

HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED ISIVUNGVUNGU WIND ENERGY FACILITY, VREDENBURG MAGISTERIAL DISTRICT, WESTERN CAPE

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act (No. 25 of 1999) as part of a Basic Assessment)

Prepared for

Aurecon South Africa (Pty) Ltd

Aurecon Centre, 1 Century City Drive, Waterford Precinct,
Century City, Cape Town 7441
Phone: (021) 526 6033 Fax (021) 526 9500
Email: Rene.Stewart@aurecongroup.com

December 2011



Prepared by

Jayson Orton

Archaeology Contracts Office

Department of Archaeology
University of Cape Town
Private Bag
Rondebosch
7701

Phone (021) 650 2357
Fax (021) 650 2352
Email Jayson.Orton@uct.ac.za

EXECUTIVE SUMMARY

The UCT Archaeology Contracts Office was appointed by Aurecon South Africa (Pty) Ltd to undertake a Heritage Impact Assessment for the proposed Isivunguvungu Wind Energy Facility (WEF). The WEF is to be located on Jakkalskloof 195/2, Yzervarkensrug 129/remainder and Farm 1132 (the present ArcelorMittal: Saldanha Works site). The portions of these properties under consideration for the EIA is about 115 ha, although the total footprint of the WEF, including all ancillary infrastructure, will only be 2.68 ha. The properties are currently zoned Agriculture 1 but agriculture has not been practised on site since 1995. The project is to comprise of six 70 – 80 m high turbines with a total generating capacity of 15 MW. Underground cables and an access road would link the turbines, and an over head cable will link to the Saldanha Steel plant and an underground cable would run through the plant to their substation. The access road would be partially an upgrade of an existing track and partly a new road, the latter being along the turbine row.

The site was visited on 4th October and recorded photographically. The area is flat with much calcrete exposed at the surface. Bushes tend to be low and visibility of the substrate was good.

Several very important palaeontological localities have been recorded in the region and some have associated archaeological material. The immediate area has not yielded any significant archaeological resources, although at Saldanha Bay, Langebaan and further afield highly significant sites have been located. The local built environment is mostly modern with the majority of buildings close to the study area being industrial. Owing to these buildings and other related infrastructure, the site context is distinctly industrial such that important cultural landscapes are absent.

Significant palaeontological material may be expected to occur within the substrates present on site. These relate largely to old sand bodies which have now solidified as aeolinite or calcrete. The significance of expected impacts is medium-high without mitigation but medium with mitigation. Archaeological material was not found on the site but a very small chance exists of finding buried material, perhaps associated with fossils, beneath the calcrete. Archaeological impacts are thus very low but buried material could be rated as for palaeontology. No buildings occur on site and no significant cultural landscape elements occur. Visual impacts will occur but are of moderate significance given the small size of the project and the present state of the landscape with all its industrial facilities and related infrastructure. They cannot be mitigated. HWC requested specific attention be paid to the R27, the R45 and the R399. The nearest that any of these comes to the proposed site is 5.8 km. Due to the generally industrial character of the surrounding area, the proximate sections of these roads are not considered to have high scenic value and, furthermore, they are at a reasonable distance from the proposed turbines and the visual study indicated that impacts over distances greater than 5 km would be very low.

It is concluded that construction of the WEF should be allowed to proceed but the following recommendations apply:

- Palaeontological monitoring will be required during and after excavation of the foundations and cable trenches.
- Should fossil material be noted, suitable measures as determined by the practitioner on site must be taken. This would likely involve collection of fossils and description of their context. A permit would need to be obtained but, due to the nature of the rescue work, this may need to be done retrospectively.

- If buried archaeological material is encountered, this should be reported to an archaeologist and/or palaeontologist for evaluation and, if required, planning of appropriate mitigatory measures.



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference Number:	
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

PROJECT TITLE

Basic Assessment: Isivunguvungu Wind Energy Facility, Saldanha - Heritage

Specialist:	UCT Archaeology Contracts Office		
Contact person:	Jayson Orton		
Postal address:	Archaeology Contracts Office, Dept Archaeology, UCT, Private Bag, Rondebosch		
Postal code:	7701	Cell:	083 272 3225
Telephone:	021 650 2357	Fax:	021 650 2352
E-mail:	Jayson.Orton@uct.ac.za		
Professional affiliation(s) (if any)	Accredited Principal Investigator with ASAPA, Member #233.		

