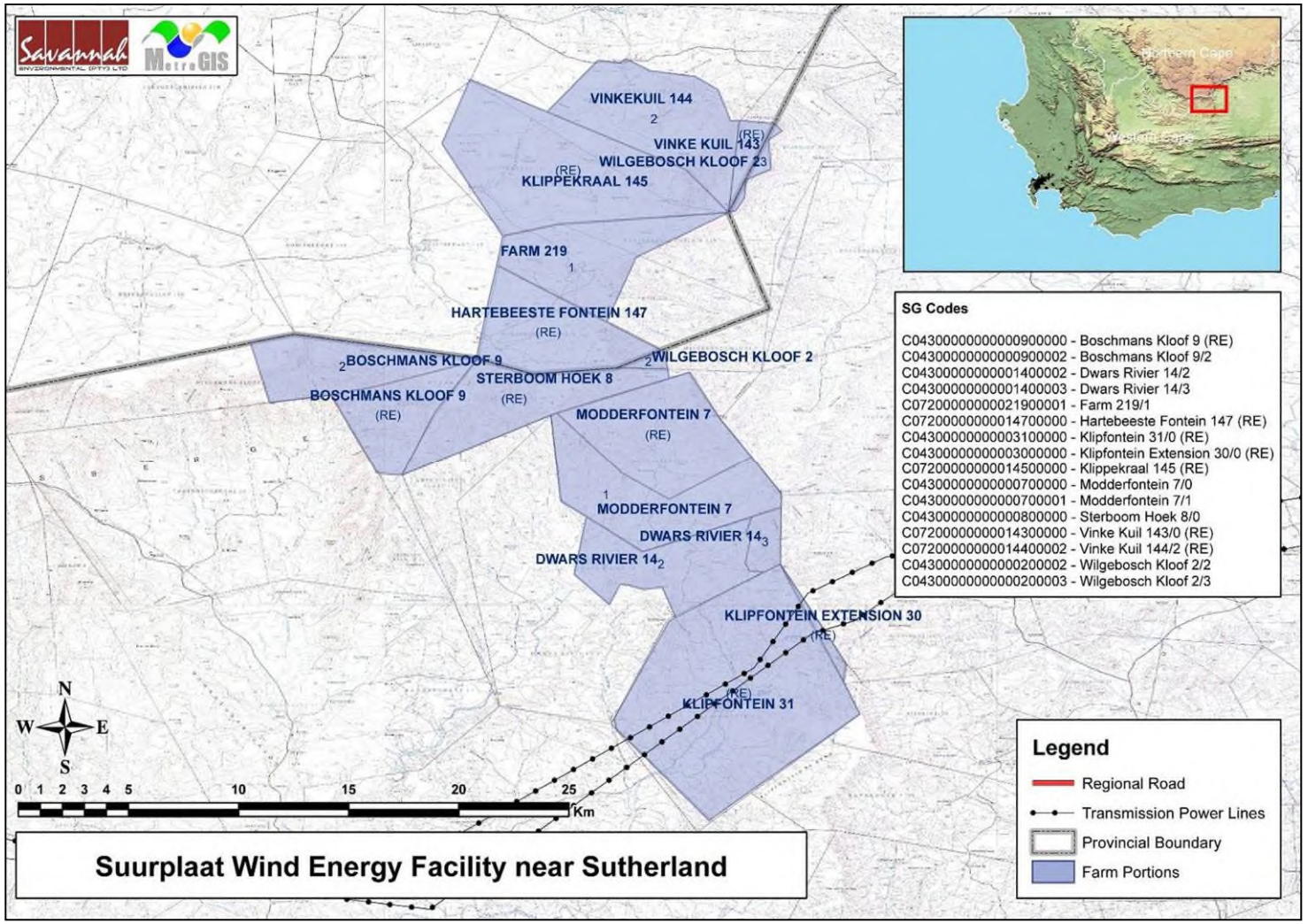

Figure 1 The study area with farms affected by the proposal. The provincial boundary runs through the mid-upper portion of the site.

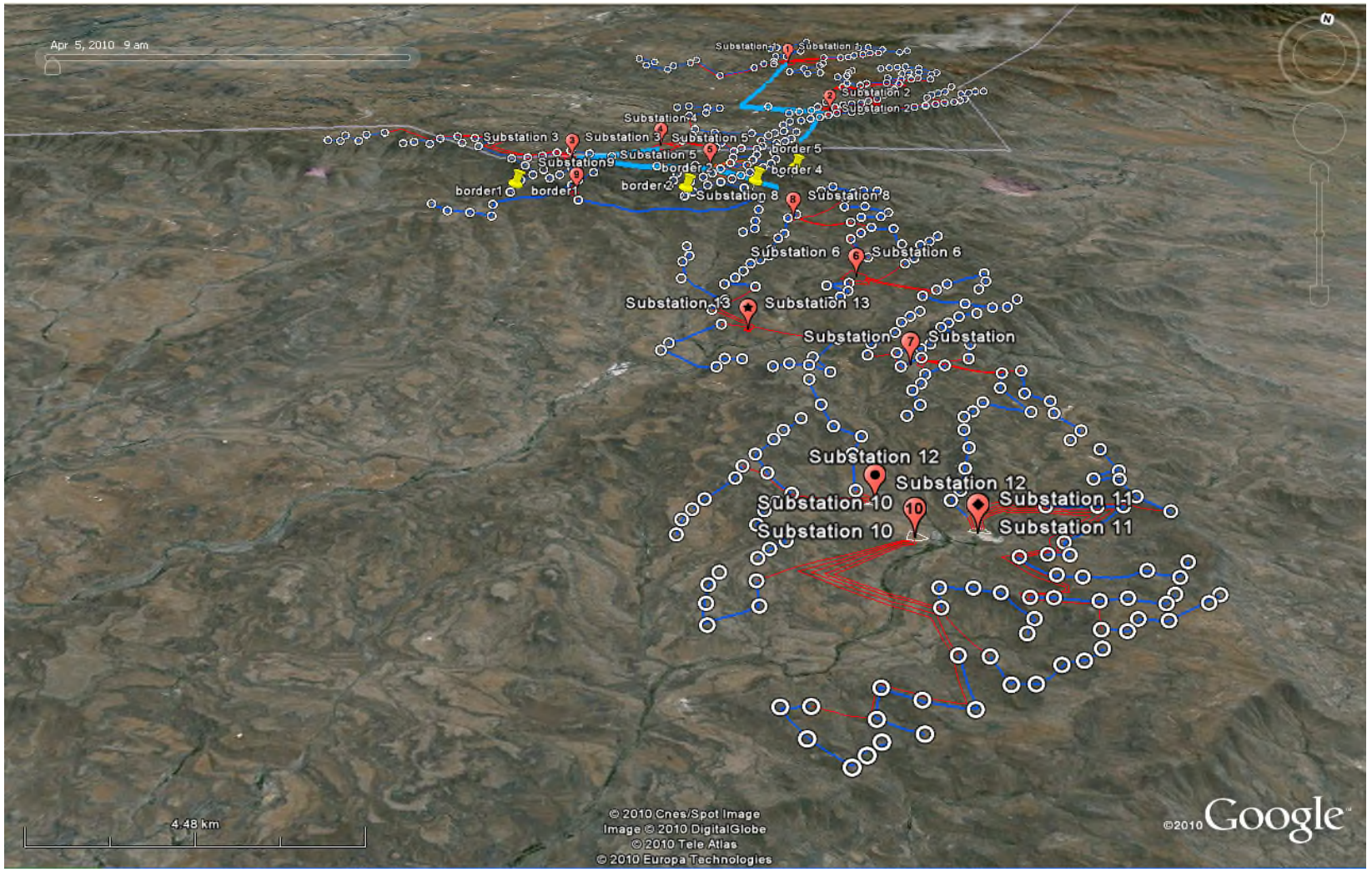

Figure 2 An oblique view of the study area showing the Great Escarpment (Besembos Mountains). The provisional location of turbines and other infrastructure are indicated.

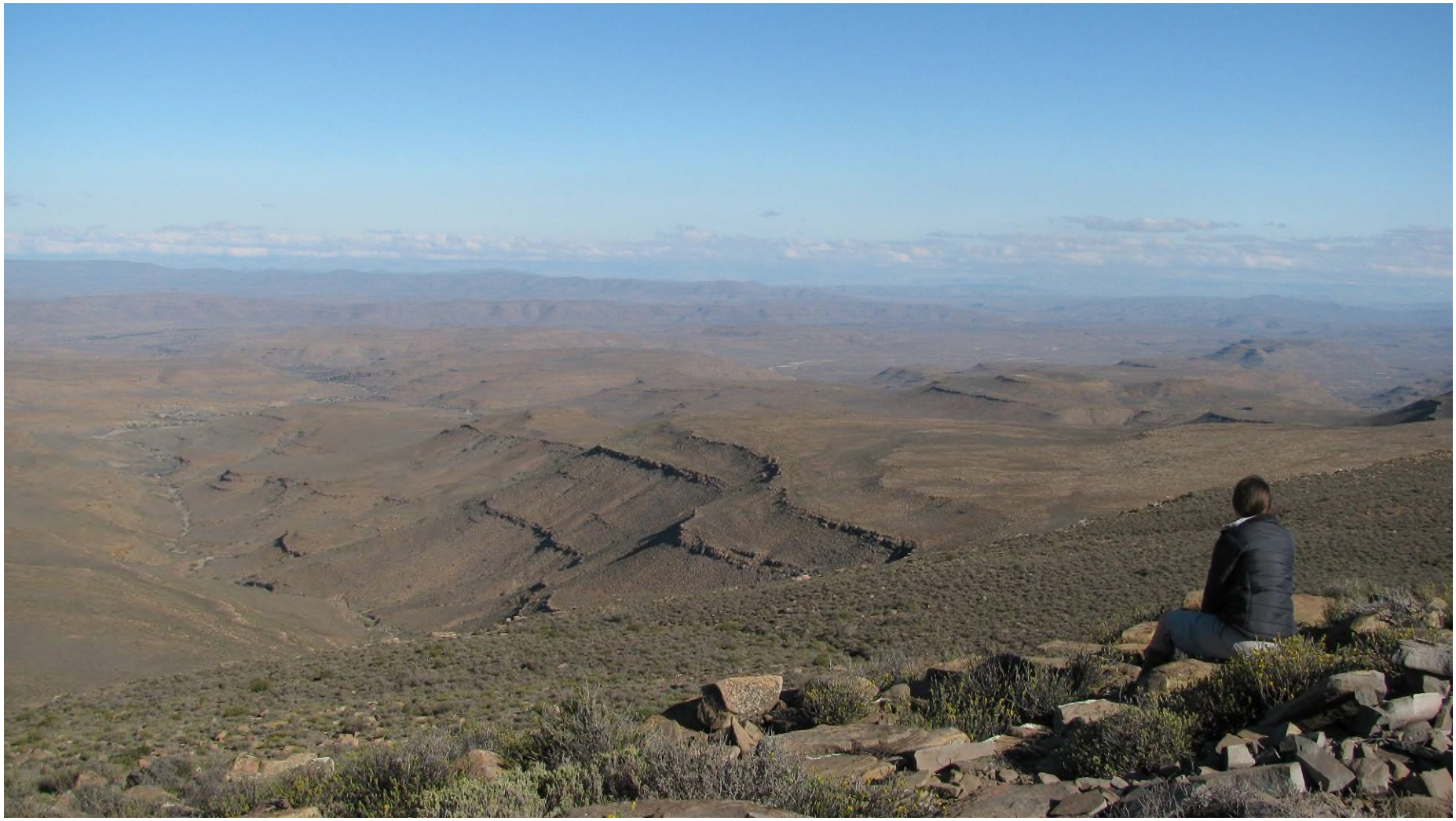

Figure 3 The landscape looking in a south easterly direction from the top of the escarpment. The Swaartberg range is in the far distance.

Figure 4 View from the Northern Cape boundary down the Tronk River Canyon **into the Western Cape.**

3. Heritage indicators within the receiving environment

3.1 The background

Despite its arid appearance, the Karoo had a relatively high carrying capacity and teamed with game before European colonisation (Skead 1980). Hunter gatherers (mainly San) successfully occupied the central interior of South Africa during the last 4500 years, subsisting on the large herds of grazing animals that occurred during that time (Sampson et al 1989). Late Stone Age archaeological sites dating to the late Holocene (within the last 4000 years) are surprisingly common. Although the Karoo is presently more suited to the keeping of small stock such as sheep and goats, research has shown that, at about 1200 – 1400 AD, a climatic fluctuation (known as the Mini-Ice Age) may well have caused an increased rainfall in the central Karoo resulting in the area being more suitable for grazing of cattle and occupation by Khoekhoen pastoralist groups. Using sophisticated dating methods Sampson has determined that Khoekhoen herders and San with flocks of sheep were present in the eastern Karoo until the advent of European colonization (Sampson 2008). These pastoral groups left behind an archaeological legacy that consists of stone *kraal* complexes of which several hundred have been recorded in the Zeekoe Valley in the eastern Karoo and the Riet River area in the Northern Cape (Hart 1989, Sampson 2008).

