

HERITAGE IMPACT ASSESSMENT: SECTION 38
Wind energy Facility near Caledon

Klip Heuvel no. 410/5 (Remaining Extent) & 410/9; Klipheuvel no: 410/8 (alias Kruis Vley) & 410/10 (alias Haasjes Kop); portions 417/0 of the Farm Boontjieskraal and 418/0 (Remaining Extent) of Farm 418; Portion 1 (Remaining Extent) Huveltjes Kraal 426; Heuwelkraal a portion of the farm Pampoenkraal 843/0.

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

Prepared for:

Savannah Environmental (Pty) Ltd
7 October 2010



Prepared by:

Tim Hart
ACO Associates
8 Jacobs Ladder
St James
Email: Lita.Webley@uct.ac.za

EXECUTIVE SUMMARY

ACO Associates CC have been appointed by Savannah Environmental (Pty) Ltd on behalf of the client, BioTherm Energy (Pty) Ltd, to undertake a Heritage Impact Assessment, as part of the EIA process, for the establishment of a wind energy facility on Klip Heuvel no. 410/5 (Remaining Extent) & 410/9; Klipheuvel no: 410/8 (alias Kruis Vley) & 410/10 (alias Haasjes Kop); portions 417/0 of the Farm Boontjieskraal and 418/0 (Remaining Extent) of Farm 418; Portion 1 (Remaining Extent) Huveltjes Kraal 426; Heuwelkraal a portion of the farm Pampoenkraal 843/0. These land parcels are situated west of Caledon on the south side of the N2 scenic route between Caledon and Botrivier.

ACO has completed a physical site inspection. The proposal for 16 turbines (6 at Dassiesfontein behind the farm stall and 10 at Klipheuvel just west of Caledon) is limited in scale compared with other proposals in the Province at present. The study has found that while the turbines will be highly visible, they are not densely massed, and therefore the proposal should be considered as the architecture of the turbines may not be at odds with the heavily cultivated local environment. No fatal flaws were identified.

Archaeological Heritage

The archaeological significance of the study area is very low with only one locality at Dassiesfontein requiring limited mitigation. The scientific record would benefit by having a systematic record of the material at this site. The material is not significant enough to warrant moving the turbine locality.

Built Environment

Impacts to the built environment will not occur within the study area other than modifications to existing tracks. While the environment, which is largely historical and human made, is aesthetically significant and important to the area, it is expected that it will be able to absorb the presence of the proposed moderate sized wind energy facility. No mitigation is required.

Heritage landscape

The cultural landscape qualities of the area will be affected by the proposal which will result in changes to the aesthetic qualities of the place, and generally add a new modern element onto an old rural landscape. The nature of this change is a matter of aesthetics. Wind turbines have a clean sculptured, if not graceful form which when placed judiciously and in low concentrations is not at odds with a manicured human-made agricultural environment. The facility will impact visual reference points such as the N2, parts of Caledon and Boontjieskraal, however the quality of the impact will depend on personal aesthetics which is very difficult to qualify in an impact assessment such as this, however the facility will be visible from a number of conservation areas, farms and towns in the region. It is the finding of this study that the heritage authority should be open to considering the possibility that the presence of the proposed moderate sized wind energy facility may not necessarily be out of place within this landscape context. No specific adjustment of turbine positions is recommended.

Declaration:

Dr Lita Webley and Mr Tim Hart are independent specialist consultants who are in no way connected with the proponent, other than delivery of consulting services.

Lita Webley (PhD) is an archaeologist with 14 years of working experience in heritage consultancy. She is also accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

Tim Hart (MA) is an archaeologist with 22 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.

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.

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

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

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

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
VOC	Vereenigde Oostindische Compagnie

TABLE OF CONTENTS

1. Introduction.....	6
1.1 The need for the project.....	6
1.2 The proposal.....	7
1.3 Scoping Study.....	7
1.3.1 Palaeontology:	7
1.3.2 Pre-colonial archaeology	7
1.3.3 Colonial period	7
1.3.4 The landscape.....	8
1.4 Methodology for study.....	8
1.4.1 Assessing heritage in the context of wind energy developments	8
1.4.2 Site survey	9
1.4.3 Restrictions and assumptions	10
1.5 Legislative context.....	10
1.5.1 Wind energy policy and heritage	11
2. The receiving environment.....	11
2.1 Dassiefontein cluster (6 Turbines).....	11
2.2 Klipheuwel cluster (10 turbines).	12
2.3 Colonial history	13
2.4 Pre-colonial Archaeology.....	15
3. Assessment of Impacts.....	16
3.1 The kinds of impacts caused by wind energy facilities	16
3.2 Impacts to Pre-colonial archaeology	18
3.3 Impacts to colonial period heritage and archaeology.....	19
3.4 Impacts to Cultural landscape	19
3.5 Impact Statement	21
3.5.1 Archaeological Heritage	21
3.5.2 Built Environment.....	21
3.5.3 Cultural landscape	21
4. Mitigation and conservation.....	22
4.1 Site 19.284:	22
4.2 Cautionary: Un-identified archaeological material, fossils and fossil bone	22
5. References	23
6. Appendix A	24