Project Consultant:	Aurecon South Africa (Pty) Ltd		
Contact person:	René Stewart		
Postal address:	PO Box 494, Cape Town		
Postal code:	8000	Cell:	084 2511 884
Telephone:	021 526 6033	Fax:	021 526 9500
E-mail:	René Stewart		


4.2 The specialist appointed in terms of the Regulations_

I, JAYSON ORTON , declare that --

General declaration:

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist


UCT Archaeology Contracts Office

Name of company (if applicable):

24 October 2011

Date:

Contents

1. INTRODUCTION	7
2. HERITAGE LEGISLATION	8
3. METHODS.....	9
3.1. Limitations	9
4. DESCRIPTION OF THE AFFECTED ENVIRONMENT	9
5. HERITAGE CONTEXT	9
5.1. Pre-colonial archaeology.....	9
5.2. Colonial period	10
5.3. Built environment.....	10
6. FINDINGS.....	12
6.1. Palaeontology.....	12
6.2. Archaeology	13
6.3. Built environment.....	13
6.4. Cultural landscapes.....	14
6.5. Visual Issues	16
7. ASSESSMENT OF IMPACTS	19
8. CONCLUSIONS	20
9. RECOMMENDATIONS	20
10. REFERENCES	21
APPENDICES – PALAEOLOGY AND VISUAL SPECIALIST REPORTS.....	24
PALAEOLOGY SPECIALIST REPORT	25
VISUAL SPECIALIST REPORT.....	26

1. INTRODUCTION

The UCT Archaeology Contracts Office was appointed by Aurecon South Africa (Pty) Ltd to undertake a Heritage Impact Assessment for the proposed Isivunguvungu Wind Energy Facility (WEF). The WEF is to be located on Jakkalskloof 195/2, Yzervarkensrug 129/remainder and Farm 1132 (the present ArcelorMittal: Saldanha Works site). The portions of these properties under consideration for the EIA is about 115 ha, although the total footprint of the WEF, including all ancillary infrastructure, will only be 2.68 ha. Remainder 129 of the Farm Yzervarkensrug and Farm 195/2 Jakkalskloof are currently zoned for agricultural activities however no agricultural activities are currently being undertaken on the property nor has it been used for agriculture since the land use application for rezoning on the AMSA site in 1995. Farm 1132 is however currently zoned for industrial activities. The project is to comprise of six turbines with a total generating capacity of 15 MW.. The turbine masts would be between 70 m and 80 m high and the blade lengths would be between 46.9 m and 50.3 m in length. An underground 11 kV power line would link the turbines, while an above ground 11 kV power line would run from the eastern end of the turbine row to a point close to the existing substation within the grounds of the Saldanha Steel facility. A short below ground power line would then run into the substation site (Figure 2). Below ground lines will total 2.4 km, while the above ground section will be 2.2 km long. A 1.5 km access road would run along the turbine row and link to the existing track that will be upgraded. A container with a 14.5 m² footprint will be used as a semi-permanent site office.