According to the SAHRA (2009) database, no archaeological surveys have been undertaken in the study area until now. There has been limited work around Sutherland (Evans et al. 1985; Hart 2005). Evans et al. (1985) excavated a small rock shelter on the grounds of the South African Astronomical Observatory in Sutherland. It contained a Later Stone Age assemblage with a relatively high proportion of small convex scrapers. The site also contained some thin-walled potsherds, ostrich eggshell beads and some *Nassarius kraussianus* beads. Evans et al. (1985: 108) comment that the presence of the latter beads points to cultural ties with people along the Cape coast while the small scrapers can be assigned to the Wilton industry as opposed to large elongated scrapers typically associated with the interior sites along the Orange River (Sampson et al. 1989).

Hart (2005) undertook a survey for a golf course to the south of the Sutherland urban edge. The most significant find was a complex of 13 stone enclosures which are typical of the *Khoekhoen kraals* that were mapped and described by the author in the Eastern Karoo (Hart 1989, Sampson 2008). A single highly dispersed artefact scatter consisting of mainly waste material (flakes made from *hornfels* or indurated shale) was also found. Hart (2005) reported finding a dense artefact scatter associated with a shallow rock shelter outside the study area indicating that such material may found in areas that were sheltered from the wind (important given Sutherland's extreme temperatures).

3.2 The landscape character

The study area falls within one of the least populated and remotest parts of South Africa even though it is only 4 hours drive from Cape Town. The site, which straddles the great escarpment, lies on entirely privately owned land and is very seldom visited by tourists, even day visitors from Sutherland. Roads are poor requiring the use of an off-road vehicle while substantial tracts of land are not accessible at all.

Above the escarpment (the Besemgoed Moutains) the karoo is characterised by low hills, kopjes, shale ridges and broad plains. Human settlement is sparse – many of the farm houses are un-occupied. Although technically all the land is zoned agricultural, in real terms it has the character of a wilderness. Occasional stock posts, dry stone kraals, fences, wind pumps, boundary beacons and tracks are the only apparent elements of human modification of the landscape. The treeless environment of above the escarpment is windswept and harsh, winter temperatures can be well below freezing point. Game is present – small herds of Vaalreehbok may be seen from time to time as well as rock hyrax, small antelope, and judging by the *spoor* observed, several species of carnivore. The sense of solitude and wilderness is profound in places.

The escarpment within and around the study area is without doubt among the most dramatic places in both the Western Cape and Northern Cape provinces (see Figs 3 and 4) being comparable in terms of its aesthetic qualities to places such as the Valley of Desolation and the Richtersveld. Notably close to the study is the Tronk Rivier Valley – a massive canyon where the geology of the escarpment is exposed in a series of stepped cliff faces (Fig 4)

Where the study area straddles the escarpment in the south, the landscape although more broken is no less dramatic. Approached from the lower karoo, the landscape literally follows natural steps up to upper plateau. Here there are numerous small valleys where rivers have incised themselves into the landscape. The sandy river bottoms are vegetated with stands of *Acacia karoo* trees and *Dikgatboom* in contrast to the treeless scrub of the upper plateau. The valley bottoms (farms Modderfontein and Dwarsriver) are extremely remote, yet there is evidence of early colonial heritage in these areas.

The cultural landscape of the study area is remarkably intact and deeply layered. The traces of KhoeKhoen settlement as remarked on by Sampson and others is visible on the upper plateau in the form of distributions of dry walled kraals and associated material. The layering of colonial settlement is visible – farm yards are complete with multiple phases of building ranging from early 19th -18th century "*brakdak huisies*" to established Victorian and early 20th century bungalows. In the southern portion of the study area even one of the most mysterious time periods in southern African archaeology is manifested – the brief contact period between Khoekhoen pastoralists and early European settlers is evident in a series of open sites containing both indigenous artefacts and European goods.

In terms of cultural landscape, the study area and environs is highly significant, and in terms of academic research potential, a place with unique qualities.

3.3 Colonial history

The indigenous people of Karoo waged a bitter war against colonial expansion as they gradually lost control of their traditional land. Penn (2005) notes the most determined indigenous resistance to *Trekboer* expansion occurred when they entered the harsh environment of the escarpment of the interior plateau (namely Hantam, Roggeveld and Nieuweveld Mountains).

The *Trekboers* settled on the escarpment where most of the springs were found, from here they were able to exploit the vegetation of the Onder Karoo as well as the Sak River in Bushmanland. Pastoralists were highly mobile; each *Trekboer* also had a farm in the Karoo called a *legplaats*. Winters very severe in the Roggeveld and inhabitants had to trek regularly. Many farms were abandoned, not only due to San, but also due to drought and poor grazing. Disputes over farm boundaries were intense.

According to Penn (ibid) there were independent Khoekhoen kraals located between the Trekboer farms in the Roggeveld in the 18th century. Pen indicates that the first recorded loan farms in the Roggeveld date to 1743, and by 1750 there were 31 registrations. Resistance to the Trekboers in the Roggeveld came initially from the San who resisted fiercely throughout the great Karoo, at times beating back the vanguard of *Trekboer* farmers. The colonists fought back by establishing the *"Kommando"* system – the "hunting" of San was officially sanctioned in 1777 (Dooling 2007) and in some instances bounties were obtainable from the local *landrost*. There was apparently a massacre of 186 San in the Roggeveld in 1765. The only confirmation of this is from the farm "*Oorlogskloof*" near Sutherland. There are a great many graves, some 30, laid out in three groups, with piles of rocks above them. There is also a separate gravestone with the date 1768. There is another mass grave on the farm 'Gunsfontein", possibly dating to the rebellion of the 1770s. According to Penn (pers comm.) somewhere in the valleys of the escarpment is a large cave or where some of the last surviving San made their last stand against the *kommandos.* Despite building a wall round the front of the cave to fortify themselves they were defeated. The colonists removed the bodies from the cave for burial. The site has not yet been identified. Hence, the landscape of the Roggeveld and Great Escarpment is a historic conflict landscape which is physically poorly understood – the last stand of the Cape San.

Of the farms in the Komsberg (Klein Roggeveld), Hartebeeste Fontein was surveyed in 1833, Klipfontein, Dwars Rivier and Modderfontein in 1834. All the other farms were surveyed much later (Figure 2). According to the survey diagrams, all these farms are described as being in the Field Cornetcy of Klein Roggeveld in the Division/District of Worcester. Although the farms were first surveyed in the 19th century, the likelihood is that they were informally occupied by

trekboer farmers well before this time.

3.4 The archaeology

A brief outline of the various types of archaeological occurrences will be discussed here, the details are recorded in Appendix A along with geographical co-ordinates and site gradings. The edge of the escarpment where it is proposed that many of the turbines are to be built, is relatively devoid of archaeological material.

Pre-colonial archaeological material, as expected include Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) artifact scatters. Open sites are extremely sparse on the upper plateau with only one MSA site being recorded – a scatter associated with a dry pan. The most common raw materials are hornfels, quartzite, chert, and also quartz and Karoo shale. Occasional flakes were noted randomly on the landscape lie scattered on the land surface which represents the "litter" of the Stone Age. On the upper plateau even incidental artifacts were scarce. In the southern portion of the study area a significant and well preserved Early Stone Age site containing complete and highly refined bifaces (hand axes) attributable to the *Fauresmith industry* was found on the farm Klipfontein.

The most common form of pre-colonial site on the upper plateau were clusters of ***ancient kraals***, which according to Sampson's (2008) figures from the Eastern Karoo could be between 300 and just over 1000 years of age. The kraal complexes (which are distinctly dissimilar to colonial period stock kraals) tend to be found along the leeward slopes of low ridges (or where minimal wind affects the area). These typically consist of dry stone piled wall enclosures in a roughly circular configuration, sometimes interlocking but not more than half a meter high, and ranging from 3 - 4 meters to 9 m in diameter. In the past they are likely to have been associated with reed mat huts or brush shelters (or shelter), which were probably erected a few meters away from the main 'kraal' where stock (fat tailed sheep and goats) were kept. Combined with the large 'kraals' are often found '*lammerkraals*' or lambs' kraals, which are much smaller (about 1m in diameter) and a bit higher (usually a few more layers of stones added to the wall) than the adjoining larger 'kraal'. These small kraals are known to have been used to keep new born lambs or goats separate from their mothers so that the milk could be used by the people (Webley 1986). It was noted that kraals are arranged in complexes of up to 13 interlocking enclosures with adjoining "lammerkraals". Notable complexes were recorded in the area of Hartebeestfontein (way points 017a-017o, 018, 018b) and at Vinkekuil. Also associated with these 'kraals' is artefactual material, fine thin red burnished pottery, and ostrich egg shell. At a site alongside the access road to Waterval there is a remarkable complex of 'kraals' below and on top of a ridge (way points B17.1-B17.7:). The complex has been bisected by the access road, and may be further impacted by the need to upgrade the road to accommodate heavy vehicles during construction.

The kraal complexes are significant heritage sites, which have the potential to gain status as more and more "coloured" people become aware of their Khoisan ancestry. The sites

represent a heritage that is poorly understood due to the fragmented nature of information from the great Karoo.

Below the escarpment in the southern section of the study area, another form of archaeological site was identified. These are what we interpret to be open Khoekhoen encampments situated among the *Kameeldoring* trees along the dry river beds in the bottom of valleys. The sites are typically quite large (80 – 80m in diameter), rich with very fine thin walled and burnished Cape Coastal pottery. There are numerous stone features, informal stone artefacts, grinding surfaces as well as a number of graves, some of which have broken grinding stones placed on top. Also evident were discreet ash middens and animal bone. On two of the sites is evidence of European goods (19th century glass and ceramics) which may indicate some form of continuous use of the sites by Khoekhoen herders into the colonial period.

The 3 sites of this kind which were identified lie on the main track from Klipfontein to Modderfontein. They are vulnerable and are likely to be damaged if the road is widened. Archaeological sites of this kind are very rare in the Western Cape, having been only previously recorded in the Richersveld.

3.5 The built environment and colonial period archaeology

Boundary markers. Quite prevalent on the landscape are stone cairns, or beacons, often indicating a property boundary. Mostly these cairns are not more than two meters high, and are constructed with layered flat rocks. They are usually located on the tops of ridges or slopes for good visibility. We believe these cairns to have been built in association with the original farm surveys that took place in the 19th century.

Farm houses and their associated structures, and farm workers buildings. Five farm houses were visited altogether, with the names of Van Heerden Louw se Plaas, Nooitgedacht, Waterval, Klipfontein, and Modderfontein. The houses are all built from slabs of partially dressed shale stone structures, all are older then 60 years of age and are therefore considered generally protected heritage in terms of NHRA. Almost all of them have grave yards associated with them, as well as dry stone kraals and walls, many of which are beautifully built. The stone boundary walls at Louw se Plaas are among the most extensive ever observed by the authors of this study. At the Farm complex at Waterval there is a well conserved 19th century homestead as well as a rare, but typical vernacular flat roofed long house (possibly late 18th – early 19th century) which may once have been the original farm building. It is currently occupied by staff.

Early structures were encountered at the farm complex at Modderfontein where there is a transitional homestead dating to approximately 1860 – 1880. Associated with this abandoned farm are spectacular complexes of dry stone kraals, stone boundary walls, outbuildings, and a

grave yard. Recent re-roofing of the old house has saved the joinery and fenestration which although in poor condition is relatively complete. A notable find at Modderfontein was the identification of the foundations of a *Kapstyl* or *Hardbeeshuis* with and associated *kookskerm*. The presence of oriental ceramics on the site indicates that this may have been the temporary home of an early *trekboer* farmer in the 1700's.

Ruins within the study area are quite numerous. These range from full ruined farm complexes (old "T" shaped house an out buildings at Klipfontein) as well as a variety of stock posts, historic kraals and boundary walls. Almost all of these are over 100 years of age and are considered to be archaeological heritage.

Historic middens were recorded at Louw se Plaas, Modderfontein and at the ruined homestead at Dwarsrivier. All the middens appear to be large early 18th to mid-late 19th century judging by the ceramics which renage from European sponge and annular ware to oriental coarse porcelain. Since the middens contain the material remnants of domestic life on these frontier farms, they are considered to be archaeologically important.

Passes and wagon routes. While many of the tracks throughout the study area are likely to have their origins in the 19th century wagon routes between farms, and are therefore to a degree historic structures, most notable is the pass between Dwarsrivier and Modderfontein was likely to have been "engineered" in the 19th century. This treacherous little pass is highlighted due to the dry stone embankments and road edges that clearly make it part of the historic built environment and therefore a protected structure. Its alteration or upgrading will require a permit from the heritage authority.

