

Scoping Heritage Impact Assessment of a proposed Wind Energy Facility to be situated at Olifantsriver Neddersetting 617, 620 and Gravewaterkop 158/5 situated on the Namaqualand Coast in the Vredendal District, South Western Cape.

Prepared for

Savannah Environmental (Pty) Ltd

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## Executive summary

The Archaeology Contracts Office of the University of Cape Town was appointed by Savannah Environmental (Pty) Ltd of behalf of the proponent Eskom Generation, to undertake a scoping level heritage assessment (as part of an EIA process) of portions of the farms Olifantsriver Nedersetting 617 and 620 and Grave Water Kop 158/5 situated on the Namaqualand Coast in the Vredendal District, South Western Cape. The proposed activity is the development of a Wind Energy Facility which will consist of up to 100 wind turbines distributed over a 36.7 sq km area. The study area in question is located 2 km inland of the shoreline above the coastal escarpment.

Research has shown that while the shoreline of Namaqualand is rich in archaeological sites, historical sites and other forms of generally protected heritage are relatively scarce. The area is characterised by rocky shorelines, beaches and dune fields, while the inland coastal plain is arid and flat occasionally punctuated by vegetated dunes and deflation bays. The area is remote being used mostly by local farmers (grazing of small stock), while the coastline has been subject to *ad hoc* alluvial diamond mining resulting in significant environmental damage in places.

Indications are:

- Archaeological sites tend to be associated with the immediate coastline therefore will not be significantly impacted by the proposed activity which is limited to the coastal plain (2 km inland from the highwater mark). It is expected that mitigation will be possible for any material that does exist in the study area.
- Historical sites and buildings are very scarce in the area and are unlikely to be impacted.
- Probable impacts to wilderness qualities of the landscape are a concern and need to be followed up along with completion of a Visual Impact Assessment.
- In heritage terms, no fatal flaws have been identified for the proposed turbine site, access road or powerlines.

## 1. INTRODUCTION

The Archaeology Contracts Office of the University of Cape Town was appointed by Savannah Environmental (Pty) Ltd of behalf of the proponent Eskom Generation, to undertake a scoping level heritage assessment of portion of the farms Olifantsriver Nedersetting 617, 620 and Grave Water Kop 158/5 situated on the Namaqualand Coast in the Vredendal District, South Western Cape. The proposed activity is the development of a Wind Energy Facility which will consist of up to 100 wind turbines distributed over a 25 sq km area.

### 1.1 The need for the project

Studies completed by Eskom have forecast that the company's electricity generating capacity will be under pressure to meet the needs of the nation considering the current rate of growth of the economy. This is particularly so in the Western Cape Province, where local growth rates exceed the national average. Eskom is responding to this situation by taking measures to expand South Africa's generating and distribution capacity in a number of ways. Besides increasing the number of non-renewable energy sources, Eskom is trying to raise the contribution of clean renewable energy such as wind and solar energy to the national distribution network. To this end an experimental wind farm has been established near Klipheuwel in the Western Cape where three different kinds of wind turbines have been undergoing testing to establish what best suits local conditions. In order to optimize the use of the wind resource, Eskom has identified areas of the country that experience consistently high wind speeds for optimum daily power generation. An area on the Namaqualand coast just north of the Olifants River mouth has been identified as being suitable. Site selection has been a lengthy process involving work-shopping various options to make sure that the process are in line with the DEA&DP Strategic Initiative report.