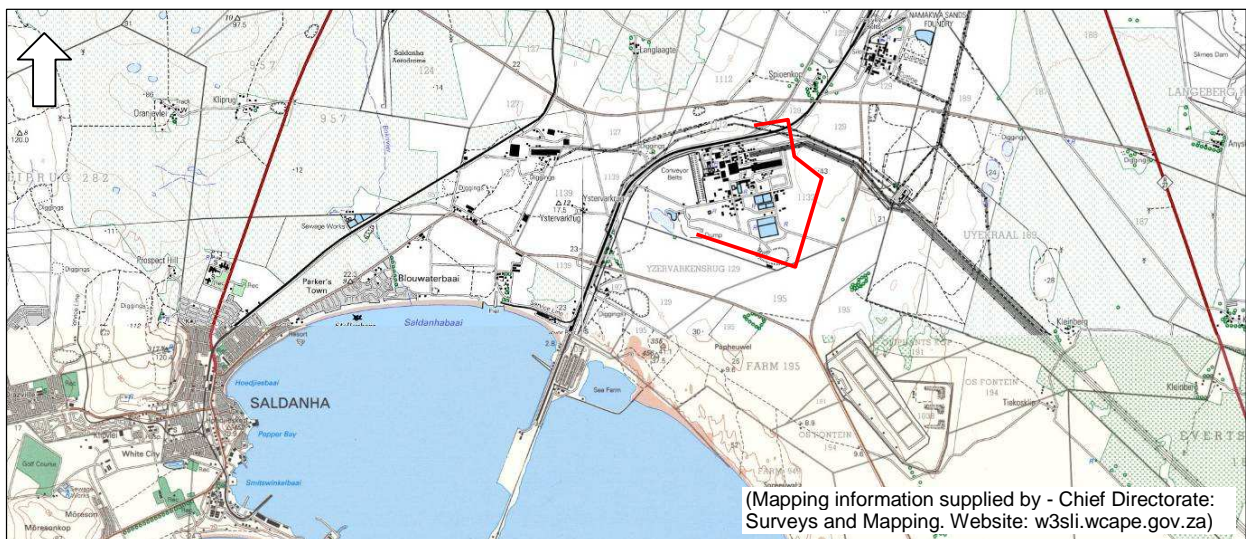


Figure 1: Map showing the location of the proposed development. The red line shows the turbine row and power line route with the turbines being located along the southern section of the line.

A Notification of Intent to Develop was submitted to Heritage Western Cape and they in turn requested a Heritage Impact Assessment that included palaeontological, archaeological and visual studies with the latter to focus on the scenic routes of the R27, R45 and R399. This report fulfils these requirements. The Palaeontological and Visual Specialist studies were conducted separately and are referred to and discussed in this report (Sections 6.1 and 6.5 respectively). They are submitted in full along with the present report as appendices and should be referred to if further details are required.

2. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources including palaeontological, prehistoric and historical material (including ruins) more than 100 years old (Section 35), human remains older than 60 years and located outside of a formal cemetery administered by a local authority (Section 36) and non-ruined structures older than 60 years (Section 34). Landscapes with cultural significance are also protected under the definition of the National Estate (Section 3 (3.2d)). Section 38 (2a) states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted. This report fulfils that requirement.

Since the project is subject to a Basic Environmental Impact Assessment, Heritage Western Cape (HWC) is required to provide comment on the proposed project in order to facilitate final decision making by the Department of Environmental Affairs (DEA).



Figure 2: Aerial photograph showing the layout of the proposed WEF. The yellow lines denote subsurface power lines and the orange an above ground power line. The six turbine positions are also shown.

3. METHODS

The site was visited on 4th October 2011. The entire turbine row was inspected on foot along with part of the overhead power line route. The remainder, falling within the security area of the Saldanha Steel facility, was not examined. The site and its features were recorded photographically and a walk-path was created using a hand-held GPS receiver set to the WGS84 datum.

3.1. Limitations

Part of the power line route was not examined but this is not considered to be problematic in terms of the outcome of the report since the impacts along that section would be negligible.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The site is flat, mostly with low vegetation although clumps of taller bushes are present (Figures 3 & 4). Calcrete is visible on the surface in many areas (Figure 5) and low heuweltjies (ancient termitaria) are present (Figure 6). A pipeline crosses the eastern part of the site from north to south (very close to Turbine 1) as evidenced by a few manhole covers. The ArcelorMittal: Saldanha Works lies immediately to the north.

5. HERITAGE CONTEXT

A review of locally known palaeontological resources is provided in the appended palaeontological assessment (Pether 2011) and is not repeated here. However, other aspects of heritage are discussed.

5.1. Pre-colonial archaeology

Along the coast in this part of South Africa several Middle Stone Age (MSA) shell middens have been identified (Avery *et al.* 2008; Berger & Parkington 1995; Stynder *et al.* 2001). These are very important but are linked to the coast and thus similar finds would not occur in the current study area. Inland fossil sites such as Elandsfontein do include stone artefacts and thus have an archaeological component to them. Bifacial points associated with a period known as “Still Bay” have been found at a few localities on the Vredenburg Peninsula (Bateman 1946; Smith 2006). Isolated artefacts dating to the Early (ESA) and Middle Stone Ages are regularly found throughout the Western Cape and are of little to no significance other than in that they document the range of occurrence of artefacts relating to each period.