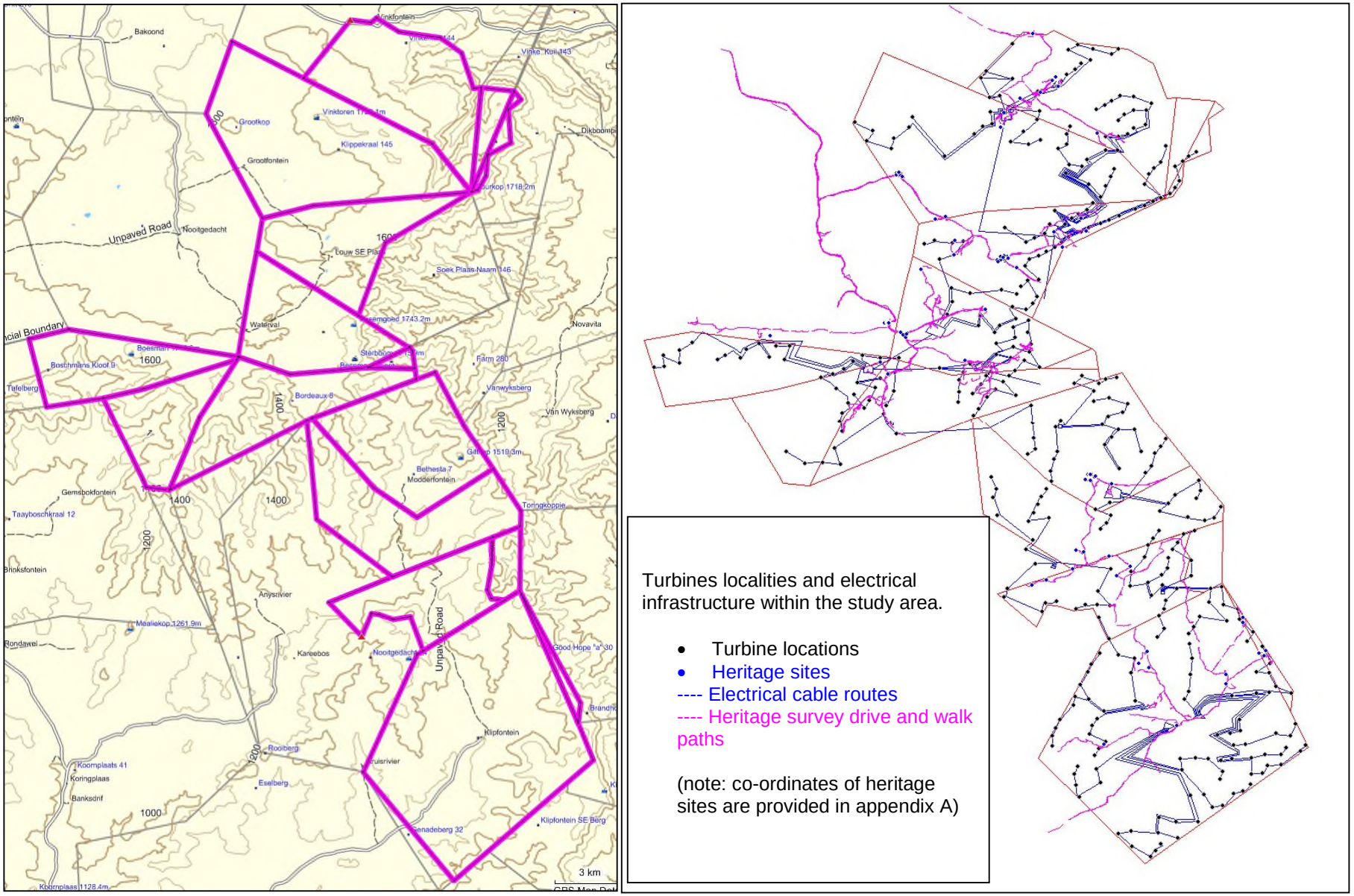

Figure 5 The study area (right) with a map indicating the coverage of the heritage survey (left).

Figure 6 Pre-colonial Khoekhoen kraal site. Top left is a circular stone kraal with associated Cape Coastal pottery (bottom left). Right is a well formed kraal of piled stone in the lee of a low shale ridge.

Figure 7 The historic abandoned farm house at Modderfontein. The farm yard includes dry stone walls (bottom left), the grave yard with high dutch inscriptions (bottom right). The house still has original features – a dutch oven (top right), *muurkas* (top center) and window joinery in place.

Figure 8 Other heritage recorded are 400 000 year old ESA tools (top), an historic stone boundary marker (bottom left) and this example of a long house with a flat roof at Waterval.

4. Assessment of Impacts

4.1 Activities that will affect the heritage environment

Wind energy facilities can produce a wide range of impacts that will affect the heritage qualities of an area. Each turbine site needs road access that can be negotiated by a heavy lift crane(s) which means that in undulating topography (such as in parts of the study area) deep cuttings and contoured roads will have to be cut into the landscape to create workable gradients. During the construction phase each of the turbine sites will have to be levelled off to create a solid platform for cranes as well as a lay-down area for materials. This will involve earthmoving and road construction, followed by the bringing in of materials and plant. The actual construction of the turbines will involve excavation into the land surface to a depth of up to 3m and over an area of 225m^2 for the concrete base. The pre-fabricated tubular steel tower is bolted on to the base and erected in segments. The nacelle containing the generator is finally attached followed by the rotors. The turbines are connected via underground cables to substations (positioned to where after the generated current will be fed to the national grid via 132kV transmission lines, a substation and a 400kV power line). The turbines are expected to have a life span of between 20-30 years, after which they will be renewed or disassembled.

The physical process of preparing the turbine sites, substation sites and the access roads to turbines and associated ancillary structures (workshop, office) can be a source of physical destruction of archaeological sites and historic structures. Archaeological sites are sensitive to contextual and physical disturbance which destroys their significance.

4.2 Impacts: The cultural landscape

The cultural landscape is the unique interaction of human kind with the landscape as manifested in its heritage, its natural qualities, its evolution over time and its cultural and aesthetic qualities.

During both the construction and operational phases the effect of massed wind turbines on the quality of a cultural landscape is perhaps the most significant impact of all as it is these impacts that will persist for the duration of the life of the facility, and to an extent after the facility has been decommissioned.

Due to the size of the turbines the visual impacts are largely immitigable (they are easily visible from 10 km) in virtually all landscapes (personal observations), however indications are (PGWC 2006) that they are perceived to be aesthetically/artistically more acceptable in agricultural or manicured landscapes.

Shadow flicker – an impact particular to wind turbines is very large moving shadows created

by the blades when the sun is low on the horizon. Such shadows can extend a considerable distance from the turbine. Continuous shadow flicker will have a serious impact on the sense of place of a heritage site or collection of heritage sites, especially if the site has any potential to be publically celebrated.

Visual impact of road cuttings into the sides of slopes will affect the cultural, natural and wilderness qualities of the area. Given the semi-desert environment, such scaring is likely to be persistent.

Noise caused by construction, and the turbines themselves will affect the ambience of a place, especially if it is a remote, desolate or wilderness landscape.

Residual impacts can occur after the cessation of operations. The large concrete base will remain buried in the ground indefinitely. Bankruptcy or neglect by a wind energy company can result in turbines standing derelict for years creating a long term eyesore.

Substations and power lines will contribute to the industrialisation of the environment and detract from the wilderness qualities of the place.

4.3 Impacts: construction of the turbines

During the construction phase the following physical impacts to the landscape and any heritage that lies on it can be expected:

» Bulldozing of roads to turbines sites with a possibility of cut and fill operations in places.
» Upgrading/widening of existing farm tracks
» Creation of working and lay-down areas close to each turbine site
» Excavation of foundations for each tower

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In terms of impacts to heritage, archaeological sites which are highly context sensitive are most vulnerable to the alteration of the land surface. The survey undertaken to inform this assessment has revealed that archaeological sites are not situated in the kinds of areas that the turbines are likely to be built on – tops of escarpment edges, hill tops and high ridge lines.

4.3.1 Impacts: construction of cable routes and power lines.

The activities that may affect heritage sites are:

- Excavation of many kilometers of linear trenches for cables
- Erection of 132 kV power lines on mono-poles.
- Erection of a 400kV power line

- Construction of electrical infra-structure in the form of substations

Construction of overhead power lines is likely to have a low impact on physical heritage, but may have a high impact on cultural landscape during construction and operation. Excavation of cable trenches will have limited local impacts on physical heritage, but very little impact on cultural landscape once rehabilitation is achieved. None of the proposed substation sites (note – large substations alternative sites excluded) that were examined are considered to be archaeologically sensitive (final localities will need to be checked), however it was noted that the construction of the substation 11 in close proximity (300 m) to the Klipfontein farm complex will cause changes to the sense of place and diminish the aesthetic values of the locality. Relocation further west (say at least 600 m) is suggested.

4.3.2 Impacts during road upgrading and construction

Of greater concern to physical heritage than the turbines themselves is the potential impact of construction of branch access roads to turbines, which will generally involve use of existing tracks as far as is possible. Even the upgrading/widening of existing roads has the potential to impact sites in the valley bottoms below the escarpment, and may affect some pre-colonial herder sites on the upper plateau. Although it is not expected that impacts will involve complete destruction of sites, they have the potential to result in loss of heritage knowledge and diminish the significance of the sites themselves.

4.4 Pre-colonial archaeology

Nature of impacts: The proposed activity may cause localised exposure and displacement of archaeological material, especially with respect to the construction of new roads and the upgrading of farm tracks.

Extent of impacts: Given that the distribution of archaeological sites is generally sparse on the high ridges and escarpment edge, and the fact that the chances of chances of turbine bases impacting them are low, only highly localised impacts at turbine sites are likely, and most may through appropriate mitigation, be avoided altogether. Access roads are likely to cause greater destruction, however this impact is expected to be local in extent.

NATURE OF IMPACT: Impacts to archaeological material could involve localised displacement of material at turbine footings or lateral disturbance of material by vehicles, service roads and cable trenches.		
	Without mitigation	**With mitigation**
EXTENT	Local (2)	Local (1)
DURATION	Long term (5)	N/a
MAGINITUDE	Small (1)	Small (1)
PROBABILITY	Possible (2)	Possible (2)

SIGNIFICANCE	Low (16)	Low (6)
STATUS	Negative	Positive
REVERSIBILITY	Non-reversible	Non-reversible
IRREPLACEABLE LOSS OF RESOURCES?	No	No
CAN IMPACTS BE MITIGATED?	Yes	Impacts can be avoided.
MITIGATION: An archaeologist should be involved with the final design phase to make sure that service roads and footings do not impact any archaeological material. It will be necessary to conduct a walk down survey of some roads, turbine and cable trenches and power line alignments before construction.		
CUMULATIVE IMPACTS: N/a		
RESIDUAL IMPACTS: N/a		

Table 1 Summary of impacts to Pre-colonial archaeological material

4.4.1 Colonial period heritage

Nature of impacts:

Settlement of the landscape during the colonial period commenced during the 18th century with the establishment of impermanent *trekboer* homesteads, once settlement on a more permanent basis took place after indigenous people had been forced off the land, permanent structures were built. These are sparse within the study area, and may only be marginally affected by building activities in relation to the proposed wind energy facility. Re-use of buildings may result in illegal changes to structures or removal of historic fittings and fabric. The rural cultural landscape is significant – impacts could occur to walls, kraals, stock posts when roads are upgraded or constructed, or buried cables installed.

Extent of Impacts: The impacts are likely to be local in extent, and are unlikely to result in complete destruction of heritage resources. The kinds of impacts that can be expected are localised demolition or damage to parts of structures such as dry stone walls and kraals, or in-appropriate use and abuse of ruins and empty buildings and the yards around them.

NATURE OF IMPACT: Indirect impacts cuased inappropriate re-use of buildings, theft of materials, damage to dry stone walls during construction.		
	Without mitigation	**With mitigation**
EXTENT	Local (1)	Local (1)
DURATION	Long term (4)	Long term (4)

MAGINITUDE	Moderate (5)	Low (3)
PROBABILITY	Probable (3)	Possible (2)
SIGNIFICANCE	Medium (30)	Low (14)
STATUS	– negative	neutral
REVERSIBILITY	reversible	Reversible
IRREPLACEABLE LOSS OF RESOURCES?	No	No
CAN IMPACTS BE MITIGATED?	Yes	
MITIGATION: A policy towards protection of heritage structures needs to be development and implemented before construction commences.		
CUMULATIVE IMPACTS: Given that 2 other large WEFs are planned for the region (EIA's in progress by ERM), poor management of heritage resources across all of these (if implemented) could in part sterilise future resource use and the physical history of the area.		
RESIDUAL IMPACTS: Ongoing use of historic structures and places may result in both positive and negative impacts – if properties were conserved, they could be re-utilised after closure of the facility.		

Table 2 Summary of Impacts to built environment.

4.4.2 Impacts to Cultural landscape

Impacts to cultural landscape are expected to occur. The "cultural landscape" can be described as the *place* – the totality of its person built heritage, its natural qualities and aesthetic value and the spatial patterning and layering of human interaction with the environment. Such impacts relate to changes to the feel, atmosphere and identity of a place or landscape. Such changes are evoked by visual intrusion, noise, changes in land use and population density. In the case of this project, impacts to remote and rural landscape and wilderness qualities are of concern.