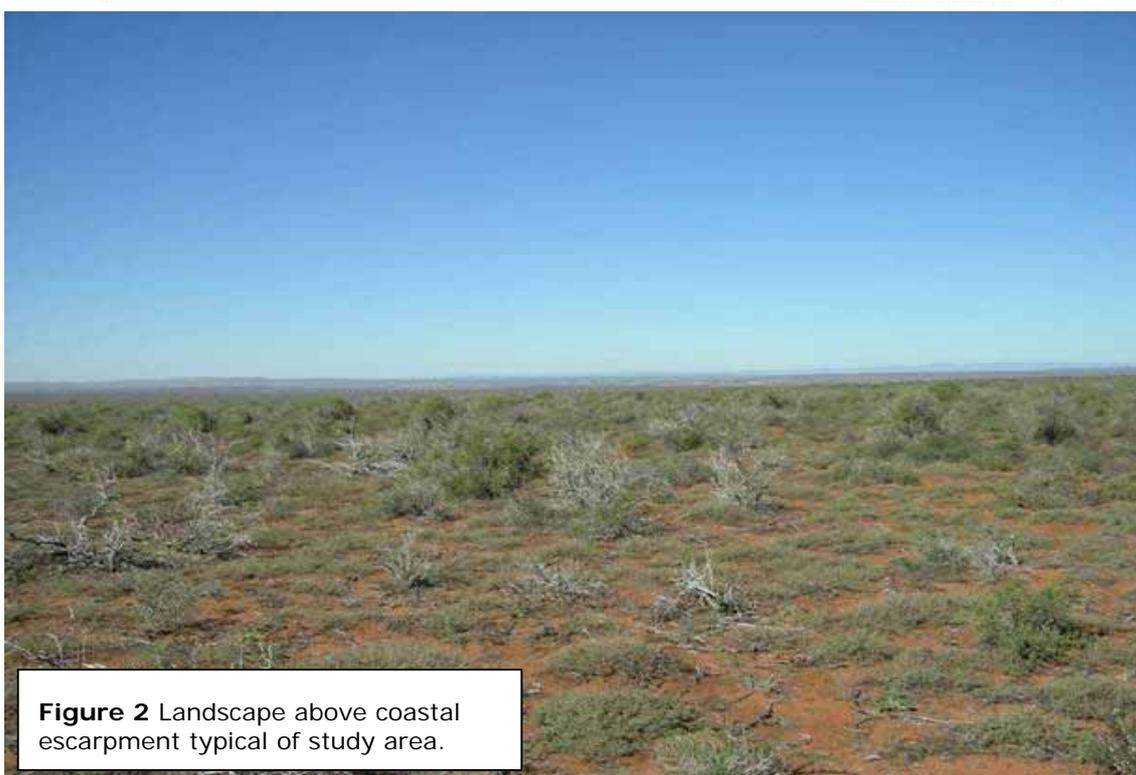
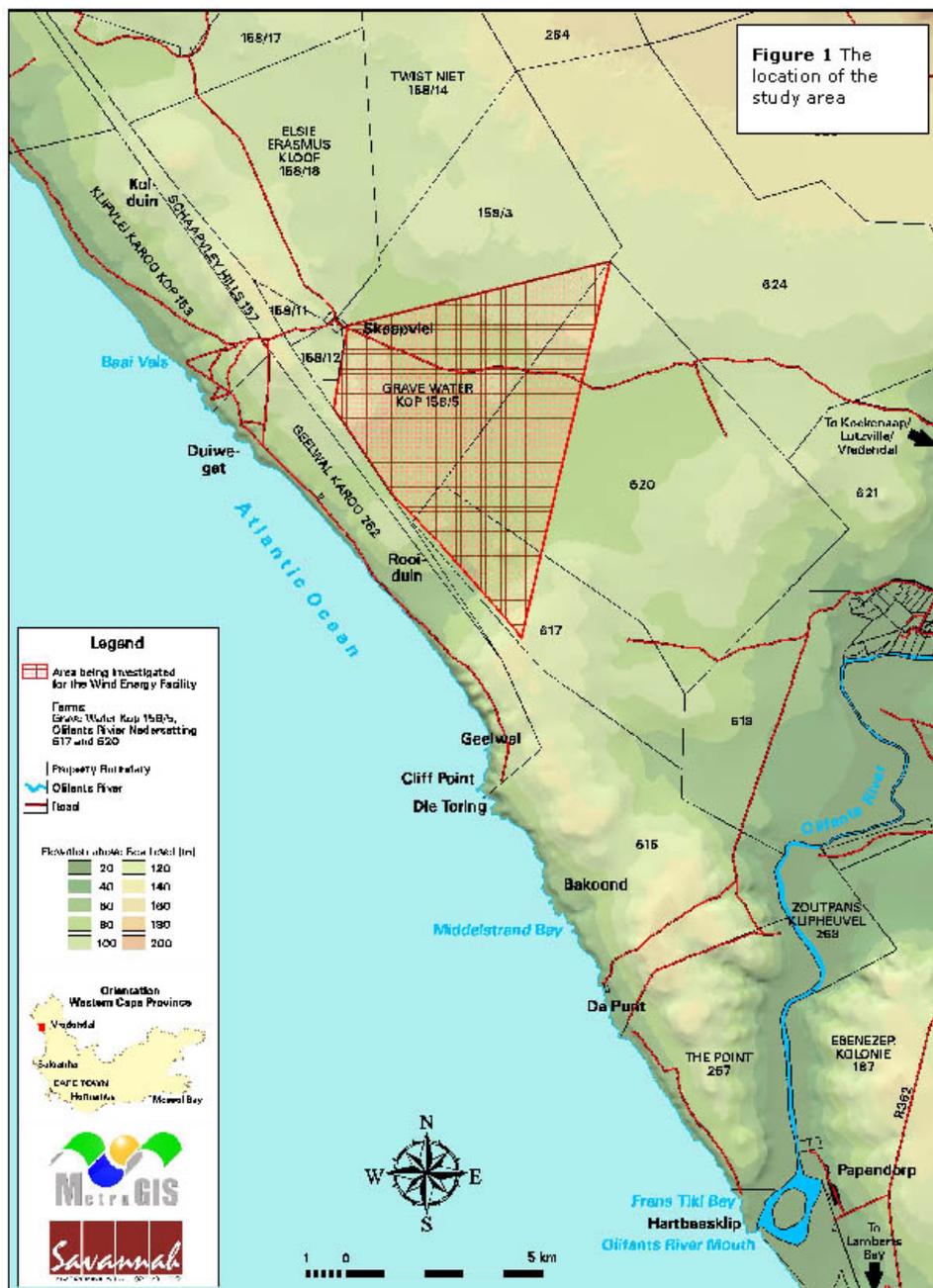
### 1.2 The receiving environment