Later Stone Age (LSA) material is more widely distributed and sites can be found in most areas. It is usually the case that sites are located in association with landscape features of one kind or another, be they silcrete outcrops where people have been quarrying stone for artefact manufacture or else rocky outcrops (of granite in the Vredenburg area) where shelter was sought. The latter is particularly evident at Kasteelberg 10 km northwest of Vredenburg and other smaller granite hills on the Vredenburg Peninsula (Sadr *et al.* 2003; Smith 2006; Smith *et al.* 1991). A recent survey that covered extensive tracts of land around the Kasteelberg Hill revealed rare isolated artefacts and very few meaningful concentrations of artefacts in open areas away from rocky outcrops (Webley *et al.* 2010). Other surveys just

west (Hart & Pether 2008) and east (Orton 2010) of the current study area yielded no surface archaeological material, while a survey at the northern end of Saldanha Bay located just two ephemeral LSA sites (Hart 2003). These areas mostly abut sandy shores but if one goes further south towards the vicinity of Club Mykonos one finds many shell middens associated with the rocky points there. A number have been excavated revealing the typical cultural finds associated with coastal shell middens (Hart 2001; Hart and Gribble 1998; Hart & Jerardino 1998). These finds included stone artefacts, ostrich eggshell beads and shell scrapers. The nearest of these rocky points with shell middens is some 5 km from the southern end of the proposed WEF area.

Another landscape feature that attracted prehistoric settlement is sand dunes. Some 20 km south of the study area Conard and Kandel (2006; Conard *et al.* 1999; Kandel & Conard 2005; Kandel *et al.* 2003) have described numerous occurrences of both MSA and LSA material located in deflating areas between the dunes. The same researchers have also worked in a large deflation at Anyskop, in the grounds of the Langebaanweg Fossil Park, where they found limited ESA and MSA artefacts as well as numerous LSA artefacts and burnt stones indicative of hearths (Dietl *et al.* 2005; Kandel & Conard n.d.). The deflation lies atop a low hill that is underlain by a calcrete ridge (D. Halkett, pers. comm. 2010).

Of course the pattern of sites associated with landscape features does not always hold true. In the town of Saldanha Bay, some 600 m from the coast and in a flat, open area, what might easily have been the most significant open shell midden on the Cape West Coast was found (Orton 2009). The area is flat today, but prior to modern development there might well have been something present that attracted people to the area, perhaps a small spring or even sand dunes. While almost the entire site was destroyed through construction activities, the tiny amount of material recovered showed that occupational spanning the last 6000 years occurred. Multiple burials were also present (Dewar 2010) but these were all clustered within a few centuries of 2000 years ago. Another significant open site found away from rocky outcrops is KFS5 (Fauvelle-Aymar *et al.* 2006). This site was identified in ploughed land and contained material possibly suggestive of the presence of a Khoekhoe kraal.

LSA burials can occur almost anywhere, particularly in sandy substrate. People would likely have been buried at or very close to where they died and numerous burials have been reported from the Western Cape coast and adjacent hinterland (Morris 1992).

5.2. Colonial period

Archaeological sites relating to the colonial period are generally rare with the most significant one from this region being Oudepost, a Dutch East India Company outpost on the Churchhaven Peninsula (Schrire *et al.* 1990). Historical records suggest that European settlers were living in the area from quite early on, but no other known historical archaeological sites are on record. A survey close to Saldanha Bay did find a scatter of late 19th or early 20th century glass and ceramics but these were not associated with anything (Orton 2007a).

5.3. Built environment

The Vredenburg area has many farm houses and outbuildings dating to the 19th and 20th centuries but Fransen (2004) documents relatively few as significant heritage resources. The main built structures in the study area are modern industrial facilities.



Figure 3: View to the north from a point between Turbines 3 and 4. The Steel Mill and its mine dump are visible in the centre.



Figure 4: View eastwards along the turbine row and taken from Turbine 6. The Steel Mill lies to the left, the mine dump in the centre and at far right the oil storage facility is visible.



Figure 5: Calcrete visible on the surface of the site.



Figure 6: A heuweltjie as evidenced by the different vegetation (yellow grass) present on it.

6. FINDINGS

6.1. Palaeontology

These findings are summarised as bullet points from the specialist report by John Pether (2011) which is included in the appendices to this report.