Nature of Impact

The landscape of the study area is of very high aesthetic value. As a visual resource it is among the best of what both the Northern and the Western Cape have to offer. The layering of the human made heritage on the landscape, although relict is remarkably in-tact and ancient. The establishment of the wind energy facility will effectively industrialise this landscape and sterilise it of its wilderness qualities, sense of remoteness as well as potentially certain kinds of future use.

Extent of the impact

The impact will be felt across the entire study area and up to a distance of at least 10 km from the study area. The impact has the potential to change the character of the region and affect the identity of nearby towns such Sutherland, Merweville and Matjiesfontein through the perceived change in the character of the region.

NATURE OF IMPACT: Impact is the change to the identity of the region, industrialization of its aesthetic quilites and the addition of an industrial layer on a very old landscape.		
	Without mitigation	**With mitigation**
EXTENT	Local (3)	Local (3)
DURATION	Long term (4)	Long term (4)
MAGINITUDE	High (7)	High (7)
PROBABILITY	likely (4)	Likely (4)
SIGNIFICANCE	High (56)	High (56)
STATUS	- Negative	- Negative
REVERSIBILITY	Non-Reversible	Reversible in long term
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	No	No
MITIGATION:		
CUMULATIVE IMPACTS: Three or more WEFs are planned for the area. The accumulative impacts may change the character of the entire region, and on an even broader scale, (other WEFs are planned throughout the karoo) negatively affect the Karoo as an iconic South African landscape**.**		
RESIDUAL IMPACTS: Landscape scaring, long term traces of human intervention in a remote landscape with wilderness character.		

Table 3 Summary of impacts to cultural landscape.

4.5 Impact Statement

4.5.1 Archaeological Heritage

The best way to manage impacts to archaeological material is to avoid impacting them. This means micro-adjusting turbine positions where feasible, or routing access roads around sensitive areas. If primary avoidance of the heritage resource is not possible some degree of mitigation can be achieved by systematically removing the archaeological material from the landscape in accordance with a relevant permit issued by the heritage authority. This is generally considered a second best approach as the process that has to be used is exacting and time-consuming, and therefore expensive. Furthermore the NHRA requires that archaeological material is stored indefinitely which has cost implications and places an undue burden on the limited museum storage space available in the province.

Although indications are that impacts to archaeological material are likely to be of low significance due to the fact that the proposed turbines and associated infrastructure are located away from the identified sites, it must be noted that it has not been possible to assess the potential impacts of additional road construction on archaeological sites due largely to the limited access on site. The study area is vast which means that the full range and number of heritage sites on the landscape remains uncertain. Judging by what is known about the location of archaeological sites, it is expected that some sites will be impacted, but generally mitigation is possible.

In terms of adding value to the project, the academic research opportunities offered by the study area are excellent. The developer of the WEF should consider facilitating/supporting academic research and so contribute to the enrichment of knowledge which will result in a positive impact for the overall project.

It is recommended that the following mitigation measures are implemented.

- Existing farm tracks must be re-used or upgraded to minimise the amount of change to un-transformed landscape.
- In general terms, construction of turbines and roads in valley bottoms should be kept to a minimum. Archaeological sites close to the access roads at Hartebeestfontein and in the valley bottoms close to the roads between Klipfontein and Modderfontein will need active protective intervention and even archaeological sampling.
- Any pre-colonial kraal complexes that will be affected by the proposed activity should be mapped, and measures taken to protect the sites.
- During the detailed planning phase, drawings of proposed road alignments, infrastructure and near-final turbine positions should be submitted to an archaeologist

for review and field-proofing. Micro-adjustment of alignments and turbine positions is likely to be sufficient to achieve adequate mitigation.
- A "walkdown" of final cable routes, and power lines and access roads will be required.
- If farm buildings at Louw se Plaas, Modderfontein are to be re-used, the middens should be protected.
- It is illegal at all times to destroy or change and archaeological site without a permit.

4.6 Built Environment

The physical built environment at the site is unlikely to experience direct impacts, however it may be necessary to upgrade/widen roads round some farms and close to historic structures. In general terms a policy of minimal intervention is advocated. Sensitive reuse of farm buildings is advocated (this helps maintenance of these buildings) provided that changes are kept to a minimum and materials such as old door handles, window frames, shutters and wood/coal stoves are not removed for "use elsewhere". The stone kraals and outbuildings are also important components of the historic farms and they must not be demolished or altered. Stone must not be taken from them for use as building materials on other projects.

Mitigation:

- Conserve old buildings, kraals, dams and wall alignments – do not demolish or damage.
- Do not demolish wind pumps. Some of these are protected structures.
- Follow a policy of not intervention – old farm buildings such as those at Modderfontein should be conserved, or rehabilitated.
- Theft of fittings from buildings needs to be monitored and culprits fined and charged under NHRA.
- Seek guidance from a heritage consultant if any buildings are to be restored.
- Keep infrastructure at least 500 m away from farm complexes.
- Apply to the relevant provincial heritage authorities to demolish or alter and historic structures (buildings, historic passes, walls kraals etc).

4.7 Cultural landscape

The cultural landscape qualities of the area will be affected by the proposal which will result in the negative impacts to the aesthetic qualities of the place, and generally add a whole new layer of activity onto a landscape that has seen little change for more than 1000 years. While actively protecting archaeological sites and structures, supporting historical and archaeological research will conserve the physical elements and add value to the development, impacts to the intangible and aesthetic qualities of the study area and surrounds cannot be mitigated.

Mitigation

- Turbines must be positioned in such a way that they are at least 500m away from farm complexes, all of which have heritage elements.
- Turbines must be positioned in such a way that shadow flicker does not affect any farm complexes.
- Road alignments must be planned in such a way that the minimum of cut and fill operations are required.
- Guarantees for demolition of turbines after their useful life must be in place as a condition of approval.

4.8 Cautionary: Un-identified archaeological material, fossils and fossil bone

All archaeological material is protected by Section 38.5 of the National Heritage Resources Act and it is an offense to destroy material. If archaeological material (including graves) is uncovered, all work must cease in that area, while the relevant heritage authorities are notified. Rescue mitigation may be required, for the cost of the developer. Human graves can occur anywhere on the landscape. It is best that these are not disturbed. In the event of an accidental disturbance, the find site must be left as undisturbed as possible (i.e. treated as a forensic site) and an archaeologist contacted immediately. The archaeologist will invoke the necessary procedure for exhumation if needed.

5. Assessment of alternatives

5.1 Main 400 kV substations and power line routes.

The construction of a substation at the bottom of the escarpment to the east of the study area will be necessary for the evacuation of current from the wind energy facility to the national grid via the 2x400kV Eskom transmission lines that pass through the area.

Substation site 1 (fig) lies relatively close to the existing 2x400 kV lines. The position of the substation is favoured over site 2 as it does not require a lengthy 400 kV connection to reach the main transmission lines to the south, and thus reduces additional landscape clutter. Three alternative routes (A, B, C) have been posed for the 132 kV lines that evacuate power from the WEF to the substation. Each of these lines will pass over sensitive landscape. Indications are that none of the alternatives have any heritage impact advantage over another.

Substation site 2 (fig) lies some 5.5 km the existing Eskom 2x400 kV lines. The position of the substation is not favoured over site 1 as it will require the construction of a longer 400 kV connection to reach the main Eskom transmission lines to the south, and thus will result in additional landscape clutter. Three alternative routes (1, 2, 3) have been posed for the 132 kV lines that evacuate power from the WEF to the substation. Each of these lines will pass over sensitive landscapes. Indications are that none of the alternatives have any heritage impact advantage over another.

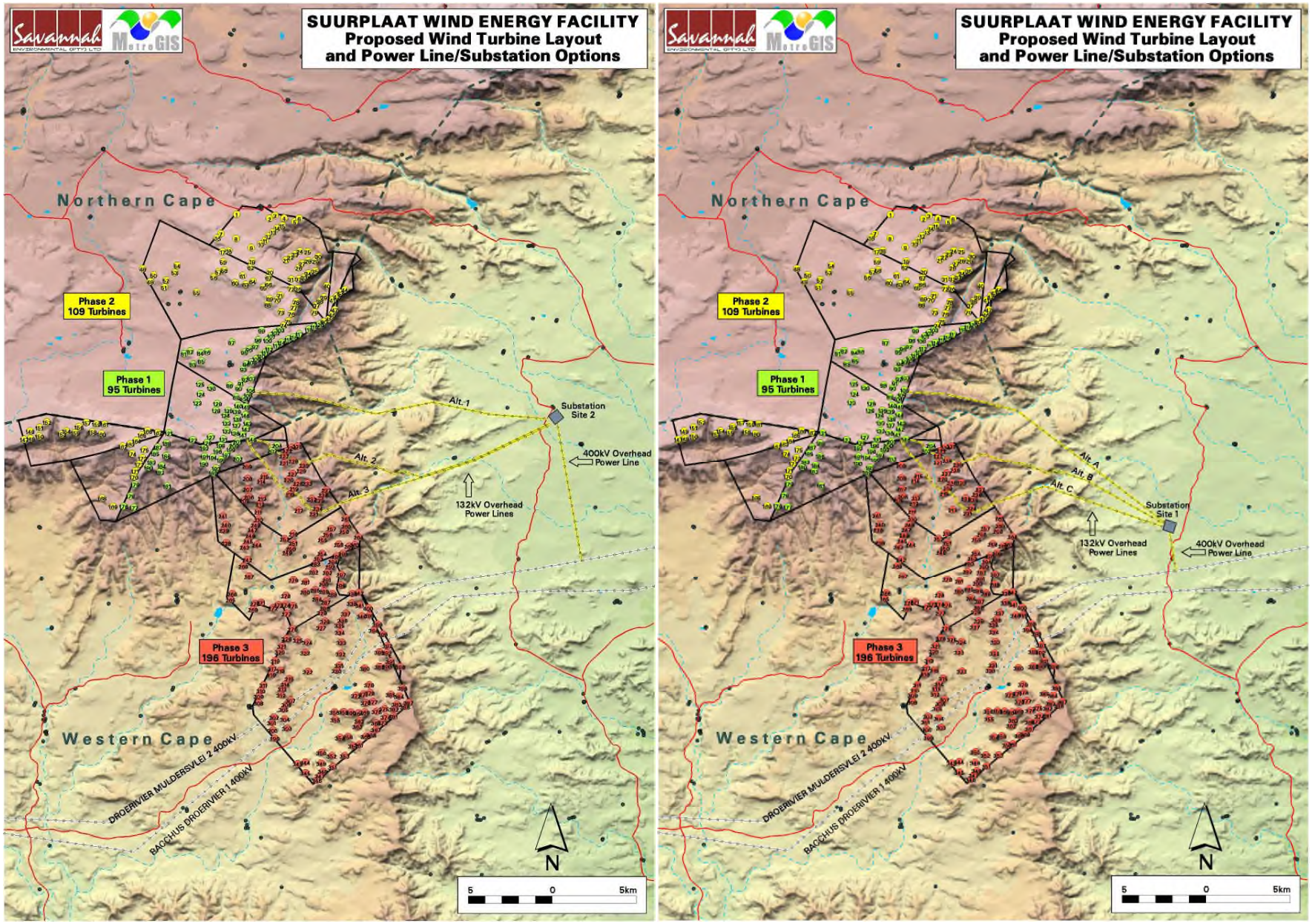

Figure 9 Alternative sites for main substations and 132 kV lines: Site 1 (right) and site 2 (left).

5.2 The no-go alternative

Exercising of the no-go option will not have any immediate affects on heritage apart from the usual process of incremental change to buildings by their owners, the gradual alteration of landscape by land use patterns and the natural processes of erosion and sedimentation. In terms of heritage, implementation of the no-go alternative will result in retention of the status quo (which is neutral and satisfactory).

5.3 Fatal Flaws

None identified.

6. Conclusions

While wind farms certainly represent clean energy which much needed in South Africa, they are not without impacts that are particular to this form of development. In heritage terms these relate to the size of the turbines and the requirement for massive expanses of landscape. Under most circumstances it would be unthinkable to erect a 25 story tower block (let alone hundreds of them) in a natural area, yet all round the world the wind energy industry has been successful at gaining the acceptance of individuals and authorities alike as the payoff for clean energy is universally attractive. This form of development is gathering significant momentum in South Africa before such time that the nation has developed adequate baseline information or adequate policy for the protection of its landscapes.

The accumulative impact on wind farms on the "South African Experience" are perhaps is perhaps greater than the impact of individual facilities. South Africa is internationally known for its scenic landscapes, its wilderness qualities and vast horizons. This national identity is one of the nation's greatest heritage assets, tourism draw-cards. On a planet which is becoming increasingly industrialised and urbanised, the value of un-altered natural areas can only increase. Wind farms proliferating across the South African landscape is a direct threat to these almost intangible, but very important qualities.

7. Recommendations

Given that this study has taken place prior to the development of a the final layout for the wind farm infrastructure, the impacts that we have identified are of a general nature, which means that it will be necessary to review further more detailed information as it becomes available so that where necessary, archaeological sites can be mitigated. Management of the heritage impacts of the proposal will be quite complex and beyond the scope of the average environmental control officer (unless he/she has quite a high level of training).