The study area lies on the arid coast of Namaqualand, Western Cape Province a little way to the north of the Olifants River mouth. The application that is now for consideration in the EIA process is a Wind Energy Facility of up to 100 turbines. The area identified for the study is generous in size comprising some 36.7 sq km incorporating parts of farms Olifantsriver Nedersetting 617 and 620 and 158/5 Gravewaterkop. A facility of up to 100 turbines would require an area in the order of 25km<sup>2</sup>.

The land in question is entirely undeveloped and somewhat remote being accessible via a dirt road. The person made environment is limited to a gravel provincial road, casual off-road tracks, the Skaapvlei Farm/Mining Houses immediately to the north of the study area. In some areas previous attempts have been made to farm wheat, however these areas are largely overgrown at present. In the immediate coastal zone to the west, concession diamond mining has significantly damaged an otherwise scenic coastline (characterised by cliffs, beaches and sheltered bays). Within the study area, the landscape is characterised by low vegetated dunes, occasional deflation bays and fossil *Termiteria* mounds (*Heuweljies*). The Strandveld vegetation is low and scrubby – there are no significant trees.

The study area which is some 2 km from the immediate coastline does not lie on any commonly used tourism route (although in recent years a local farmer has commenced an eco-tourism initiative) however the shoreline is frequented by people who regularly use the coast for recreational camping over the holiday season. Generally, apart from Transhex Diamond Mining staff and local farmers the local area is scarcely populated.