1. Introduction

ACO Associates CC have been appointed by Savannah Environmental (Pty) Ltd on behalf of the client, BioTherm Energy (Pty) Ltd, to undertake a Heritage Impact Assessment, as part of the EIA process, for the establishment of a wind energy facility on farms situated between Botrivier and Caledon, Overberg District, South Western Cape. The land parcels involved are Klip Heuvel no. 410/5 (Remaining Extent) & 410/9; Klip Heuvel no. 410/8 (alias Kruis Vley) & 410/10 (alias Haasjes Kop); Boontjieskraal no. 417/0 and Farm 418 no. 418/0 (Remaining Extent) of; Dassiesfontein: farm portions 1 (Remaining Extent) & 5 Huveltjes Kraal 426; Heuwelkraal a portion of the farm Pampoenkraal 843/0. The study areas consists of two separate portions of land (Dassiesfontein and Klipheuvel) situated just west of Caledon adjacent to the N2 (see Figure 1).

An area of approximately 602 hectares in total is being considered within which the facility is to be constructed.

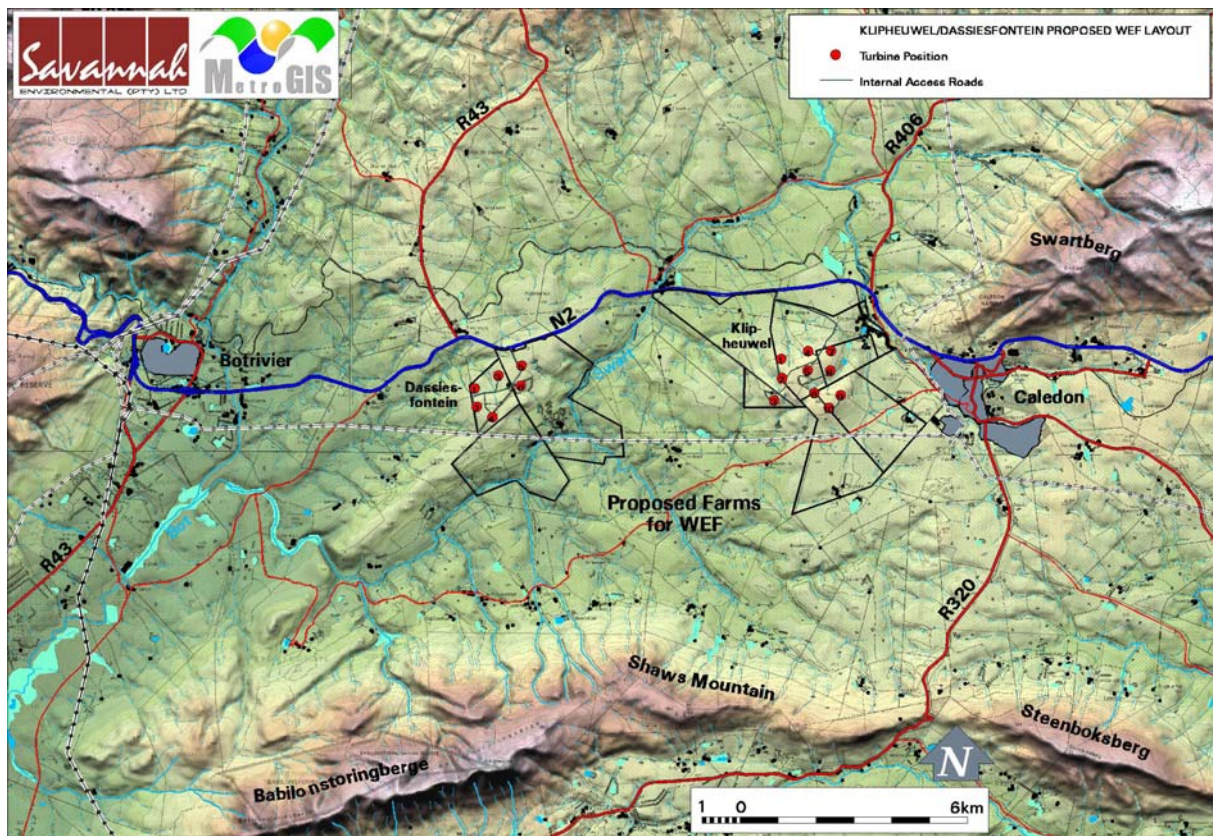


Figure 1: Locality map supplied by Savannah Environmental (Pty) Ltd based on the preliminary layout provided by BioTherm Energy.

1.1 The need for the project

Greenhouse effects and the national energy crisis have prompted the development of renewable 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. The National Energy Regulator and Department of Energy has indicated that it will support the development of private energy initiatives and the purchasing of power from private companies. The applicant is a potential private wind energy producer.