Therefore, it is recommended that there be an archaeologist contracted to check selected final

infrastructure positions (and mitigate if necessary) for each phase of implementation of the proposed development. The archaeologist should develop a heritage conservation plan which can be referred to and added to during the life of the operation. The plan should include a regularly updated heritage inventory.

In terms of adding value to the project, the academic research opportunities offered by the study area are excellent. The developer of the WEF should consider facilitating/supporting academic research and so contribute to the enrichment of knowledge.

7.1 EMP – Heritage management planning

Action required during the proposed activity

Mitigation Action/control	**Responsibility**	**Timeframe**
Finalising turbine locations, cable trenches. (positions along edge of escarpment are not sensitive, plateau ridges are sensitive).	Contract an archaeologist to check selected positions	Before commencement of construction.
Substations and power line – undertake walkdown of near final power line and substations to steer impacts.	Contract archaeologist to review proposed road alignments and field check where necessary.	At time of line design once draft final routes are selected.
Built environment. Apply minimal intervention policy. Buildings can be reutilized but without changing too much. Respect old structures, no matter how humble. Inventorise building fittings (video). Consult with heritage consultant re-major changes to buildings and environs.	Action to be adopted by WEF company as policy and implemented by ECO with assistance of heritage consultant where necessary.	During construction and operation.
Ongoing heritage conservation and managed to be guided by conservation plan.	Plan to be drafted by archaeologist and maintained through life of facility by person responsible for	Construction and life of facility.

environment.	
Performance indicator	**A record to be kept of all instances of accidental disturbance of heritage material, as well as post construction review of impacts on landscape context.**
Monitoring	A log of monitoring and observations be kept by the responsible archaeologist for submission to HWC for review by relevant committees. Compliance authority to check as per their discretion.

Emergency finds: Should any finds be unearthed during construction activity when an archaeologist is not present, an archaeologist and Heritage Western Cape or SAHRA Cape Town (for Northern Cape) should be informed immediately. The relevant contact person at Heritage Western Cape is Ms Belinda Mutti (021 4839685) and Dr Maria-Gracia Gilamberti at SAHRA. The person responsible for reporting any finds that evoke concern should be a senior person on site, or an environmental control officer who is on site during construction.

Human remains

Human remains can occur anywhere on the landscape. Most archaeologists retrieve several skeletons a year from various development projects around the province, so finds of this nature are not necessarily rare. Human remains are protected by several sets of legislation which means that certain protocols must be followed in the event of a find.

- leave the remains in place, nothing should be moved
- Cordon off the area
- Call the state archaeologist at SAHRA (021 4624509)
- Contact an archaeologist
- Once an archaeologist has examined the find, the archaeologist/SAHRA should contact SA Police services and the state pathologist to report human remains
- If the human remains are found to be a legitimate burial or a pre-colonial burial, an emergency exhumation permit will be issued by SAHRA or HWC (if exhumation is needed).
- If a crime is suspected, a police docket will need to be opened.

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Appendix A

Key to grading: 1=National significance, 2 =Regional significance, 3a=high local significance, 3b=medium local significance, 3c=Some residual significance, Ungraded=generally protected. Section 36=graves protected under national legislation administered by SAHRA

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
BMK	20.08	L01	1	S32 39.043 E21 02.027	LITHIC SCATTER	SMALL PAN WITH SCATTER OF FINE GRAINED MSA STONE ARTEFACTS ON THE NORTH-EASTERN EDGE, ONE SNAPPED BLADE WITH RETOUCH.	
BMK	20.08	L003	2	S32 38.456 E20 59.542	DSW SHELTER	SMALL ROCK SHELTER UP A GORGE, LOOKING NORTHWARD. A WELL PACKED STONE WALL ALONG THE FRONT FORMING SMALL KRAAL - PARAFFIN CAN INSIDE. JUST OUTSIDE STUDY AREA	
DWSR	23.08	L008	3	S32 44.070 E21 05.406	T--SHAPED HOUSE, TRAPVLOER, MIDDEN	TRAPVLOER 9-10M IN DIAMETER W/ ENTRANCE, TWO UPRIGHT STONES. BUILDING 1: SMALL STONE STORE (?), NO WINDOWS BUT LARGE DOOR, ATTACHED SMALL CIRCULAR KRAAL. BUILDING 2: EARLY T HOUSE, W KITCHEN+OVEN, LARGE FRONT ROOM, STOEP AND STEPS. BUILDING 3: WAGGON ROOM (?) WITH ATTACHED ROOMS. ORIENTAL CERAMIC, ALSO 19TH C BRITISH CERAMICS. FURTHER STONE KRAALS TO THE FRONT AS WELL AS A VERY LONG STONE WALL. BUILDINGS HAVE EARLY LIMEWASH CEMENT AND WERE WHITE WASHED.	
DWSR	23.08	L009	4	S32 43.940 E21 05.737	CAIRN	CAIRN/GRAVE ON SIDE OF ROAD, NEAR A SMALL STREAM	
DWSR	23.08	L009A	5	S32 43.940 E21 05.724	CAIRN/LITHIC SCATTER	CAIRN/GRAVE WITH SPREAD OF FLAKED STONE, GRINDSTONE AND SOME BLUE GLASS NEARBY	
DWSR	23.08	L019	6	S32 43.860 E21 07.317	DSW	BOTTOM AND TOP OF THE STONE-WALLED PASS BETWEEN DWARS RIVIER AND KLIPFONTEIN. THIS PASS MAY HAVE HERITAGE VALUE AND MAY BE THREATENED BY ACCESS ROAD	3B
DWSR	23.08	L019PB	7	S32 43.649 E21 07.625	PASS	BEGINNING OF EARLY WAGON ROAD PASS WITH SOME DRY STONE EMBANKMENTS.	3B
DWSR	23.08	L019PE	8	S32 43.860 E21 07.317	PASS	END OF ABOVE PASS.	3B
F219	17.08	002	9	S32 36.321 E21 03.703	DAM WALL/ARTIFACT	DAM/ RESERVOIR: SMALL RESERVOIR WITH DRYSTONE WALL REVETMENT ON A NW-SE ALIGNMENT; 8-12 COURSES HIGH. CLEAR GLASS, RECTANGULAR BOTTLE FOUND, BROKEN; PARTIAL EMBOSSED LETTERING SURVIVES IN 3 LINES - "...SOWSE/...LEWENS/...ESSENS. SIMILAR RESERVOIR SEEN C. 200M TO THE EAST OF 002.	
F219	17.08	003	10	S32 36.946 E21 05.088	DSW	DRYSTONE WALL: EXTENSIVE FARM BOUNDARY ASSOCIATED WITH FARMSTEAD 007; BUILT WITH TWO-FACES AND RUBBLE CORE, SOME PLACES ONLY SURVIVES AS RUBBLE; 003 CORRESPONDS TO INTERSECTION WITH TRACK-WAY; WALL ON SW-NE ALIGNMENT – CONTINUES NE OVER RIDGE FOR C.200M THEN TURNS NW TO FARMHOUSE, CONTINUES SW FOR C.300M THEN TURNS W FOR C.2KM AS FAR AS CAN SEE.	3B
F219	17.08	004	11	S32 36.779 E21 04.816	BARN/KRAALS	DRYSTONE BARN WITH CIRCULAR KRAALS AT EITHER END, ASSOCIATED WITH 007: RECTANGULAR ON A N-S ALIGNMENT; BUILT WITH REGULAR FACED BLOCKS, UNCOURSED; BUILT WITH 2 DIVISIONS WITH NORTHERN ONE CONTAINING ANIMAL TROUGH; SURVIVES TO 2.50M HIGH. CIRCULAR KRAAL TO S OF BUILDING SURVIVES AS DRYSTONE WALL UP TO 0.50M HIGH. SUB-CIRCULAR KRAAL TO N OF BUILDING (7.0X5.0M FOOTPRINT) WITH WALLS SURVIVING UP TO 2.0M HIGH.	3B
F219	17.08	005	12	S32 36.743 E21 04.819	DAM WALL	DAM WALL ASSOCIATED WITH 007: DRYSTONE WALL/ REVETMENT OVER 6.0M FROM BASE TO TOP OF WALL; SEMI-CIRCULAR IN PLAN, CONVEX TO NORTH WHERE WATER WAS DAMMED; WAY-POINT 005 RELATES TO EASTERN END OF DAM WALL	
F219	17.08	005B	13	S32 36.739 E21 04.772	DAM WALL	WESTERN END OF DAM WALL – TRACK BETWEEN 005 AND 005B IS TRACT ALONG TOP	

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
						OF DAM WALL	
F219	17.08	006	14	S32 36.753 E21 04.703	STONE HOUSE	FARMWORKER COTTAGES: STONE-BUILT WITH REGULAR FACED BLOCKS, CORRUGATED METAL ROOF; ADJACENT TO C20TH CEMENT BLOCK BUILDING AND DRYSTONE KRAAL TO THE E.	3C
F219	17.08	007	15	S32 36.785 E21 04.705	FARMHOUSE	FARMHOUSE: LATE C19TH/ EARLY C20TH BUNGALOW; STONE-BUILT WITH REGULAR (SELECTED) AND DRESSED BLOCKS (NOT FACED), C. 0.60M THICK WALLS, SQUARE FOOTPRINT; CORRUGATED METAL ROOF WITH SOLDER; WINDOWS REPLACED WITH METAL FRAMES BUT WOODEN LINTELS STILL IN PLACE (POSSIBLY WIDENED); BUILDING CONSTRUCTED IN AT LEAST 2 PHASES. OUTBUILDING C.5.0M TO THE NE: RECTANGULAR FOOTPRINT (15X8M) WITH IDENTICAL CONSTRUCTION MATERIALS TO FARMHOUSE; HAS WINDOWS ON NORTHERN SIDE AND MAY THEREFORE BE EARLIER FARMHOUSE TO 007. RECENT CEMENT BLOCK AND CORRUGATED METAL SHED IMMEDIATELY N OF ABOVE OUTBUILDING. DRYSTONE ROUND-HOUSE C.30M TO THE NW OF 007: POSSIBLE CORBELLED HOUSE?; WALLS SURVIVE TO HEIGHT OF 2.0M; HAS RECENT CORRUGATED ROOF (SUPPORTED ON 4 POSTS SURROUNDING THE STRUCTURE) PROTECTING IT FROM WEATHER.	3B
F219	17.08	008	16	S32 36.795 E21 04.683	MIDDEN	HISTORICAL MIDDEN ASSOCIATED WITH 007: SURFACE SPREAD OF PORCELAIN, GLASS AND ABUNDANT ANIMAL BONE	3A
F219	17.08	009	17	S32 36.770 E21 04.641	KRAAL	KRAAL COMPLEX: FOUR CELLS ALL RECTANGULAR IN SHAPE WITH ENTRANCES ON THE S ASPECT. FAR E CELL 1: SHALLOW BROKEN WALLS, TWO FACES, INDISREPAIR, WITH NATURAL BOUNDARY USED FOR THE N WALL. CELL 2: 24X12M, 1.5M HIGH. CELL 3: 24X18M HIGH. FAR W CELL 4: 30X43M 1.5M HIGH. CELL-2-4: STACKED IRREGULAR BOULDERS WITH CENTRAL RUBBLE PACKING.	3B
F219	17.08	010	18	S32 36.772 E21 04.721	MIDDEN	MIDDEN SCATTER, SHEEP AND ANTELOPE. APPROX 15M IN DIAMETER EXTENT.	3A
F219	17.08	011	19	S32 36.141 E21 05.926	LITHIC	RETOUCHED QUARTZITE POINT: UNI-FACIAL, VERY WEATHERED/ ROLLED; CLOSE TO OUTCROP OF BEDROCK, COULD BE PART OF DEFLATED DEPOSITION	
F219	17.08	B02	20	S32 36.644 E21 03.667	DAM WALL	SMALL RESERVIOUR BOARDERED BY DSW RUNNING NE-SW. MADE FROM SCHALE BLOCKS APPROX 8-12 LAYERS HIGH.	
F219	17.08	B03	21	S32 36.687 E21 04.875	KRAAL COMPLEX	DSW KRAAL COMPLEX: 2 CELLS. E CELL APPROX 30X20M, 1.5M HIGH. W CELL APPROX 10X20M, 1.5M HIGH. BOTH KRAALS ARE CONSTRUCTED WITH RIRREGULAR SHAPED BOULDERS WITH CENTRAL RUBBLE PACKING. WALLS ARE IN RELATIVELY GOOD CONDITION.	
F219	17.08	B04	22	S32 36.685 E21 04.801	LITHIC SCATTER	E/MSA STONE FLAKES AND CORES, SCHALE AND SILCRETE, FOUND IN A CONCENTRATION SURROUNDING A BECON APPROX 1M HIGH. EXTENT OF THE SCATTER EXTENDS APPROX 20M IN DIAMETER.	
F219	17.08	B05	23	S32 36.662 E21 04.794	DAM WALL	DSW DAM. THIS IS THE NORTHERN BOUNDARY WALL OF THE DAM. WALL EXTENDS NE-SW AND IS CONCAVE APPROX 48M IN LENGTH AND 10M HIGH. THE WALL STOPS WHEN IT MEETS NATURAL ROCK OUTCROPS AT THE ENDS. WALL IS SITUATED APPROX 20M NE OF THE ABOVE KRAAL COMPLEX.	
F219	17.08	B06	24	S32 36.689 E21 04.733	STONE HOUSE	SMALL DSW HOUSE, 2 CELLS+CONCAVE ENTRANCE WAY ON N ASPECT. CELL 1: ROOM WALLS HAVE COLLAPSED ON E&SE ASPECTS. FIRE PLACE HAS BEEN BUILT INTO SW WALL WHICH STILL STANDS. CELL 2: FULLY INTACT WALLS, WOOD REMAINS IN THE DOOR FRAME THAT IS BOARDERED BY SPRINGBOK HORNS. SMALL WINDOWS LOOK OUT TO THE W AND SW THAT ARE SHAPED BY RUSTED METAL CANS. RED POTTERY, CERAMICS, GLASS AND RUSTING METAL MECHANIMS SURROUND THE EXTERIOR TO THE N AND E.	
F219	17.08	B07	25	S32 36.810 E21 04.673	GRAVEYARD	PRIVATE FAMILY GRAVE YARD. THE OLDEST STONE READS 1897. TWO MUCH OLDER GRAVE STONES EXIST MADE FROM KAROO SCHALE AND MUST HAVE BEEN ERECTED BEFORE THE AVAILABILITY OF COMMERCIALLY CONSTRUCTED GRAVE STONES.	SECTION 36
F219	17.08	B08	26	S32 36.724 E21 04.890	DSW ENCLOSURES	3 COLLAPSED DSW ROUNDED ENCLOSURES. S CELL: 4M IN DIAMETER. N CELL: 1.5M DIAMETER. E CELL: 1.5M DIAMETER. ALL ENCLOSURES ARE COLLAPSED, REMAINING ONLY 1-2 LAYERS HIGH. IRREGULAR STONES STACKED ON TOP OF ONE ANOTHER. NO CENTRAL RUBBLE PACKING.	