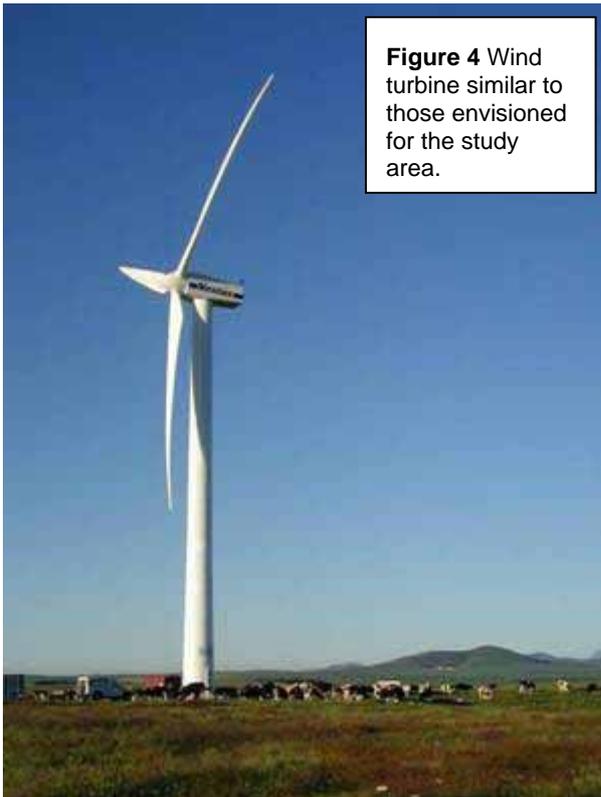
Archaeological sites, mainly shell middens are known to be common close to the shoreline. Several were noted during the initial site inspection, however many sites have been extensively impacted by coastal diamond mining. Besides archaeological sites, the dominant heritage quality of the area is its powerful sense of wilderness, desolation and open space.





**Figure 3** The study area lies 2km inland of the shoreline (typical).

### 1.3 The proposed activity



**Figure 4** Wind turbine similar to those envisioned for the study area.

Eskom propose to erect up to 100 wind turbines on a site of approximately 25km<sup>2</sup>. The turbines will be patterned throughout the study area so that each unit can make optimum use of the wind resources. The turbines are substantial in size, each one standing on a steel tower 60 – 80 m high. Each blade will be between 40 and 45m long.

A foundation of 15mx15mx2m is required to ballast and provide a footing for each unit. The foundation will be concrete, and the steel tower on which the turbine and generator are mounted will be anchored to this.

## 2. RESEARCH BACKGROUND

The history and pre-history of Namaqualand, despite its obvious rich cultural resources, has been until recently one of the most neglected areas of study in the country. The first serious academic archaeological and anthropological studies of the area did not take place until the 1980s. These focussed on the Nama reserves of the Kamiesberg mountains while a few initial archaeological studies have been conducted in the Richtersveld and

southern Namibia.