1.2 The proposal

An area of approximately 602 hectares is being considered within which the facility is to be constructed. It is proposed that 6 turbines are to be constructed at the Dassiesfontein site (south of the well known Dassiesfontein Trading store), while a further 10 will be built at the Klipheuwel site some 5 more km to the east just outside of Caledon. The proposed wind energy facility will include:

- Up to 16 2.3 MW wind turbines with 93 m rotor diameter
- Concrete foundations to support the turbine towers (80 m).
- 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 distribution pattern of wind turbines will necessitate the construction of a number of short lengths of new road from farm tracks to the turbines sites.
- Underground (~ 1m deep) cabling, linking the wind turbines to a substation on each site, to be located in the vicinity of the existing power line crossing the site. In as far as possible, cabling will follow the internal access roads.
- Current will be evacuated from the site using the existing 66kV power line that crosses the area.
- An on-site operations and maintenance facility, including a storage building to be situated potentially at Klipheuwel.

1.3 Scoping Study

The following heritage indicators were identified during the scoping study:

1.3.1 Palaeontology:

The palaeontological significance of the study area was found to be low as the ancient decomposed shales that form the substrate do not preserve fossil remains.

1.3.2 Pre-colonial archaeology

The scoping study predicted the likely existence of Early, Middle and Later Stone Age artefacts that are known to be scattered throughout the wheat-land areas of the Cape. The fact that the study area has been so transformed by hundreds of years of agricultural activity means that significant impacts are unlikely to occur.

1.3.3 Colonial period

Historical records indicate that the area was settled by Europeans since Ferdinand Appel was granted land around the hot spring at Caledon so that he could establish a guest house for visitors. Since that time the VOC became firmly entrenched and agriculture commenced with the granting of numerous loan farms of which the study area formed a part. The scoping report established that the land in question were subdivisions of original farms with no historic farm houses existing on the directly affected land.

1.3.4 The landscape

Wind energy facilities inevitably cause impacts to the landscape, however the quality of the impact relates directly to the landscape character of the area in question – in this case a rolling and manicured agricultural landscape. Landscape impacts were anticipated.

1.4 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 Caledon area and other unpublished reports on the history of the region. A survey of heritage resources has been conducted on site and heritage indicators (conservation-worthy buildings, archaeological sites and places celebrated as heritage) identified and mapped where appropriate. 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. 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 physical survey of the study area and the body of background information (published and unpublished) about the area. An independent visual assessment forms part of the EIA specialist studies.

1.4.1 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 and climate change. Initially communities enthusiastically accepted the presence of wind energy facilities, however web-based research of international experience 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. 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 proactive 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 often 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. Yet the circumstances are variable as in certain landscape forms the graceful shapes of the turbines and the sculptured twist of the rotors are perceived to be aesthetically pleasing. Wind turbines in fields in both Europe and America are favoured subjects for landscape photographers (figure 2).

The degree of physical landscape disturbance caused during the construction of turbines 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.



Figure 2 Wind turbines in a similar landscape context in Europe (www.gettyimages.com).

1.4.2 Site survey

Data collection took place mainly during the physical site inspection which took place over a two day period in October 2010. The proposed locations of 14 of the 16 turbines were physically inspected on foot and every accessible track was driven with an off-road vehicle. The team used to conduct the field survey consisted of 4 fully qualified staff with a Garmin GPS.

Farm buildings were checked 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*. The landscape around the study area was examined to get a sense of the way in which scenic and heritage rich areas would respond to the presence of the proposed facility.

Data analysis involving mainly the assessment of the spatial distribution of archaeological occurrences on the landscape was assessed to determine which areas held the highest potential for heritage material. 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 or set of artefacts. 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.

1.4.3 Restrictions and assumptions

Few restrictions were encountered. Two turbines at Klipheuvel (positions 19.371 and 19.3734 see appendix A) in wheat fields which were under cultivation could not be fully checked as this would damage the crop, furthermore visibility was restricted in these areas. Visibility in fallow lands was excellent.

1.5 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 Heritage Western Cape who 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).

1.5.1 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 proactive 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 (although it is the opinion of the author of this report that this is too small and should be 2 km). Neither SAHRA nor any other heritage compliance organisation 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).

2. The receiving environment

The receiving environment consists primarily of agricultural land (wheat, barley and oat fields and fallow fields) and is located outside of Caledon. This is a landscape of ploughed fields, hills and valleys punctuated in places by stands of exotic trees, patches of indigenous vegetation in valley bottoms. The landscape is considered to be of aesthetic value. In terms of the Overberg Spatial Development Framework, the N2 which passes adjacent to the study area is considered to be the key scenic route linking the key tourism towns and villages of the region. The land has been cultivated for more than 200 years and therefore the area is rich in history.

2.1 Dassiesfontein cluster (6 Turbines proposed)

The most westerly turbine cluster lies on the west bank of the Swart River Valley (12 km west of Caledon). The valley is a picturesque swathe of indigenous vegetation along with a number of farm buildings. The N2 which is considered to be a scenic route passes directly adjacent to the study area. The well known farm stall at Dassiesfontein some 8 km west of Caledon marks the entry point to the Dassiesfontein node of 6 turbines proposed for the rolling hills immediately behind the farm stall. The landscape is actively farmed and has a formal manicured appearance with contour ploughed fields (cereals), fences and dirt tracks along the edges of many fields. In winter the landscape is a verdant green and particularly attractive against the backdrop of the Riviersonderend Mountains, but changes to dusty brown in summer after the harvest. There are no built structures in the study area apart from the Dassiesfontein Store. The closest farm buildings are 1.3 km away in the Swart River valley to the east, and on the Northern side of the N2. The facility will be visible from the N2 scenic route which passes within 700 m of the closest turbine. (Figure 2)



Figure 3. Dassiefontein site viewed from the N2. Turbines will be located on the ridge in middleground.