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
F219	17.08	B09	27	S32 36.483 E21 06.112	CAIRN	DSW CAIRN ON STEEP RIDGE, N ASPECT OF THE RAVINE. APPROX 70CM HIGH, 5 LAYERS OF ROCK, 0.5 DIAMETER	
F219	17.08	B10.1*	28	S32 36.118 E21 06.644	DAM WALL	DAM DSW: SITUATED TO THE E OF AN INFLATION PAN. E ASPECT OF THE WALL IS 2M HIGH, W ASPECT 6M HIGH. APPROX 54M IN LENGTH. STACKING OF IRREGULAR SHAPED STONES.	
F219	17.08	B12.1	29	S32 35.840 E21 06.526	LITHIC SCATTER	STONE FLAKES E/MSA AMONGST A ROCKY OUTCROP APPROX 10M IN DIAMATER.	
F219	17.08	A12	30	S32 36.700 E21 04.782	RESERVOIR	MODERN CATCHEMNT AREA WITH DSW DRAINAGE SYSTEM TOWARDS THE WATER TANK TO THE E. SITUATED BETWEEN THE DAM WALLS (B05) IN THE CENTER. FLOOR IS LAYERED WITH FLAT SCHALE TABULAR BLOCKS AND CORNERED BY 1M TALL VERTICLE BOUNDARY POSTS.	
HBF	18.08	B-018.1	31	S32 38.444 E21 02.540	BRAKDAK HOUSE AND 19TH C FARM HOUSE	BRAKDAK FARMHOUSE: RECTANGULAR FOOTPRINT (C.25X5M) ON NNE-SSW ALIGNMENT; @ SW END A SQUARE ANNEX WITH DOUBLE-PITCH ROOF HAS BEEN BUILT ONTO WESTERN SIDE OF RECTANGULAR BUILDING, WITH LARGE OVEN/ FIREPLACE (CURRENTLY OCCUPIED); DOUBLE DOOR AT NE END OF BUILDING. EARLY C20TH FARMHOUSE: SINGLE-STOREY BUILDING WITH LATER C20TH ADDITIONS; TO WEST OF BUILDING ABOVE.	3A
HBF	20.08	022	32	S32 36.972 E21 02.931	KRAAL COMPLEX	SERIES OF 9 ? KHOEKHOEN KRAALS: ROLLED BOULDER CONSTRUCTION, SUB-CIRCULAR IN PLAN; ALL VERY EPHEMERAL; CENTRAL POINTS TAKEN ON ALL.	3A
HBF	20.08	022B	33	S32 36.974 E21 02.933	KRAAL	CENTRAL POINTS ON EACH OF THE KRAALS DESCRIBED ABOVE	3A
HBF	20.08	022C	34	S32 36.978 E21 02.935	KRAAL	AS ABOVE	3A
HBF	20.08	022D	35	S32 36.965 E21 02.939	KRAAL	AS ABOVE	3A
HBF	20.08	022E	36	S32 36.959 E21 02.949	KRAAL	AS ABOVE	3A
HBF	20.08	022F	37	S32 36.963 E21 02.954	KRAAL	AS ABOVE	3A
HBF	20.08	022G	38	S32 36.967 E21 02.947	KRAAL	AS ABOVE	3A
HBF	20.08	022H	39	S32 36.972 E21 02.939	KRAAL	AS ABOVE	3A
HBF	18.08	B17.1	40	S32 38.161 E21 02.204	KRAAL COMPLEX	PREHISTORIC KRAAL COMPLEX: CONSISTING OF 7 KRAALS AND ASSOCIATED FEATURES. 17.1: KRAAL 11X8M MADE FROM IRREGULAR BOULDERS AND STACKED WITH NO UNIFORMITY. THE REMAINING STRUCTURE IS ONLY 1 LAYER HIGH.	3A
HBF	18.08	B17.2	41	S32 38.162 E21 02.160	KRAAL	DSW KRAAL 2 LAYERS HIGH. IRREGULAR SHAPED BOULDERS ARRANGED IN AN OVAL, 6X8M IN DIAMETER 2-3 LAYERS HIGH.	3B
HBF	18.08	B17.3	42	S32 38.178 E21 02.115	KRAAL	NORTHERN BOUDARY WALL EXTENDS FROM E-W IN A CONCAVE FASHION. REMARKABLY INTACT 7 LAYERS HIGH, IRREGULAR SHAPED BOULDERS STACKED ON TOP OF EACH OTHER. APPROX 30M LONG.	3B
HBF	18.08	B17.4	43	S32 38.162 E21 02.163	KRAAL	E BOUNDARY WALL, IRREGULAR STACKED BOULDERS WITH NO UNIFORMITY, NE WALL MISSING. ROUNDED IN SHAPE, THE WALLS TO THE S AND W ARE COLLAPSED. AT THE HIGHEST POINT THE WALLS ARE 7 LAYERS HIGH, 1 LAYER AT ITS LOWEST. APPROX 10M IN DIAMETER. LAMBSKRAAL TO THE NW, 5M IN DIAMETER, 4 LAYERS HIGH OF IRREGULAR SHAPED STACKED BOULDERS.	3B
HBF	18.08	B17.5	44	S32 38.169 E21 02.172	KRAAL	KRAAL 11X8M MADE FROM IRREGULAR BOULDERS AND STACKED WITH NO UNIFORMITY. THE REMAINING STRUCTURE IS ONLY 1 LAYER HIGH. SMALL LAMBSKRAAL EXTENDS TO THE S APPRX 1.5M DIAMETER.	3A
HBF	18.08	B17.6	45	S32 38.166 E21 02.193	KRAAL	DSW KRAAL APPROX 8X10M AND 2-3 LAYERS HIGH. ROUNDED IN SHAPE BY IRREGULAR STACKED BOULDERS WITH NO UNIFORMITY	3A
HBF	18.08	B17.7	46	S32 38.180 E21 02.215	KRAAL	NORTH FACING DSW APPROX 4M IN LENGTH AND 3-4 LAYERS HIGH. CONCAVE IN SHAPE TO THE N.	3A
HBF	18.08	B18.1	47	S32 38.444 E21 02.540	FARMSTEAD	WATERVALE FARM COMPLEX	3A
HBF	18.08	B19.1	48	S32 38.506 E21 02.593	GRAVEYARD	PRIVATE FAMILY GRAVE YARD. 2 ENCLOSED GRAVES WITH MODERN GRAVE STONES, OLDEST 1956. 6 ASSOCIATED UNMARKED GRAVESTONES. 1 MARKED WITH NAME AND	SECTION 36

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
						DATES.	
HBF	18.08	B20	49	S32 38.405 E21 02.622	KRAAL	PREHISTORIC KRAAL . PARTIAL REMINANCE OF STACKED IRREGULAR BOULDERS 3-4 LAYERS HIGH. APPROX 14M IN DIAMETER . NOT WELL PRESERVED AS THE ROCKS HAVE BEEN STOLEN AND USED TO BUILD THE ASSOCIATED KRAALS TO THE W (NEXT CELL)	3A
HBF	18.08	B21	50	S32 38.422 E21 02.602	KRAAL	DSW KRAAL, 2 CELLS. SMALL KRAAL TO THE N, 8X12M, RECTANGULAR SHAPE. E CELL 12X45M, RECTANGULAR SHAPE. A SHORT 10M LONG WALL EXTENDS FROM THE EDGE OF THE E WALL.	3A
HBF	18.08	B22	51	S32 37.872 E21 04.385	KRAAL	SMALL DSW KRAAL, 7-8LAYERS HIGH. MED-LARGE FLAT BOULDERS ARRANGED IN TABULAR FORMATION TO CREATE A CIRCLE. COLLAPSED AT THE N AND S ASPECTS OF THE ENCLOSURE. APPROX 4M IN DIAMETER WITH CENTRAL RUBBLE PACKING. A COLLAPSED WALL SEEMS TO BE ASSOCIATED WITH THE STRUCTURE TO THE N APPROX 2 LAYERS HIGH AND 10M LONG. CERAMICS AND GLASS ARE SCATTERED AROUND THE AREA.	3A
HBF	18.08	B23	52	S32 38.380 E21 02.475	DSW HOUSE	SMALL DSW HOUSE, 1 CELL. BUTTRESSED AT THE FRONT AND SIDES TO SUPPORT THE WARPING WALLS. WOODEN STRUTS STILL REMAIN IN THE ROOF.	3A
HBF	18.08	B24	53	S32 38.376 E21 02.483	KRAAL COMPLEX	AN ASSOCAITED KRAAL COMPLEX 2X3M IN DIAMETER IS NE OF THE FRONT DOOR OF THE ABOVE HOUSE.	3A
HBF	18.08	ET_004	142	S32 39.019 E21 03.918	KRAAL	PRECOLONIAL KRAAL	3A
KFEXT	21.08	D02*	54	S32 45.522 E21 10.663	LITHIC SCATTER	STONE SCATTER/"QUARRY" FLAKES AND CORES ESA/MSA. MSA INCLUDES BLADES AND TYPICAL FLAKES…DENTICULATES AND NOTCHES NOTED, ALSO RETOUCH. QUITE DENSE. COMMON PATINA RED/WHITE AND MAY BE A STRATUM OUTCROPPING IN THIS AREA AS IT SEEMS COMMON AND SOME IS UNWORKED.	3B
KFEXT	21.08	D03*	55	S32 45.584 E21 10.523	LITHIC SCATTER	SAME MATERIAL AS AT D02. SOME POSSIBLE LEVALLOIS. ON PAVEMENT NEXT TO PAN.	3B
KFEXT	21.08	D04	56	S32 45.637 E21 10.624	LITHIC SCATTER	MORE OF THE SAME STONE SCATTER, VERY DENSE HERE. THE STUFF IS ALL OVER THE FLAT AREA.	3B
KFEXT	21.08	D06	57	S32 44.891 E21 10.159	LITHIC SCATTER	LARGE STONE SCATTER ON PAN/PAVEMENT. MSA/ESA CORES FLAKES BLADES, PATINATED. SHALE AND HORNFELS AND SAW SOME SILCRETE.	3B
KFEXT	21.08	D07	58	S32 44.790 E21 10.152	LITHIC SCATTER	AREA OF STONE SCATTER ON PAN/PAVEMENT INCL FINE BIFACES, FAURESMITH?. QUITE A FEW VERY WELL MADE AND OTHER FLAKES, CORES ETC. SOME CRUDE POSSIBLE HANDAXES. FAURESMITH BIFACES SEEM TO CONCENTRATE IN A SMALL AREA WITHIN THE SCATTER.	3A
KFEXT	23.08	L005A	59	S32 45.550 E21 07.988	GRAVE	STONE CAIRN WITH HEAD AND FOOTSTONE - PROBABLY A GRAVE	SECTION 36
KFEXT	23.08	L005B	60	S32 45.558 E21 07.992	GRAVE	SPREAD OF ROCKS NEAR LARGE BUSH, POSSIBLE CAIRN/GRAVE BUT NOT AS CLEARLY DEFINED AS L005A	3A
KFEXT	23.08	L005C	61	S32 45.561 E21 07.983	MIDDEN	ASH MIDDEN ALONGSIDE ROAD.	2
KLK	18.08	012	62	S32 34.816 E21 02.382	FARMHOUSE	FARMHOUSE: LATE C19TH/ EARLY C20TH BUNGALOW; STONE-BUILT WITH BLOCKS DRESSED ON AT LEAST 4 SIDES BUT NOT FACED; ORIGINAL C. 12M SQ FOOTPRINT BUT LATER C20TH ADDITIONS; CORRUGATED METAL ROOF, WINDOWS REPLACED WITH METAL FRAMES 2 OUTBUILDINGS TO WEST OF FARMHOUSE ABOVE: 1. RECTANGULAR FOOTPRINT, ALIGNED E-W; STONE BUILT WITH REGULAR DRESSED BUT NOT FACED BLOCKS, CORRUGATED METAL ROOF 2. LONG RECTANGULAR BARN; 1/3 STONE BUILT AS ABOVE, WITH 2/3 WOODEN PLANKING WALLS; CORRUGATED METAL ROOFCIRCULAR THRESHING FLOOR (?): SITUATED BETWEEN OUTBUILDINGS AND FARMHOUSE DESCRIBED ABOVE; DEMARCATED BY A SINGLE LINE OF STONES STE INTO THE GROUND IN A CIRCLE, WITH GROUND ENCLOSED BY THEM DELIBERATELY FLATTENED; STONE LINED AND COVERED CULVERT LED OF THIS FEATURE TO THE NW. RANGE OF OUTBUILDINGS TO SE OF FARMHOUSE ABOVE: (I) STONE-BUILT BARN WITH SIMILAR CONSTRUCTION MATERIALS TO FARMHOUSE; COBBLED RAMP AT IT'S DOUBLE DOOR ENTRANCE, CORRUGATED METAL DOORS AND SINGLE-PITCH ROOF.	3B