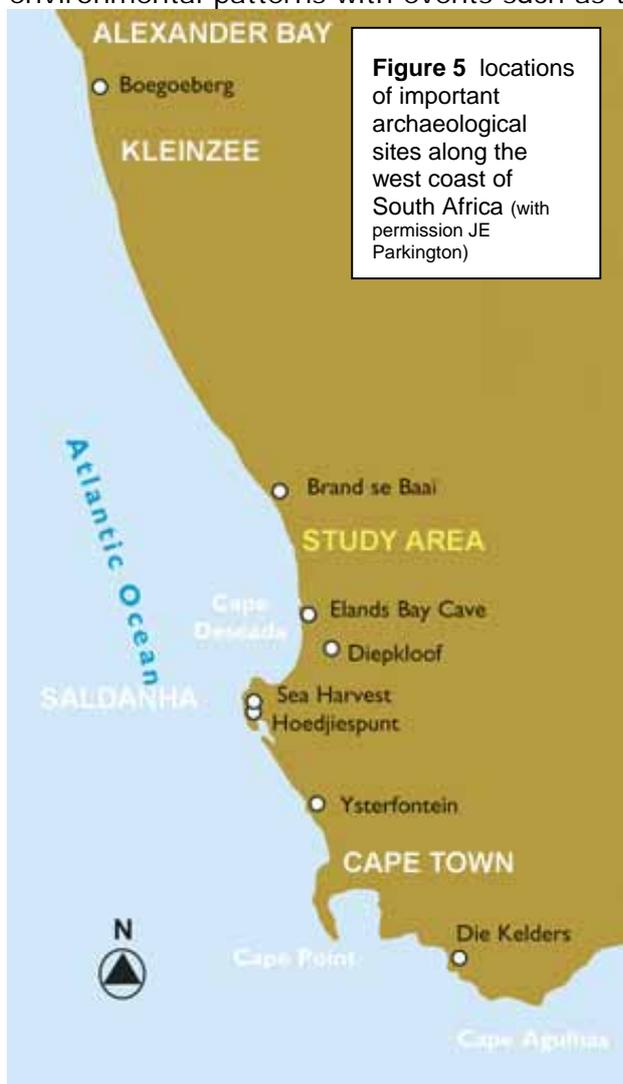
The archaeological wealth of the Namaqualand coast was only demonstrated circa 1988 when Eskom commissioned a series of preliminary studies to identify potential power station sites along the Namaqualand coast. Hundreds of Late Stone Age archaeological sites were located in the apparently waterless landscape. This observation was further illustrated in 1991 when Halkett and Hart (ACO) sample-surveyed the coastline of De Beers owned properties between Mitchell's Bay and Port Nolloth recording details of almost 1000 archaeological sites. Archaeological work in the mining areas has been ongoing since 1991 with the result that a great deal of information is now

available with respect to the coastal areas and the Gariep River. Recent research in the Kleinzee area (Halkett and Orton pers comm., Dewar 2007) has revealed that parts of Namaqualand were occupied by people almost a million years ago as is evident by massive scatters of Early Stone Age artefacts on high ground overlooking the coastal plain, however the greatest amount of archaeological sites are those which relate to the ancestors of the San and Khoekhoen which have been radiocarbon dated to the last 5000 years. These sites are densest along the immediate coastline but may be found further inland close to water sources or natural foci (dunefields, rock outcrops) on the landscape. Colonial period sites, apart from those related to the relatively recent heritage of mining, are extremely scarce.

## 2.1 The Vredendal Coastal Area

The Namaqualand coast north of the Olifants River was archaeologically unknown until 1987 when John Parkington of the ACO was appointed by the Environmental Evaluation Unit (EEU) on behalf of Namakwa Sands to assess the impacts of proposed heavy mineral sands mining. It became clear at that time that the dry areas of the West Coast were surprisingly archaeologically rich. Parkington and Poggenpoel (1991) after several preliminary assessments in the Brand Se Baai area near Vredendal suggested that occupation of the coast during the Late Stone Age had taken place as a single burst of prehistoric occupation, probably within the last 2000 years. However, subsequent research including archaeological excavation at several localities between Brand Se Baai and the Orange River Mouth have shown that people have been exploiting coastal resources since the Eemian interglacial period about 120 000 years ago with the discovery of rare Middle Stone Age shell middens, at Brand Se Baai, Liebenbergsbaai and Boegoeberg (Figure 5).

Historically the primary inhabitants of Namaqualand were San (bushmen) and Khoekhoen herders – the ancestors of the Nama speaking South Africans of the present day. Occupation of the area by San during the last 10 000 years (Holocene) was probably continuous but pulsed according to environmental patterns with events such as the “little ice age” circa 1400 AD playing a significant role. Although there is still much to be learned about the archaeology of the region, some interesting patterns in the distribution of archaeological sites are beginning to emerge.