2.2 Klipheuwel cluster (10 turbines proposed).

The most easterly land parcel (Boontjieskraal and Klipheuwel) lies close (1.3 km) to the eastern outskirts of Caledon. Being situated on high ground, the facility will be visible from both the N2 and the scenic Cemetery Road which skirts around the scenic eastern urban edge of Caledon. Like the Dassiesfontein cluster the landscape is characterised by rolling agricultural land, actively farmed but in part fallow at present. There are no built structures within the study area, however there are attractive conservation-worthy structures off Cemetery Road (refer to figure 4). The facility will be visible from the scenic N2 route. One of the proposed turbines lies on land pertaining to the Farm Boontjieskraal, a prominent landmark and historic farm complex on the northern side of the N2 (Fransen 2004). Boontjieskraal was a stock post established in the days of Simon van der Stel. Although the original buildings have been modified, Boontjieskraal is famous on account of its meandering *ringmuur* and as such is an important place-marker on this scenic strip of the N2. Needless to say the proposed facility will be visible from Boontjieskraal (just over 1 km distance) as well as from many vantage points in and around Caledon. Caledon itself is a town that has early origins. The hot water springs for which the area is famous were used as a stopping-off point on the wagon route to the east. It was used as a health spa by the Dutch East India Company and was later the site of an elaborate Victorian sanatorium. Caledon as a town has a rich heritage of its own and a number of early buildings survive.

The landscape of this area is an important local heritage and tourism asset – the wheat lands are in all seasons set against the backdrop of the Hottentots Holland and Overberg Mountains, a cherished visual resource dominating the character of the region. The question that may be asked is how much industrialisation will this landscape be able to absorb before its character becomes irrevocably changed and the values for which the region is sought after, compromised?



Figure 4 View towards Caledon Mountain from position 19.3874 (turbine 7) on klipheuwel. The town of Caledon can be seen to the right of the image.



Figure 5 View of the Klipheuwel site from Cemetery Road, Caledon. The turbines will be located behind the ridge in the background and are likely to be visible.

2.3 Colonial history

Aikman *et al.* (2004) comment that Khoekhoen herders were the dominant groups of people in the Overstrand region when the Dutch East India Company started extending their interests beyond the Cape Peninsula in the 17th century. A powerful herding community who occupied the Caledon plains, the Chainoqua, traded regularly with VOC outposts –

the demand from the VOC for cattle for re-victualing ships was insatiable. Although the Overberg areas were considered to be among the remotest of the fledgling colony, the pervasiveness of the colonial settlement endured. The first Europeans used small sailing craft to access the coast, eventually followed by overland wagon trails over the Houwhoek Pass to Botrivier and onwards towards into the interior (stopping to take the warm waters at Caledon). Eventually nomadic European stock farmers and professional hunters moved into the area – they were the forerunners of permanent colonial settlement.

In the 18th century the Dutch East India Company began to “formalise” the process of granting farms in the area. Stock posts were granted east of Hermanus by the 1730’s while the first hunting licences were granted in the Baardskeerdersbos area by 1706. By the mid 18th century it can be safely assumed that European settlers had made their presence known in the Pearly Beach – Buffeljags area. The Khoekhoen Herders who had grazed their sheep, cattle and goats on the coastal plains for more than 1 000 years did not fare well in what was a hopelessly unequal contest with the Europeans. They lost their traditional grazing lands and succumbed to foreign illnesses brought in by the colonists. By the 19th century the remnant populations of these once powerful communities, devastated by smallpox and the breakdown of their traditional political structures found themselves confined to mission stations or “employed” on the colonist’s farms.

The history of the town of Caledon is closely linked to the hot water springs. As early as 1708, explorers from the Cape were visiting the springs, on route to the interior, or specifically for its curative purposes. In 1805, the warm baths were acquired by Dr Haezner, who developed the springs into a more formalized establishment.

The town, Caledon, was established in 1811 at the junction of the road to the hot springs and the road to Swellendam. The purpose of the town was mainly administrative, being a sub-drostdy for the Drostdy at Swellendam, and initially grew very slowly. (Fransen 2006:155). (See Fransen 2006:156-157 for survey and general plans for Caledon).

Expansion into the Overberg by freeburgher farmers was officially sanctioned in the first decade of the 18th century, although illegal hunting and trade with the local Khoekhoe more than likely was taking place well before that. The loan farm Aan de Warm Bad granted to Ferdinand Appel in 1708, was one of the first loan farms officially granted in this area. A VOC outpost was established at Soetmelksvlei in 1727, partly to serve as a grazing post for the Company’s cattle and partly to try and control the illegal trade between farmers and the Khoekhoe (Sleigh 2004:555-557).