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
						(II). IMMEDIATELY WEST OF (I): BARN BUILT WITH CORRUGATED ASBESTOS WALLS AND CORRUGATED METAL ROOF. (III) IMMEDIATELY WEST OF (II): 3-SIDED SHED, BUILT WITH CORRUGATED METAL WALLS.(IV) WEST OF (III): CORRUGATED METAL BUILDING WITH WOODEN WINDOW FRAMES. KRAALS ASSOCIATED WITH 012 RECORDED ON GPS B-013 TO B-015.	
KLK	18.08	013	63	S32 34.865 E21 02.386	STONE HOUSE	FARMWORKER COTTAGE ASSOCIATED WITH 012: BRAKDAK HOUSE, RECTANGULAR FOOTPRINT, BUILT WITH DRESSED AND FACED STONE, SOME BRICKS USED IN THE DOORWAY AT THE E END; CORRUGATED METAL ROOF WITH SINGLE-PITCH DOWN TO SOUTH; SINGLE WINDOW ON WESTERN END OF HOUSE	3C
KLPF	21.08	023	64	S32 45.810 E21 07.809	LITHIC	QUARTZITE CORE FRAGMENT; 3 PREVIOUS REMOVALS	
KLPF	21.08	KYLA005	65	S32 45.911 E21 08.041	KRAAL	SMALL KRAAL (3X4M) VERY NEAR RIVERBED	3C
KLPF	21.08	KLIPFONTEIN HOUSE	66	S32 47.271 E21 08.666	FARMHOUSE	KLIPFONTEIN FARMHOUSE	3B
KLPF	21.08	024	67	S32 47.628 E21 07.034	LITHIC	BROKEN BACKED FLAKE: RETOUCHED AT PROXIMAL END; STEEP RETOUCH ON LATERAL SIDE	
KLPF	21.08	D01	68	S32 46.271 E21 09.774	LITHIC SCATTER	SMALL PAN WITH MSA SCATTER AROUND. RELATIVELY EPHEMERAL. MATERIAL HEAVILY PATINATED	
KLPF	21.08	D05	69	S32 46.054 E21 09.776	KRAAL	HISTORICAL STONE KRAAL. NOT WELL PRESERVED AND SOME STONE IS MISSING OR HAS COLLAPSED	
KLPF	21.08	L005	70	S32 45.553 E21 07.991	OPEN SITE	IN RIVER VALLEY, ON SOFT SANDY SOIL, LARGE OPEN SITE EXTENDING BOTH SIDES OF ROAD, ASHY SOIL WITH DEPTH OF AROUND 30CM, CONTAINING FRAGMENTS CHARCOAL AND BONE. SPREAD OF POTTERY (5-6MM THICK, RED BURNISH, FINE GRAINED, EVERTED RIM), OES FRAGMENTS (ONE BEAD BLANK), FLAKED SHALE ARTEFACTS (FLAKES AND CORES), FRESHWATER MUSSEL FRAGES (?), ALSO 20TH C BROWN AND CLEAR GLASS. LOCATED NEARBY ARE SOME STONE CAIRNS/GRAVES - SEE BELOW.	2
KLPK	19.08	020	71	S32 33.479 E21 04.842	LITHIC SCATTER	2 QUARTZITE FLAKES	
KLPK	17.08	001	72	S32 35.791 E21 03.492	CAIRN	STONE CAIRN: POSSIBLE PROPERTY MARKER; 1 OF 2 FOUND – OTHER MARKED AS B-001: CONSISTS OF 7 STONE COURSES, C. 1.10M HIGH AND 0.63X0.52M AT THE BASE	3B
KLPK	17.08	B01	73	S32 35.849 E21 03.253	CAIRN	DRY STONE WALL (DSW) CAIRN APPROX 6 FEET HIGH, APPROX 20M W OF THE MAIN FENCE LINE 500M SW FROM THE ROAD. MADE FROM CAUFROT SCHALE.	3B
KLPK	19.08	021	74	S32 33.475 E21 04.799	LITHIC SCATTER	2 LARGE QUARTZITE FLAKS, POSS ESA ?; 1 RUBBED STONE WITH ONE SMOOTH FACET	
KLPK	18.08	B13.1	75	S32 34.821 E21 02.447	KRAAL	DSW KRAAL 35X20X10M, COLLAPSED APPROX ONLY 4-5 LAYERS HIGH. W WALL IS SHORTER THAN E WALL BY 10M. MAINLY LARGE TABULR BLOCKS.	3B
KLPK	18.08	B14.1	76	S32 34.804 E21 02.444	KRAAL	MODERN DSW KRAAL. SHAPED BY LARGE TABULAR BLOCKS, RECTANGULAR IN SHAPE, APPROX 10 LAYERS HIGH.15X20M	3B
KLPK	18.08	B15.1	77	S32 34.874 E21 02.480	KRAAL	LARGE KRAAL MADE FROM IRREGULAR LARGE BOULDERS WITH CENTRAL RUBBLE PACKING. THE WALLS SURROUND A STEEP CATCHMENT AREA (30DEGREES)WHICH RUNS PARALLEL TO THE E AND W WALLS. NO N WALL EXISTS.	3B
KLPK	18.08	B16.1	78	S32 34.907 E21 02.507	DSW	COLLAPSED DSW APPROX 25M IN LENGTH, 3 LAYERS HIGH, APPROX 70CM. IRREGULAR SHAPED BOULDERS WITH SOME CENTRAL RUBBLE PACKING.	3C
KLPK	19.08	B39HUT	79	S32 33.782 E21 04.737	DSW RONDAVEL	DSW HUT: 1X2M DIAMETER, CIRCULAR IN SHAPE, APPROX 12 LAYERS HIGH, SLABS ARRANGED IN TABULAR FORMATION WITH NO CENTRAL PACKING. W WALL COLLAPSED INWARDS. LARGE FLAT SLAB OVER THE TOP OF THE DOOR FRAME NO	3C

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
						ASSOCIATED WOOD REMAINS. NO WINDOWS.	
KLPK	19.08	B40CAIRN	80	S32 33.792 E21 04.735	CAIRN	CAIRN WITH CENTRAL RUBBLE PACKING, MED-LARGE SIZED IRREGULAR STONES, APPROX 1.8M HIGH.	3B
KLPK	19.08	B41	81	S32 33.804 E21 04.719	DSW ENCLOSURE	MODERN SQUARE ENCLOSURE TABULAR SHAPED ROCKS ASSOCAITED WITH SURROUNDING MINING FEATURES.	3B
MDF	23.08	MODDERFTN	82	S32 41.703 E21 06.612	FARMHOUSE	MODDERFONTEIN FARMHOUSE.	3A
MDF	23.08	L006MDN	83A	S32 43.394 E21 07.143	MIDDEN	SIMILAR OPEN SITE TO L005, ALSO BISECTED BY ROAD. NEXT TO A ROCKY RIDGE WITH STREAM ON ONE SIDE. ASHY SOIL WITH BONE AND CHARCOAL FRAGMENTS. SOME LARGE FLAKED QUARTZITE IMPLEMENTS, A GRINDSTONE, LARGE NUMBER OF RED BURNISHED POTTERY FRAGMENTS (THIN WALLED), FRESHWATER MUSSEL FRAGS, ETC.	2
MDF	23.08	L006FLK	83B	S32 43.399 E21 07.146	LITHIC	LITHICS FROM ABOVE DESCRIPTION.	2
MDF	23.08	L006GNDST	83C	S32 43.400 E21 07.134	GRINDSTONE	GRINDSTONE FROM ABOVE DESCRIPTION.	2
MDF	23.08	L006PTRY	83D	S32 43.408 E21 07.140	POTTERY	POTTERY FROM ABOVE DESCRIPTION.	2
MDF	23.08	L007	84	S32 43.691 E21 06.317	CAIRN	STONE CAIRN, REPRESENTING AN HISTORIC BOUNDARY MARKER - THREATENED BY PLACEMENT OF A TURBINE.	3B
MDF	23.08	L010	85	S32 41.587 E21 06.709	POTTERY SCATTER	MODDERFONTEIN. FRAGMENTS OF FINE GRAINED BURNISHED POTTERY, SMALL SHERDS. LOCATED BETWEEN THE RIVER AND THE GRAVEYARD	2
MDF	23.08	L011A	86	S32 41.570 E21 06.661	GRAVEYARD	GRAVEYARD CONSISTING OF AT LEAST 20 GRAVES. ONLY 4 GRAVES WITH HEADSTONES, INSCRIPTIONS IN DUTCH ON REVERSE OF HEADSTONE. SPANNING 19TH C. OTHER GRAVES ARE STONE CAIRNS. SOME GRAVES APPEAR TO BE FENCED OFF FROM OTHER GRAVES, WITH SINGLE ROW OF STONES - POSSIBLY SUPPORTING A FENCE.	SECTION 36
MDF	23.08	L011B	87	S32 41.589 E21 06.658	GRAVEYARD	ONE OF THE FOUR CORNERS OF THE ABOVE GRAVEYARD.	SECTION 36
MDF	23.08	L011C	88	S32 41.596 E21 06.673	GRAVEYARD	ONE OF THE FOUR CORNERS OF THE ABOVE GRAVEYARD.	SECTION 36
MDF	23.08	L011D	89	S32 41.575 E21 06.675	GRAVEYARD	ONE OF THE FOUR CORNERS OF THE ABOVE GRAVEYARD.	SECTION 36
MDF	23.08	L012	90	S32 41.588 E21 06.698	POTTERY/LITHIC SCATTER	FURTHER SPREAD OF FINE GRAINED, RED BURNISHED POTSHERDS AND SOME QUARTZITE FLAKES (SEE L010) ALSO BETWEEN GRAVEYARD AND RIVER ON MODDERFONTEIN	2
MDF	23.08	L013	91	S32 41.593 E21 06.727	CAIRN	CAIRN/GRAVE?	SECTION 36
MDF	23.08	L014	92	S32 41.636 E21 06.824	CAIRN	CAIRN, UNLIKELY TO BE GRAVE DUE TO HARD SUBSTATE.	3B
MDF	23.08	L015	93	S32 41.624 E21 06.849	DSW ENCLOSURE	POSSIBLE EARL(IEST) STRUCTURE, COMPRISING A RECTANGULAR STRUCTURE WITH CIRCULAR STRUCTURE TO THE FRONT. THE RECTANGULAR STRUCTURE IS MADE OF ROUGHLY PACKED STONE, TWO COURSES HIGH - BASE OF A HAARTEBEEST HOUSE? CIRCULAR STRUCTURE TO FRONT COULD BE "KOOKSKERM". FRAGMENT OF ORIENTAL CERAMIC PRESENT.	3A
MDF	23.08	L015HSE	94	S32 43.280 E21 06.408	DSW HOUSE	DRY STONE WALL HOUSE 4X6M APPROX 6 LAYERS OF TABULAR STACKED STONES IN UNIFORM TRADITION. SMALL RECTANGULAR STRUCTURE IS ADDED TO THE N ASPECT OF THE HOUSE APPROX 2X3M.	3A
MDF	23.08	L015K	95	S32 43.284 E21 06.409	KRAAL	DRY STONE KRAAL 20X10M. APPROX 3-4 LAYERS OF ROUGHLY PACKED IRREGULAR STONE WALLING.	3A