There are numerous archaeological sites on the immediate coast, mostly associated with rocky shoreline areas where marine resources were easy to obtain. Many of these sites contain ceramics and appear to be less than 2000 years old judging by the types of artefacts that are found on them. In contrast the few sites that have been located further inland on the coastal plains tend to be much older, dating to over 3000 years ago. This hints at changes in the way that people used the landscape over time, which may reflect a combination of environmental and social factors combined with population pressure. Coastal occupation and pressure on coastal resources may have increased after 2000 years ago when Khoekhoen arrived in the Cape bringing with them herds of sheep, ceramic technology and a new economic order.

## 2.2 The inland areas

To date very little is known about the inland areas (from 10km of the coast), with the few archaeological surveys that have been completed limited to the Nama reserves and the western edge of Bushman Land. There are vast tracks of

land in the mountains and between the escarpment and the coast for which absolutely no information is available.

### **2.3 Colonial period occupation**

Compared with other parts of South Africa, colonial period occupation of the un-hospitable region of the Namaqualand is very late having taken place during the mid-late 19<sup>th</sup> century. Farmers clashed with wild Bushmen, who after years of attrition were finally wiped out by the commando operations launched from regional centres in the Northern Cape. Rumour has it that the last “wild bushman” died in about the 1890s.

Built environment heritage tends to be restricted to towns and mines. Farms tend to be very large so farm houses are very sparse. Nevertheless many of these are greater than 60 years old and have unique vernacular characteristics. Formal building conservation studies in the region are in their infancy.

The industrial archaeology of Namaqualand is significant, and among some of the earliest mining, railway and transport heritage in South Africa. Like so much of Namaqualand heritage, it has never been subject to any form of academic assessment.

### **2.4 Conservation status of heritage**

In more than any other area of the Cape, impact assessments and mitigatory studies commissioned by both Namakwa Sands (Pty) Ltd, De Beers Namaqualand Mines Division, Trans Hex Mining Ltd and now Namaqualand Diamond Corporation have provided the bulk of what is known about the archaeology of the Namaqualand coast. Not only has this work contributed to research, but also importantly it has allowed us to gauge the condition of the “National Estate” of archaeological sites on the west coast.

During the early 20<sup>th</sup> century large-scale diamond mining began and it was only in the 1990s that mining companies began to implement policies for the conservation and assessment of heritage sites. This means that in certain areas massive destruction of coastal archaeological sites has occurred without any mitigatory provisions. The worst hit areas are between Alexander Bay and Port Nolloth, the coastal areas of the Buffels Marine Complex at Kleinzee, parts of the Koingnaas mining area. However, the fact that many of these areas are off-limits to the public has resulted in the excellent preservation of archaeological sites in those parts of these high security areas that have not been developed. Unfortunately the area between the Spoeg and the Olifants River mouths have been impacted very seriously by years of small *ad hoc* diamond operations which has resulted in a plethora of informal off-road tracks the coastal zone. Furthermore, there is hardly an area of the coastal fore-dunes that has not been subject to some form of disturbance. This means that virtually the entire material heritage of the immediate coastline (i.e. the Admiralty Zone – the coastal fore dunes) has already been lost. Fortunately, many sites have survived in the areas immediately inland of the coast. These are threatened by not only continued mining of these areas but especially by undisciplined use of off-road vehicles and the mass of informal roads/tracks that result.

The loss of heritage sites on the west coast is destined to continue as long as the coast and near coastal areas are subject to diamond mining, and in some instances, uncontrolled access by off-road vehicles. In the light of the substantial collective impacts that have already occurred to the population of archaeological sites, it is imperative that all effort is made to conserve the remaining sites, and where impacts will inevitably occur, sample them to ensure that loss of historical/cultural/scientific information resulting from their destruction is minimised.

The conservation status of colonial period archaeology, industrial archaeology and built environment has never been audited.