The parent farms of Klipheuwel/Dassiesfontein had their origins in three quitrent leases viz Heuweltjie kraal (parent farm to Farm 426 and part of Farm 843); Boontjieskraal¹ (Farm 417 is the remaining extent) and Klipheuwel (Farm 410 and the relevant portions). It appears as if all three of these farms approached the characteristic circular polygon² of loan farms.

All these farms were granted in quitrent between 1831 and the 1833. It is likely that they had their roots in earlier loan/grazing farms.

¹ Farm 418, originated as a ‘filler’ between the Boontjieskraal quitrent and the Klipheuwel quitrent.

² The extent of the earlier loan farms were determined by the distance covered on horseback for a fixed time period (1 hour) from a central point. A roughly circular shape is the end result, the regularity of the shape determined by topography and of course the boundary of pre-existing farms. The space between these earlier quitrents was either absorbed through later amendments to the quitrents, or subsequent grants as was the case in Footnote 1.

2.4 Pre-colonial Archaeology

The pre-colonial period archaeology of the area of the proposed activity has not been described before this time, however the coastal areas are better researched and are considered archaeologically rich.

The first formal research into the prehistory of the Overberg region was that published by Professor John Goodwin (1946). This research did not involve any excavations of archaeological sites on the southern coast but was based upon a series of observations of *viswywers* (tidal fish traps) that had been built by prehistoric people - possibly the same people responsible for the accumulation of shell middens that contained numerous fish bones and fragments of pottery. Goodwin stressed the need for the archaeological investigation of sites that could provide evidence linking the contents of shell middens and the *viswywers*.

It was not until the 1970's that research by archaeologists of the South African Museum provided further insight into the prehistory of the southern cape to the west of Cape Agulhas. Excavations by Frank R. Schweitzer (1979) at Die Kelders coastal cave near Gansbaai produced early evidence (1 600 years ago) for the introduction of pottery technology and domestic stock into the Cape as well as a MSA (Middle Stone Age) occupation over 40 000 years old.

The significant pottery finds led Schweitzer (1970, 1979) to conclude that the cave occupants were in contact with herders – Khoekhoen pastoralists who made their appearance in the Western Cape (along with the skill of making pottery and herding domestic animals) roughly 2 000 years ago. He thought this view was substantiated by the change in seasonal use of the cave that seemed to be reflected through time. The earlier layers seemed to have accumulated in winter months, while the more recent layers showed longer occupation extending into spring and possibly even summer (Schweitzer, 1979). This prolonged occupation was thought to be facilitated by an increased reliance on domestic animals for food. More recent excavations validated much of Schweitzer's work (Marean, 2000). The researchers were able to make use of more modern technologies and dating techniques to conduct excavations at a far finer degree of resolution.

Inland of Gansbaai on the farm Byneskranskop are the limestone outcrops which contain numerous caves and shelters that attracted pre-colonial occupation. First excavated in 1974 (Schweitzer & Wilson, 1982), the main archaeological cave site at Byneskranskop is near the top of a hill, 60 m above sea level and 19 m x 15 m at its greatest extent. The site records a relatively complete sequence of occupation over almost 13 000 years. The importance of sequences such as Die Kelders and Byneskranskop is that they help researchers to understand the relative ages and cultural affiliations of the many open sites in the region.

Research in the Pearly Beach area has mainly been conducted by Graham Avery of Iziko Museums of Cape Town. Several open station shell middens in the Pearly Beach area were surveyed and excavated by him in an attempt to derive a systematic, regional understanding of the subsistence strategies of pre-colonial south coast populations (Avery, 1974). Avery (1976) drew the conclusion that these coastal sites reveal that the ancestors of both the Khoekhoen herders and hunter gatherer groups accumulated them as part of a cyclic or seasonal system that used both inland and coastal resources. It is now broadly accepted by archaeologists that shortly after 2 000 years ago, a new economic system was introduced to Southern Africa - namely certain groups of people adopted transhumance pastoralism (in this case with herds of fat-tailed sheep and later cattle) instead of primarily relying on hunting and gathering which was universally practiced in South Africa before this time. The origin of early stock keeping in Africa is still unknown.

3. Assessment of Impacts

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 225m² 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, in this case through existing electrical infrastructure). The turbines are expected to have a life span of between 20-30 years, after which they will be renewed or disassembled.

3.1 The kinds of impacts caused by wind energy facilities

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 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). The kinds of impacts that can affect a cultural landscape are:

- The visual impacts associated with wind turbines are controversial. Massed turbines have a profound impact on the aesthetics and intangible qualities of an area (especially wilderness areas). However, in the contexts of certain kinds of landscapes the architecture of the wind turbines is aesthetically tolerable, if not pleasing. Although there will be a visual impact, small turbine clusters in agricultural land may not necessarily result in a negative impact to a cultural landscape. In this case the low number of turbines, the generous spacing and the context of the rolling fields could produce a result that is aesthetically satisfactory with minimal impact on the cultural landscape values of the area (refer to figure 7).
- Shadow flicker (figure 7) – 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 publicly celebrated.
- Visual impact of road cuttings into the sides of slopes will affect the cultural, natural and wilderness qualities of the area.

- Noise caused by construction, and by the turbines themselves during operation 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 can contribute to the industrialisation of the environment and detract from the wilderness or rural qualities of the place.