Local geology

- The bedrock geology consists of shales of the Malmesbury Group intruded by crystalline Cape Granite. Neither of these is of any palaeontological interest.
- The flat plain of the Saldanha embayment on which the facility would be constructed is underlain by calcareous aeolianites and calcretes of the Langebaan Formation (Fm). This formation underlies the entire study area (Figure 7).
- Nearby fossil dune ridges are evident along the coast and at Skurwerug where the oil storage tanks area.
- Coastal dunes of the Witzand Fm extend towards, but do not reach, the site from the coast to the south.
- The Langebaan Formation is underlain by the Uyekraal Shelly Sand Fm which is composed of shelly gravels (marine) and muddy sands (estuarine).
- The Uyekraal Shelly Sand Fm is fossiliferous and has no type section; it has only recorded from boreholes in the area. The deposits contain shark teeth and phosphatic casts (steinkerns) of molluscs.
- Vertebrate fossils have also been recovered from deep excavations at Saldanha Steel but some of these are certainly reworked from older deposits.
- Quaternary period raised beaches of the Varswater Fm occur along the coast. Older poorly understood raised beaches also occur further inland.

Expected palaeontology

- Fossils in aeolian settings are often revealed through wind erosion of sand. These include snails, tortoises, ostrich egg fragments and various other scattered bones. Fossils can be cemented into aeolianites and calcretes and can occur as a result of a hyena lair. Hyenas sometimes tunnel into softer deposits beneath exposed calcrete

shelves. Fossils can also occur in dissolution hollows in the calcrete. Interdune hollows, because they are a source of water, can also be rich sources of both plant and animal fossils.

- Raised beach deposits containing fossil shells may be present.
- Fossil bones associated with ESA or MSA artefacts may be encountered within and beneath the calcrete.