## **3. Methodology for study**

This study has been commissioned as a scoping assessment that attempts to predict the possible

range of impacts in terms of accumulated knowledge of the area. A site visit to the general area has been completed and a number of observations made, however the bulk of our predictions are based upon a solid body of prior knowledge based previous work. There is good information from studies conducted in the near-shore diamond mining areas (Transhex and de Beers) as well as on the coastal plains further inland. The possible impacts of the proposed activity are based on inferences drawn from this information.

### **3.1 Restrictions and assumptions.**

The study area which is substantial in size, has not been subject to a comprehensive survey. This will be conducted during the course of the full EIA. The study area has been visited, however the findings of this report assume that the heritage characteristics of the area are similar to well studied areas close by. The primary heritage resources that have been identified in this study are pre-colonial archaeology and issues relating to sense of place. Extensive soil profiles have been examined at nearby mining operations. The area is not highly fossiliferous.

## **4. Findings**

### **4.1 Pre-colonial archaeology**

Previous research has revealed that the bulk of archaeological sites (mainly Late Stone Age middens) lie within half a kilometer of the coast. Their frequency drops off rapidly with distance away from the coast. This spatial patterning reflects that people (typically in an arid environment) tended to focus their settlements, which were mostly of short seasonal duration, close to resource rich areas. Inland of the coast above the coastal escarpment archaeological sites are quite scarce being limited to ephemeral scatters situated in occasional deflation hollows. Where there is a rocky outcrop with shelters or overhangs, or any place that has the potential for providing a water source evidence of occupation is prolific. Older archaeological material dating from the Middle and Early Stone ages has been found in areas where sand mining or overburden excavation/removal has resulted in the exposure of previous land surfaces. However due to the large amounts of Aeolian sands that cover the study area none of this material is visible.

The study area is situated on average 2 km inland which means it is well clear of the sensitive immediate coastal area. There is a possibility that buried archaeological sites may be impacted by excavations and service installation, however there is no technology available at present that is able to remotely detect buried sites of the kind that exist in Namaqualand.

#### **4.1.1 Nature of impacts**

The main cause of impacts to archaeological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large scale excavations will damage archaeological sites, injudicious use of off-road vehicles is also another culprit. The illegal collection of artefacts for souvenirs has had devastating cumulative consequences for entire regions in South Africa (such as the Cape Peninsula).

#### **4.1.2 Extent of impacts**

In the case of the proposed wind farm, it is expected that impacts will be quite limited (local) but nevertheless possible. There is a chance that the deep excavations for 15x15x2 sqm tower bases could potentially impact buried archaeological material, similarly excavation of cable trenches and clearing of access roads could impact material that lies buried in the surface sand. However the locality of the study area away from the immediate coast substantially decreases the probability of impacts occurring as there are fewer sites on the inland coastal plain.

Potential impacts caused by a 132 kV powerline and proposed access road are similarly likely to be limited and local, however these will need to be physically searched during the EIA phase and

the routes adjusted where necessary.

## **4.2 Colonial period heritage**

Colonial period heritage is extremely scarce in the study area and vicinity. There are no built structures close to, or within the study area apart from the provincial road, jeep tracks, stock drinking troughs and wind pump reservoirs. The nearest built settlement is the Skaapvlei farm (just to the north) and the Transhex mining camp a number of kilometers to the south. Neither of these places can be considered to be significant heritage resources, although buildings and family graves at Skaapvlei may be more than 60 years old. In essence, the landscape is ancient – the recent human presence being limited to ephemeral traces of agriculture and various impacts resulting from alluvial diamond mining activities, which are mostly restricted to the immediate coast.

### **4.2.1 Nature of impacts**

Historic structures are sensitive to physical damage such as demolition as well as neglect. They are also context sensitive, in that changes to the surrounding landscape will affect their significance.

### **4.2.2 Extent of Impacts**

Given that there are no historic structures in the study area, and no significant structures lie within the vicinity of the study area, this factor is not expected to be an issue.

## **4.3 Cultural landscape and sense of place**

The cultural landscape is essentially a natural one with ephemeral traces of human modification. It has a quiet “unspoiled” character, somewhat bleak and definitely lonely. Although treeless, the environment is relatively rich in wildlife, especially small game and avi-fauna.