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
- Excavation of linear trenches for cables
- Construction of electrical infrastructure in the form of a substation and underground cables

In terms of impacts to heritage, archaeological sites which are highly context sensitive are most vulnerable to the alteration of the land surface.



Figure 6 Wind turbine in green agricultural landscape in Germany (notice long shadow) (after www.gettyimages.com).

3.2 Impacts to Pre-colonial archaeology

Existing farm tracks and roads will be upgraded and used, while short stretches of additional road will be needed to link the existing road network to the turbine sites. 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 because archaeological sites are sensitive to contextual and physical disturbance which destroys their significance. The survey undertaken to inform this assessment has revealed that archaeological material which consists of isolated and disturbed occurrences of Early Stone Age material (see appendix 1) is not common within the study areas and will not be significantly impacted by roads, turbines or any other associated infrastructure. There is only 1 locality at Dassiesfontein (19.284) where a moderate amount of mitigation is required (See Appendix A).

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:

Highly localised. Given that the distribution of archaeological material is sparse no significant impacts are expected.

NATURE OF IMPACT: Impacts to archaeological site-the very sparse archaeological material could involve localised displacement of artefacts at turbine footings or lateral disturbance of material by vehicles, service roads and cable trenches.

	Without mitigation	With mitigation
EXTENT	Local (1)	Local (1)
DURATION	Long term (5)	Long term (5)
MAGNITUDE	Small (1)	Small (1)
PROBABILITY	Possible (2)	Possible (2)
SIGNIFICANCE	Low (14)	Low (14)
STATUS	Neutral - negative	Neutral - positive
REVERSIBILITY	Non-reversible	Theoretically reversible
IRREPLACEABLE LOSS OF RESOURCES?	No	No
CAN IMPACTS BE MITIGATED?	Yes	Yes

MITIGATION: The heritage significance of the impact is overall very low. Mitigation in the form of collection of archaeological material within the future area of disturbance is recommended for turbine (19.2854) at Dassiesfontein.

CUMULATIVE IMPACTS: N/a

RESIDUAL IMPACTS: N/a

Table 1 Summary of impacts to Pre-colonial archaeological material
Colonial period heritage

3.3 Impacts to colonial period heritage and archaeology

Nature of impacts:

Impacts to colonial period heritage will involve the addition of new elements to the landscape that will be visible from heritage sites such as Boontjiekraal, parts of Caledon and Cemetery Road. No direct impacts will occur.

Extent of Impacts: Localised.

NATURE OF IMPACT: Impacts to colonial period heritage			
	Without mitigation		With mitigation
EXTENT	Local (1)		Local (1)
DURATION	Long term (4)		Long term (4)
MAGNITUDE	Low (1)		Low (1)
PROBABILITY	Improbable (1)		Improbable (1)
SIGNIFICANCE	Low (6)		Low (6)
STATUS	Neutral		Neutral
REVERSIBILITY	Reversible		Reversible
IRREPLACEABLE LOSS OF RESOURCES?	No		No
CAN IMPACTS BE MITIGATED?	n/a		
MITIGATION: No mitigation is required.			
CUMULATIVE IMPACTS: n/a			
RESIDUAL IMPACTS: n/a			

Table 2 Summary of Impacts to built environment.

3.4 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 rural landscape and some degree of change to identity and character is expected.



Figure 7 The historic farm complex of Boontjieskraal as viewed from the Klipheuwel site. Boontjieskraal lies immediately south of the N2.

Nature of Impacts:

The landscape of the study area is of very high aesthetic value, and has been identified as a scenic area in Overberg municipal structure plan. The layering of the human made heritage on the landscape has resulted in distribution of farm buildings and agricultural land that started forming 300 years ago. The establishment of the wind energy facility will add a modern industrial element to this landscape. In this particular context, the addition of the new element may be aesthetically interesting (figure 7) due to the highly transformed quality of the landscape. The impacts are likely to be local in extent, and are unlikely to result in massive change to the identity of the place as the density of turbines proposed is very low, and may not be a dominating element. The gentle slopes will mean that major road cuttings are not required which will reduce visual and physical impacts to the landscape. Although it is difficult to judge how the turbines will affect the aesthetics of the landscape, the visual impact assessment has established that they will be highly visible from much of Caldedon, and as far away as Bot Rivier. Hence change in the character of the landscape can be expected.

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. Hence this may be described as a large local impact.

NATURE OF IMPACT: Change to the identity of the region, industrialization of its aesthetic qualities and the addition of an industrial layer on a very old landscape.

	Without mitigation	With mitigation
EXTENT	Local (3)	n/a
DURATION	Long term (4)	n/a
MAGNITUDE	Moderate (3)	n/a
PROBABILITY	likely (4)	n/a
SIGNIFICANCE	Medium (40)	n/a

STATUS	Negative – low positive.	n/a
REVERSIBILITY	Reversible	
IRREPLACEABLE LOSS OF RESOURCES?	No	No
CAN IMPACTS BE MITIGATED?	No	No
MITIGATION: n/a		
CUMULATIVE IMPACTS: A large WEF is proposed for the Caledon area closer to Riviersonderend. This together with this much smaller proposal impacts may result in tangible character change of the wheatland landscape.		
RESIDUAL IMPACTS: Moderate landscape scaring.		