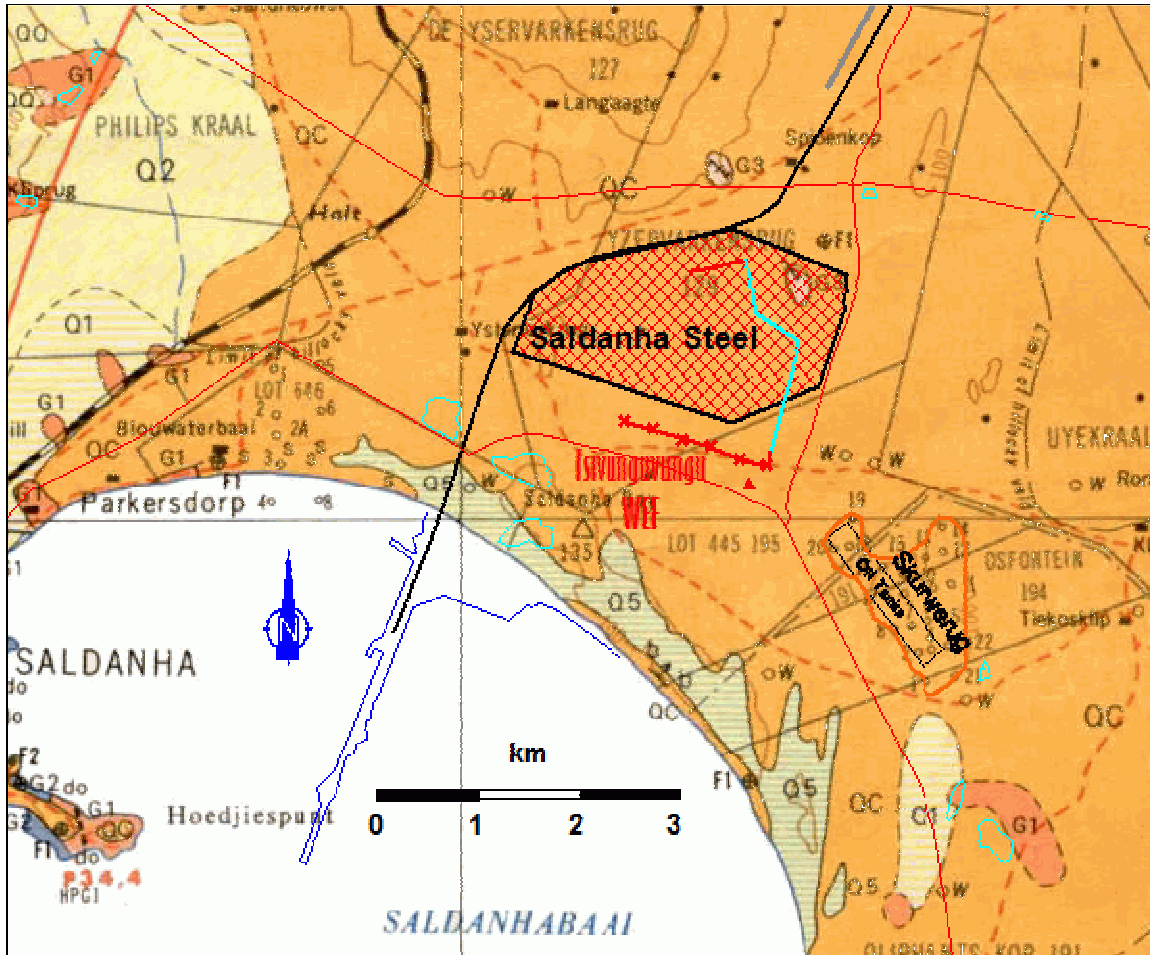


Figure 7: Local geology showing the study area to be on the Langebaan Formation (QC) (from Pether 2011:5, figure 3).

6.2. Archaeology

No archaeological sites were found. Only one item that may be archaeological was noted and this was a single *Scutellastra argenvillei* shell between Turbines 4 and 5. Archaeological material could be present beneath the calcrete. Such finds have been made at the Hoedjiespunt MSA shell midden (Berger and Parkington 1995; Stynder *et al.* 2001). Human burials are considered extremely unlikely given the hard substrate on the surface of the site.

6.3. Built environment

Although a ruined structure post-dating 1938 (from aerial photography) is located to the south of the proposed development site, no buildings or ruins are present within the project area.

6.4. Cultural landscapes

The site contained numerous piles of calcrete in varying configurations and spread over a wide area (Figures 8 to 10). The meaning of these piles is not known and examination of the 1938 aerial photography series is not helpful in this regard as the landscape appears largely undisturbed (Figures 11 and 12). Some of the piles are somewhat linear, but most are irregular in plan. The stones are rounded from weathering, well coated in lichen and algae and do not appear very recent. Their very random distribution suggests dumping rather than deliberate placement, but why they should have been dumped over such a wide area is a mystery. Besides the recent pipeline that runs from north to south through the eastern part of the study area, no evidence of excavation exists on the site. It must therefore be concluded that they came from elsewhere.



Figure 8: View across part of the study area showing numerous piles of calcrete rocks.



Figure 9: Calcrete piles.



Figure 10: Calcrete pile.



Figure 11: Aerial view of the study area with a 1938 aerial photograph superimposed. Agricultural land stands out prominently due to its higher reflectivity while darker land is unploughed.