### **4.3.1 Nature of impacts**

Conspicuous changes to a landscape such as tall buildings, landscape scarring, massed housing development can change the “feel” and atmosphere of a place irrevocably. It takes only a little intervention to alter the sense of wilderness of a place and change its atmosphere.

### **4.3.2 Extent of impacts**

Massed wind turbines, are without doubt conspicuous structures which will affect the atmosphere of the “place”. While this impact may be considered local in terms of physical extent, there may be wider implications in terms of the change in “identity” of the region and the cumulative effect this could have on future tourism potential. This means that the potential for alteration to the cultural landscape and sense of place is considered an issue that will need further attention in the EIA phase.

## **5. Mitigation and conservation**

### **5.1 Archaeological heritage**

It is expected that much the archaeological heritage will be controllable through avoidance of sensitive areas. Micro-adjustment of turbine footings, moderate deviations in service trenches, road alignments or powerline towers are expected to be all that will be required in terms of mitigation of deflation hollow sites and surface shell middens. If for any reason mitigation by avoidance is not feasible, the usual process is to record and sample the archaeological site before its destruction is permitted.

## **5.2 Human remains**

Human remains can occur at any place on the landscape. They are regularly exposed during construction activities along the west and south coasts. Such remains are protected by a plethora of legislation including the Human Tissues Act (Act No 65 of 1983), the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999). In the event of human bones being found on site, SAHRA must be informed immediately and the remains removed under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.

## **5.3 Un-identified archaeological material, fossils and fossil bone**

There is always a chance that archaeological material may be exposed during bulk excavation for services and foundations. All archaeological material over 100 years of age is protected and may only be altered or removed from its place of origin under a permit issued by Heritage Western Cape (HWC). In the event of anything unusual being encountered, the Province Archaeologist at HWC must be consulted immediately so that mitigatory action can be determined and be implemented if necessary (find-stop scenario). In the case of the proposed activity, it may be pertinent to appoint an archaeologist to monitor any bulk excavation during the construction phase. Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological/palaeontological sampling is completed.

## **5.4 Cultural landscape and sense of place**

This is perhaps the most difficult heritage impact to address. There is no doubt that the wind turbines will affect the wilderness qualities of the site, however the degree of impact will be very closely related to the visual impacts of the proposed activity (the visual impact will be separately addressed by MetroGIS).

## **6. CONCLUSION**

Indications are that in terms of historical and archaeological heritage the proposed activity is viable, impacts are expected to be limited and controllable.

In terms of impacts to the natural cultural landscape qualities of the site, impacts are expected. This may be mitigated by the fact the study area is set back from the scenic coastal escarpment (which is most frequently used by people) and the fact that the proposed wind turbines will need very little by way of support structures or staff facilities. Input from visual assessment of the site will be needed in order to comprehensively assess potential impacts.

### **6.1 Further work**

The EIA phase study needs to fulfill the requirements of heritage impact assessment as defined in the guidelines developed by the Department of Environment Affairs and Tourism (Western Cape). This means that the assessment has to cover the full range of potential cultural heritage as defined by the term "culture" contained in the National Heritage Resources Act 25 of 1999.

The proposed study area needs to be subject to a detailed survey by archaeologists who will need to walk a pattern of transects over the site recording details and locations of any heritage material found. The significance of each find will need to be assessed along with the impacts of the proposed activity. Mitigation measures will need to be identified.

Proposed routes of linear infrastructure (access roads, underground services, power lines) will need to be ground truthed to establish the impacts of the proposed activity and determine where

mitigation (if any) will be required.

The colonial period historical significance of the site will need to be established through archival and deeds surveys. Lost historical significance (if any) will need to be identified and the proposed action assessed to determine if it presents and impacts to the historical significance of the "place".

follow up heritage work such as monitoring of excavations or archaeological sampling may be required to inform the environmental management plan.

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