Table 3 Summary of impacts to cultural landscape.

3.5 Impact Statement

3.5.1 Archaeological Heritage

The archaeological significance of the study area is very low with only one locality at Dassiesfontein requiring limited mitigation. The scientific record would benefit by having a systematic record of the material at this site. The material is not significant enough to warrant moving the turbine locality.

3.5.2 Built Environment

Impacts to built environment will not occur within the study area other than modifications to existing tracks. While the environment, which is largely historical and human made, is aesthetically significant and important to the area, it is expected that it will be able to absorb the presence of the proposed moderate sized wind energy facility. No mitigation is required.

3.5.3 Cultural landscape

The cultural landscape qualities of the area will be affected by the proposal which will result in changes to the aesthetic qualities of the place, and generally add a new modern element onto an old rural landscape. The turbines will be visible from Caledon, various farms and from Botrivier. The nature of this change is a matter of aesthetics. Wind turbines have a clean sculptured, if not graceful form which when placed judiciously and in low concentrations is not at odds with a manicured human-made agricultural environment. The facility will impact visual reference points such as the N2, parts of Caledon and Boontjieskraal. However, the quality of the impact will depend on personal aesthetics which is very difficult to qualify in an impact assessment such as this. It is the finding of this study that the heritage authority should be open to considering the possibility that the presence of the proposed moderate sized wind energy facility may not necessarily be out of place within this landscape context. No specific adjustment of turbine positions is recommended.

4. Mitigation and conservation

4.1 Turbine 1 Dassiesfontein (position 19.284)

Before construction commences, and when the site is fallow or clear of vegetation, a representative sample of acheulian artefactual material should be collected and analysed on site. A photographic record should be kept and a report produced describing the characteristic artefact forms. The area of construction disturbance should form the sampling area.

4.2 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.

No other mitigation measures or adjustments are recommended at this time subject to further input from Heritage Western Cape.

5. References

- Aikman, H., Baumann, N., Winter, S. and Clift H. 2005. A state of the cultural historical environment study: Unpublished report compiled by Overstrand Heritage and Landscape Consortium for the Overstrand District Municipality.
- Avery, G. 1974. Open station shell midden sites and associated features from the Pearly Beach area, south-western Cape. *South African Archaeological Bulletin*. 30: 103-105.
- Avery, G. 1975. A discussion on the age and use of tidal fish-traps (visvywers). *South African Archaeological Bulletin* 30: 105-113.
- Avery, G. 1976. A systematic investigation of open station shell midden sites along the southwestern Cape coast. Unpublished MA thesis: University of Cape Town.
- Avery, G., Cruz-Uribe, K., Goldberg, P., Grine, F.E., Klein, R.G., Lenardi, M.J., Marean, C.W., Rink, W.J., Schwarcz, H.P., Thackeray, A.I. and Wilson, M.L. 1997. The 1992-1993 Excavations at the Die Kelders Middle and Later Stone Age cave site, South Africa. *South African Archaeological Bulletin* 24: 263-291.
- CNdV Africa 2006 Towards a regional methodology for wind energy site selection. Report prepared for Department of Environment Affairs and Development planning.
- SAHRA. 2009. Archaeology, Palaeontology and Meteorite Unit: Report Mapping Project.
- Sleigh, D. 1993. Die Buiteposte: VOC-buiteposte onder Kaapse bestuur 1652-1795. HAUM: Pretoria
- Smith, A.B. & Mütti, B. 1992. Guide to Archaeological sites in the south-western Cape. For the South African Archaeologists Conference July 5-9, 1992.
- Schweitzer, F.R. & Wilson, M.L. 1978. A preliminary report on excavations at Byeneskranskop, Bredasdorp District, Cape. *South African Archaeological Bulletin* 33: 134-140.
- Schweitzer, F.R. & Wilson, M.L. 1982. Byneskranskop 1: A late quaternary living site in the southern Cape Province, South Africa. *Annals of the South African Museum* 88(1): 1-203.
- Schweitzer, F.R. 1970. A preliminary report of excavations of a cave at Die Kelders. *South African Archaeological Bulletin* 25: 136-138.
- Schweitzer, F.R. 1979. Excavations at Die Kelders, Cape Province, South Africa: the Holocene deposits. *Annals of the South African Museum*. 78(10): 101-203.
- Schweitzer, F.R. 1982. Byeneskranskop 1, a Late Quaternary living site in the southern Cape Province, South Africa. *Annals of the South African Museum* 88.
- Overberg Spatial Development Framework 2004. Prepared for Overstrand Municipality by Dennis Moss Partnership.

6. Appendix A

Observations

Turbine 1 Position 19.284

Two ESA flakes, quartzite cobble fragment, hammer stones, core fragments, 2 more cobbles from river: quartzite, 2 hand axes (waypoint '2 handaxes') quartzite, lots of hammer stones, small quartz flake, a few quartz pieces, silcrete core fragment ESA site.