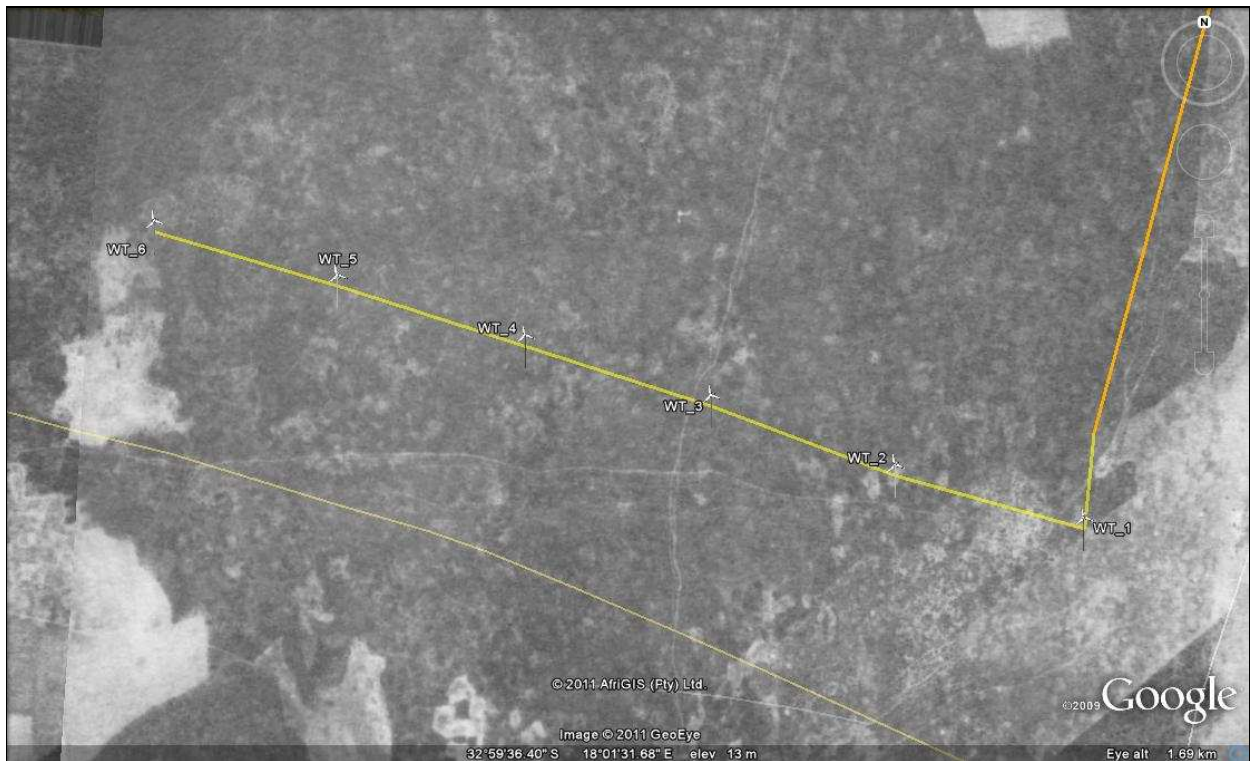


Figure 12: Close-up aerial view of the study area showing the undisturbed nature of much of the site in 1938.

6.5. Visual Issues

The Visual specialist study was conducted by Lourens du Plessis (2011) and its findings are summarised as bullet points below. The full report is appended to the present report. Note that in their response to the NID, Heritage Western Cape specifically requested assessment of the impacts to the R27, R45 and R399.

Potential visual exposure

- The relatively flat topography means that the WEF will have a high visual exposure (i.e. most or all turbines will be visible) over almost all of the area of visual exposure;
- Low mountains and hills to the north-west, north and south curtail visual exposure in those directions (Figure 13);
- Long stretches of the R27, R45, R399 and other secondary roads will experience high visual exposure;
- The northern part of Langebaan and much of Saldanha Bay would be exposed to the turbines, but Vredenburg will be protected;
- The vast majority of the West Coast National Park will be protected from exposure, but several small areas on north-facing hills will experience high visual exposure;
- The general visual environment of the site is already severely compromised through the presence of numerous industrial and mining facilities on the landscape (Figures 14 & 15); and
- Despite the above, the turbine structures are anticipated to be easily and comfortably visible, especially within a 5km radius of the WEF. This will potentially result in a visual impact.

Visual distance and observer proximity

- The majority of residential areas fall within the medium-long distance range (5 – 10 km), but Vredenburg is completely protected from view;
- Only the far eastern part of Saldanha Bay's residential area lies just inside the 5 km radius and thus the medium distance; and
- None of the R27, R45 and R399 cross the 5 km radius (all are within the medium-long distance range), but several smaller roads extend into the short distance range (0 – 2.5 km).

Viewer incidence / viewer perception

- Viewer incidence is highest along the local roads, many of which would be used by tourists visiting the area;
- Besides the towns, most of the remaining land within the view shed is vacant or agricultural land with few residents. However, Club Mykonos, a holiday resort, is located about 6 km from the facility and within view of it and many tourist accommodation facilities are to be found in the surrounding area; and
- Visitors to the West Coast National Park and Langebeen lagoon would be exposed to the WEF in some areas.

Visual absorption capacity (VAC)

- Natural vegetation is very low and topography is homogenous thus resulting in low VAC;
- The VAC is greater in urban and industrial areas where the presence of buildings and infrastructure help to absorb the visual impact; and
- Outside of the urban and industrial areas the VAC is essentially zero.