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
MDF	23.08	L015LK	96	S32 43.286 E21 06.402	LAMSKRAAL	DRY STONE WALL LAMBS KRAAL ASSOCIATED WITH THE SE ASPECTS OF THE ABOVE KRAAL. APPROX 10X3M IN DIAMETER AND 3-4 LAYERS OF IRREGULARILY STACKED STONES ROUGHLY PACKED.	3A
MDF	23.08	L015K2	97	S32 43.277 E21 06.396	KRAAL	2X4M.	
MDF	23.08	L015A	98	S32 41.629 E21 06.838	CAIRN	CAIRN	
MDF	23.08	L016	99	S32 41.800 E21 07.207	LITHIC SCATTER	UNPATINATED INDURATED SHALE FLAKES, PROBABLY LSA. FOUND IN A SMALL EROSION DONGA AT THE SIDE OF THE ROAD. SOME BLADE ELEMENTS.	3B
MDF	23.08	L017	100	S32 43.336 E21 06.558	GRAVE	ROUGHLY PACKED STONE GRAVE WITH HEAD AND FOOT STONES - AT SIDE OF ROAD. SURROUNDED BY LARGE NUMBERS OF INDURATED SHALE FLAKES AND CORES DISTRIBUTED OVER A VERY WIDE AREA. THE STONE ARTEFACTS ALL UNPATINATED - PROBABLY LSA. POSSIBLE STONE TOOL MANUFACTURING SITE?	SECTION 36
MDF	23.08	L018	101	S32 43.316 E21 06.580	QUARRY	BAND OF INDURATED SHALE ALONG SIDE OF ROAD WHICH COULD HAVE FUNCTIONED AS A QUARRY FOR THE STONE KNAPPING SITES NEARBY.	3B
MDF	23.08	KRAALS	102	S32 41.716 E21 06.730	KRAAL	ONE OF MANY KRAALS ON MODDERFONTEIN FARM, VARIOUS STYLES, SOME ROUGH SOME FINELY MADE.	3A
SBH	20.08	L002	103	S32 39.326 E21 02.187	DSW	LITTLE KNOLL OF ROCKS ON SIDE OF ROAD WITH POSSIBLE STONE WALLING ALONG FRONT, ALSO A SINGLE ROW OF ROCKS FORMING ROUGH SQUARE BEHIND THE KNOLL	
VKK	19.08	014	104	S32 33.006 E21 05.614	LITHIC	UNI-FACIAL HF POINT: RETOUCHED ON BOTH SIDES, POSSIBLE PLATFORM PREPARATION.	
VKK	19.08	015	105	S32 32.886 E21 05.985	LITHIC SCATTER	FLAKED STONE SCATTER: 5 FLAKES – 3 QUARTZITE (1 VERY FINE-GRAINED), 2 HF.	
VKK	19.08	016	106	S32 32.872 E21 06.015	LITHIC	RETOUCHED LARGE HF FLAKE; POSSIBLE SCRAPER.	
VKK	19.08	017A	107	S32 32.793 E21 05.964	KRAAL COMPLEX	PREHISTORIC KRAAL COMPLEX BUILT WITH LARGE ROUND BOULDERS, MAINLY SURVIVE AS A SINGLE ROW, BUT SOME SHOW AT LEAST 0.50M THICK WALLS WITH RUBBLE PACKING; SUB-CIRCULAR/ CIRCULAR IN PLAN, DIFFERENT DIAMETERS; SITUATED ON 'INSIDE' OF HORSESHOE-SHAPED RIDGE AT BASE OF SLOPE, CONCAVE SIDE TO N; ALL SIMILAR BUILDING MATERIALS EXCEPT WAY-POINT 017 – CONSISTED OF SMALL OVAL KRAAL ALSO BUILT WITH TABULAR BLOCKS.	2
VKK	19.08	017B	108	S32 32.798 E21 05.941	KRAAL	CENTRAL POINT ON EACH KRAAL IN COMPLEX DESCRIBED ABOVE; MAJORITY AT THE BASE OF N-FACING SLOPE, BUT SOME @ BASE OF E-FACING SLOPE; THOSE @ E-FACING SLOPE POSSIBLY ASSOCIATED WITH 018 AND 018B	2
VKK	19.08	017C	109	S32 32.796 E21 05.934	KRAAL	AS ABOVE	2
VKK	19.08	017D	110	S32 32.787 E21 05.944	KRAAL	AS ABOVE	2
VKK	19.08	017E	111	S32 32.790 E21 05.944	KRAAL	AS ABOVE	2
VKK	19.08	017F	112	S32 32.795 E21 05.947	KRAAL	AS ABOVE	2
VKK	19.08	017G	113	S32 32.794 E21 05.951	KRAAL	AS ABOVE	2
VKK	19.08	017H	114	S32 32.794 E21 05.955	KRAAL	AS ABOVE	2
VKK	19.08	017I	115	S32 32.793 E21 05.962	KRAAL	AS ABOVE	2
VKK	19.08	017J	116	S32 32.788 E21 05.971	KRAAL	AS ABOVE	2
VKK	19.08	017K	118	S32 32.783 E21 05.969	KRAAL	AS ABOVE	2
VKK	19.08	017L	119	S32 32.786 E21 05.952	KRAAL	AS ABOVE	2
VKK	19.08	017M	120	S32 32.802 E21 05.928	KRAAL	AS ABOVE	2
VKK	19.08	017N	121	S32 32.798 E21 05.922	KRAAL	AS ABOVE	2

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
VKK	19.08	017O	122	S32 32.754 E21 05.906	KRAAL	AS ABOVE	2
VKK	19.08	017P	123	S32 32.751 E21 05.912	KRAAL	AS ABOVE	2
VKK	19.08	018	124	S32 32.757 E21 05.901	DSW RONDAVEL	DRYSTONE CIRCULAR HUT: BUILT WITH SELECTED TABULAR BLOCKS; SURVIVING TO C. 1.00M IN HEIGHT, SOUTHERN WALL CONTAINING 2 BUILT-IN NICHES/ RECESSES; SITUATED NEAR KRAALS (BUT LIKELY NOT TO BE ASSOCIATED) ON EASTERN-FACING SLOPE OF 017B-017O	3B
VKK	19.08	018B	125	S32 32.754 E21 05.900	DSW RONDAVEL	CIRCULAR HUT IMMEDIATELY NE OF 018: BUILT WITH SIMILAR MATERIALS BUT IN GREATER STATE OF DISREPAIR; WALLS SURVIVE TO 0.40M IN HEIGHT	3B
VKK	19.08	019	126	S32 32.756 E21 05.888	CAIRN	CAIRN/ BEACON: DRYSTONE BUILT; SITUATED ON TOP OF WESTERN SIDE OF HORSESHOE RIDGE DESCRIBED FOR 017, WEST OF 018 AND 018B; LIKELY TO BE LANDSCAPE MARKER FOR KRAAL COMPLEX	3B
VKK	19.08	B25	127	S32 32.700 E21 06.021	DSW	DSW EXTENDING TO EACH SIDE OF A RIVERBED. AT THE FAR ENDS, 0.5M IN HEIGHT, CLOSE TO THE RIVERBED 2M IN HEIGHT. IRREGULAR LARGE AND ROUNDED ROCKS. APPROX 1 LAYER HIGH WITH ASSOCAITED LOOSE ROCKS SURROUNDING THE WALL FRONT AND BACK.	2
VKK	19.08	B26LK	128	S32 32.699 E21 06.014	LAMSKRAAL	THE FOLLOWING IS A LARGE KRAAL AND LIVING FLOOR COMPLEX: LAMBSKRAAL: 1 LAYER HIGH, LARGE ROUNDED AND IRREGULAR SHAPED ROCKS APPROX 1-2M IN DIAMETER. ROUNDED IN SHAPE AND ARRANGED ON THE NE ASPECT OF A KRAAL. BOTH SITUATED ON FLAT GROUND AT THE FOOT OF A GENTLE ROCKY SLOPE.	2
VKK	19.08	B27K	129	S32 32.697 E21 06.016	KRAAL	KRAAL: LARGE ROUNDED IRREGULAR SHAPED ROCKS, APPROX 1 LAYER HIGH WITH ASSOCIATED LOOSE ROCKS SURROUNDING THE EXTERIOR. APPROX 8-10M IN DIAMETER ROUNDED IN SHAPE. BUILT ON FLAT GROUND AT THE FOOT OF A GENTLE ROCKY SLOPE APPROX 2-3M FROM THE NEXT KRALL TO FOLLOW	2
VKK	19.08	B28K	130	S32 32.696 E21 06.007	KRAAL	KRAAL: LARGE ROUNDED IRREGULAR SHAPED ROCKS, APPROX 1 LAYER HIGH WITH ASSOCIATED LOOSE ROCKS SURROUNDING THE EXTERIOR. APPROX 8-9M IN DIAMETER ROUNDED IN SHAPE. BUILT ON FLAT GROUND AT THE FOOT OF A GENTLE ROCKY SLOPE. LAMBSKRAAL ON NW ASPECT. (NEXT POINT)	2
VKK	19.08	B29LK	131	S32 32.697 E21 06.003	LAMSKRAAL	LAMBSKRAAL: SMALL CIRCULAR ENCLOSURE ATTACHED TO THE NW ASPECT OF THE PREVIOUS KRAAL. I LAYER HIGH WITH MED TO LARGE IRREGULAR SHAPED BOULDERS	2
VKK	19.08	B30LIVINGFLO	132	S32 32.688 E21 05.98	LIVING FLOOR AREA	LIVING FLOOR AREA: APPROX 5-7M IN DIAMETER. THREE LARGE ROUNDED DELIBERATLY CLEARED AREAS SITTING ADJACENT TO EACH WITH APPROX 1-2M BETWEEN THEM. THEY SIT AT THE FOOT OF A GENTLE SLOPE.	2
VKK	19.08	B31LF	133	S32 32.681 E21 05.980	LIVING FLOOR AREA	IBID	2
VKK	19.08	B32LF	134	S32 32.678 E21 05.976	LIVING FLOOR AREA	IBID	2
VKK	19.08	B33K	135	S32 32.679 E21 05.971	KRAAL	MEDIUM SIZED KRAAL: 4-6M IN DIAMETER CONSTRUCTED OF MED-LARGE SIZED IRREGULAR SHAPED ROCKS, IRREGULARILY STACKED 2 LAYERS HIGH. B33 AND B34 ARE SIMULAR IN SHAPE, SIZE AND LAYERS. THEY ARE SITUATED ON A FLAT TERRACE BEHIND THE LIVING FLOORS TO THE S	2
VKK	19.08	B34K	136	S32 32.680 E21 05.968	KRAAL	MEDIUM SIZED KRAAL: 4-6M IN DIAMETER CONSTRUCTED OF MED-LARGE SIZED IRREGULAR SHAPED ROCKS, IRREGULARILY STACKED 2 LAYERS HIGH. THEY ARE SITUATED ON A FLAT TERRACE BEHIND THE LIVING FLOORS TO THE S	2
VKK	19.08	B35K	137	S32 32.674 E21 05.960	KRAAL	LARGER SIZED KRAAL: 9M IN DIAMETER AND ROUNDED IN SHAPE, 1 LAYER HIGH. LARGE IRREGULAR SHAPED BOULDERS IN A STACKED FORMATION	2
VKK	19.08	B36K	138	S32 33.151 E21 05.160	KRAAL	LARGER SIZED KRAAL: 8M IN DIAMETER AND ROUNDED IN SHAPE, 1 LAYER HIGH. LARGE IRREGULAR SHAPED BOULDERS IN A STACKED FORMATION	2
VKK	19.08	B37LK	139	S32 32.673 E21 05.963	LAMSKRAAL	LAMBSKRAAL: APPROX 2-3M IN DIAMETER, 1 LAYER HIGH MADE FROM MED-LARGE IRREGULAR STONES. SITUATED ON THE SW ASPECT OF THE ABOVE KRAAL	2
VKK	19.08	B38SHELTER	140	S32 33.932 E21 06.894	DSW SHELTER	SMALL SHELTER, 2 WALLS WITH THE S WALL THE NATURAL ROCK LAYER. APPROX 1.5X1.5M IN DIAMETER AND 1M HIGH. LARGE SLAB COVERS THE ROOF. FLAT, MED-LARGE SIZED SLABS STACKED IN A TABULAR FASHION. NATURAL LARGE ROCK USED	3B

FARM NAME	DATE	FIELD NO.	SITE NO.	LAT/LONG.	SITE TYPE	DESCRIPTION	GRADE
						AS THE E WALL FOUNDATION.	
VKK	19.08	B24	141	S32 31.691 E21 05.451	STONE STRUCTURE	SMALL STONE STRUCTURE, POSSIBLY SMALL SHEPHERD'S HUT.	3B