Mitigation: The material contained within the future area of disturbance of this turbine should be collected and analysed on site, thereafter it should be returned to the find site. Since the area is already highly disturbed, retention provenance information is not essential.

Position 19.2854

Quartz, quartzite hand axe tip (waypoint 'Handaxe tip') broken in half soft hammered, silcrete cobble hammerstone, quartzite hand axe (waypoint 'Hndxe')

Position 19.2905

Quartz flake, cobble fragment with pitting and very smooth surface, quartzite hammerstone, a lot of quartz pieces - more than other positions, quartzite core

Position 19.2922

Core fragment – flaked quartzite,
Quartz pieces, 2 silcrete cores, small quartzite cobbles between 10 15 cm – all flaked most have bifacial aspect, exhaustive use (hammer stones used as core)

Position 19.2986

Silcrete core, some quartz, quartzite core/cobble, quartzite flake

Position 19.2988

Quartzite grind stone (13 x 12 x 7 cm), quartzite core and flake

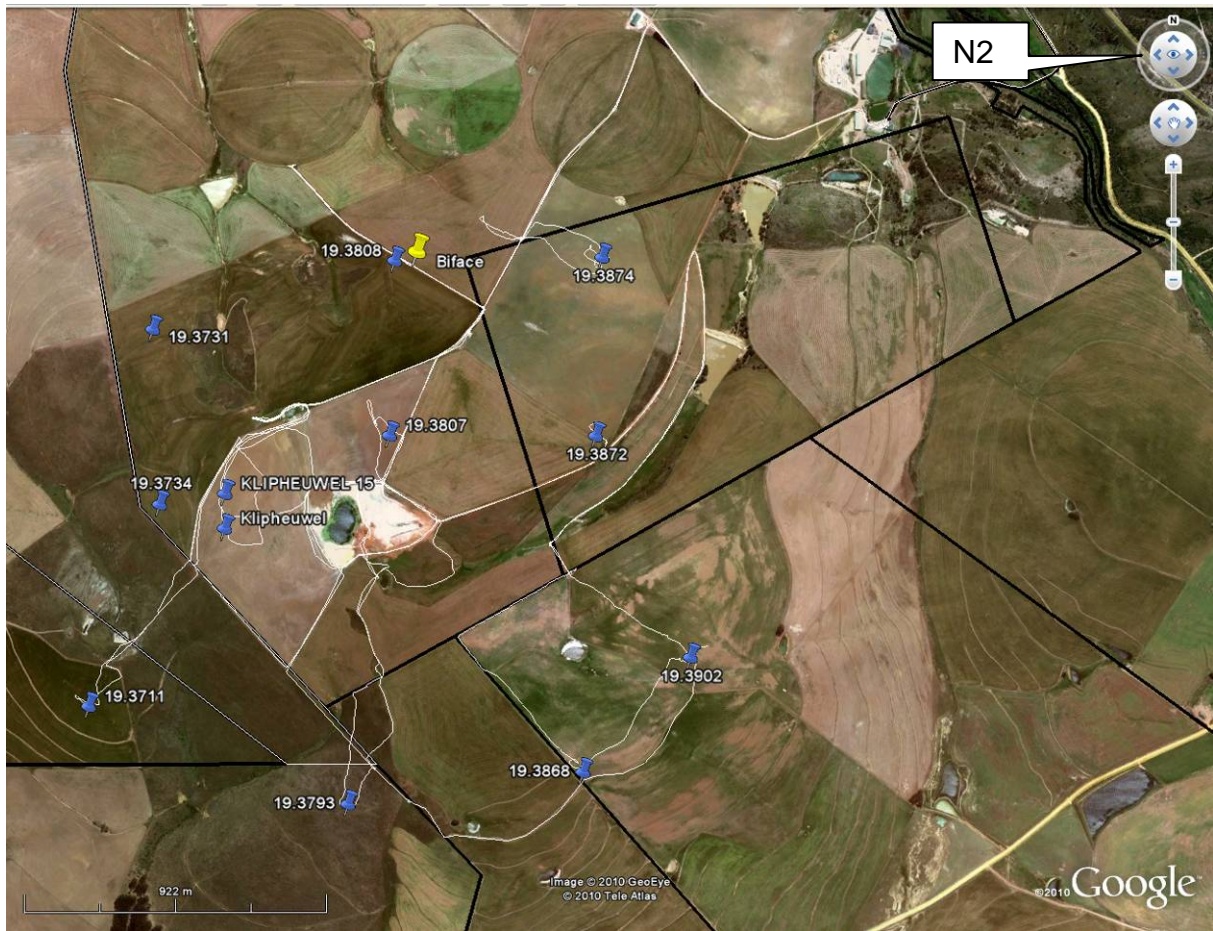


Figure 8 The klipheuwel cluster. Walkpaths are indicated by white lines.



Figure 9 The Dassiesfontein cluster. Locality 19.2854 which will require mitigation is marked with a red arrow.



Figure 10 Artefactual material from site 19.284. The turbine site is located in a bean field so visibility is limited. Top left: Acheulian biface. Bottom left: worked silcrete flake. Top right: quartzite hammer stone and flaked cobble. Bottom right; core fragment.



Figure 11 Location 19.284.