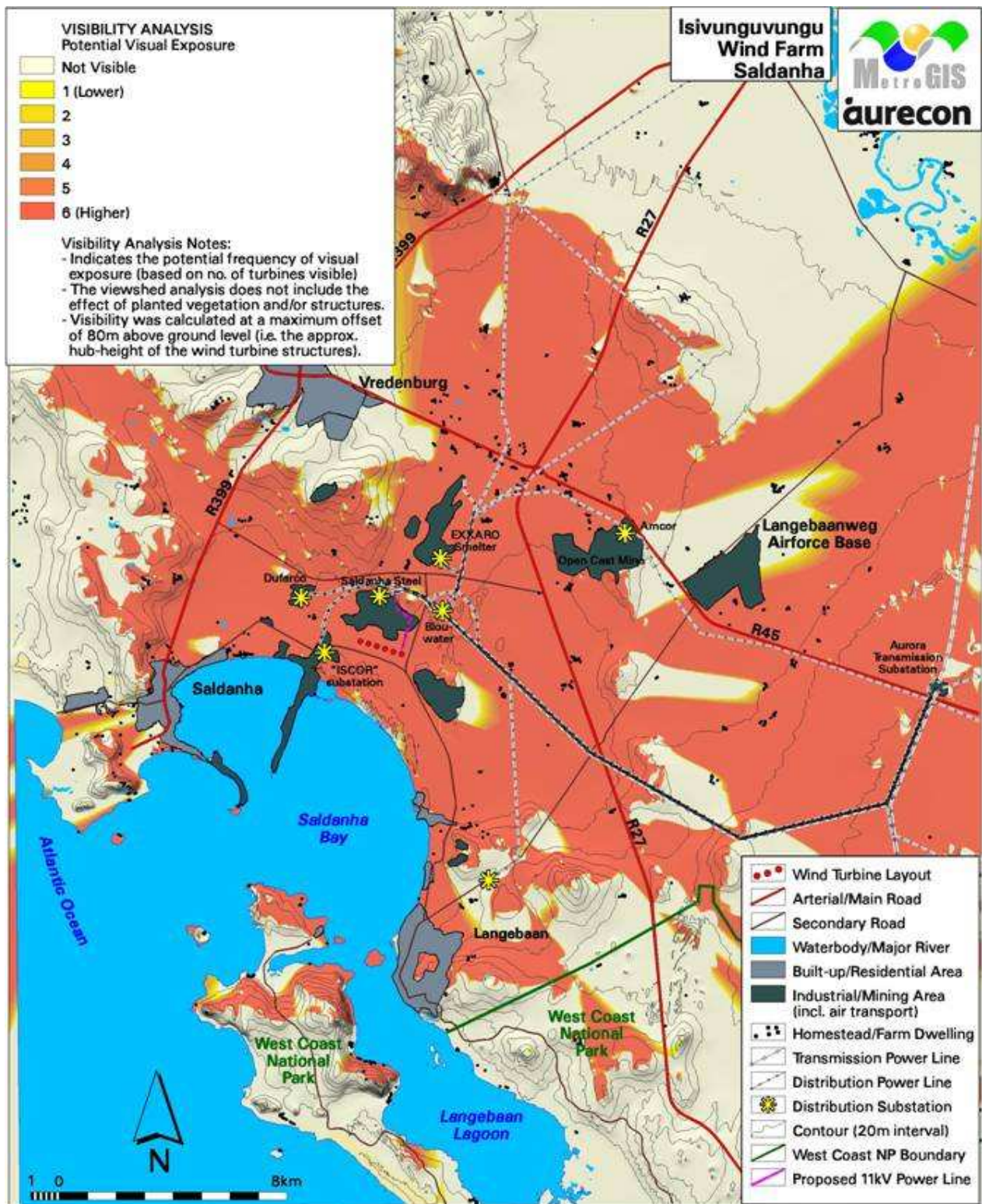


Figure 13: Potential visual exposure of the proposed WEF (from Du Plessis 2011:18, map 4).

Visual Impact Index

- In general, **moderate** impacts will be experienced within a 2.5 km radius of the facility. Visual receptors are primarily road users since the zone consists mostly of industrial

areas and only one farm settlement. These receptors may potentially experience **high** impacts. This zone is uninterrupted;

- **Low** impacts will be experienced between 2.5 and 5 km from the facility. This zone includes road users and a further four farm settlements who may experience potentially **moderate** impacts;
- Between 5 and 10 km the extent of visual impact is reduced due to the effects of topography. Impacts in this zone will be **very low** but roads through this zone will potentially experience a **low** impact; and
- Beyond 10 km the visual impacts are expected to be very low to negligible.

In addition to the above views of Du Plessis (2011), the present author finds the site to be a generally suitable location for the installation of the proposed WEF due to the industrial character of the immediate vicinity. No heritage features that might be considered visual receptors of significance are present in the vicinity and, as a result of all the industry (Figure 14), the area cannot be considered to have high scenic value. Various roads pass close to the site but, for the reasons stated above, the portions of these roads in close proximity to the site are not considered to be scenic (Figure 14). Furthermore, the three listed by HWC for assessment do not pass within 5 km of the site: the R27 reaches to within 5.8 km of the site, the R45 is 7.9 km away at its closest point and the R399 is some 6.5 km away.

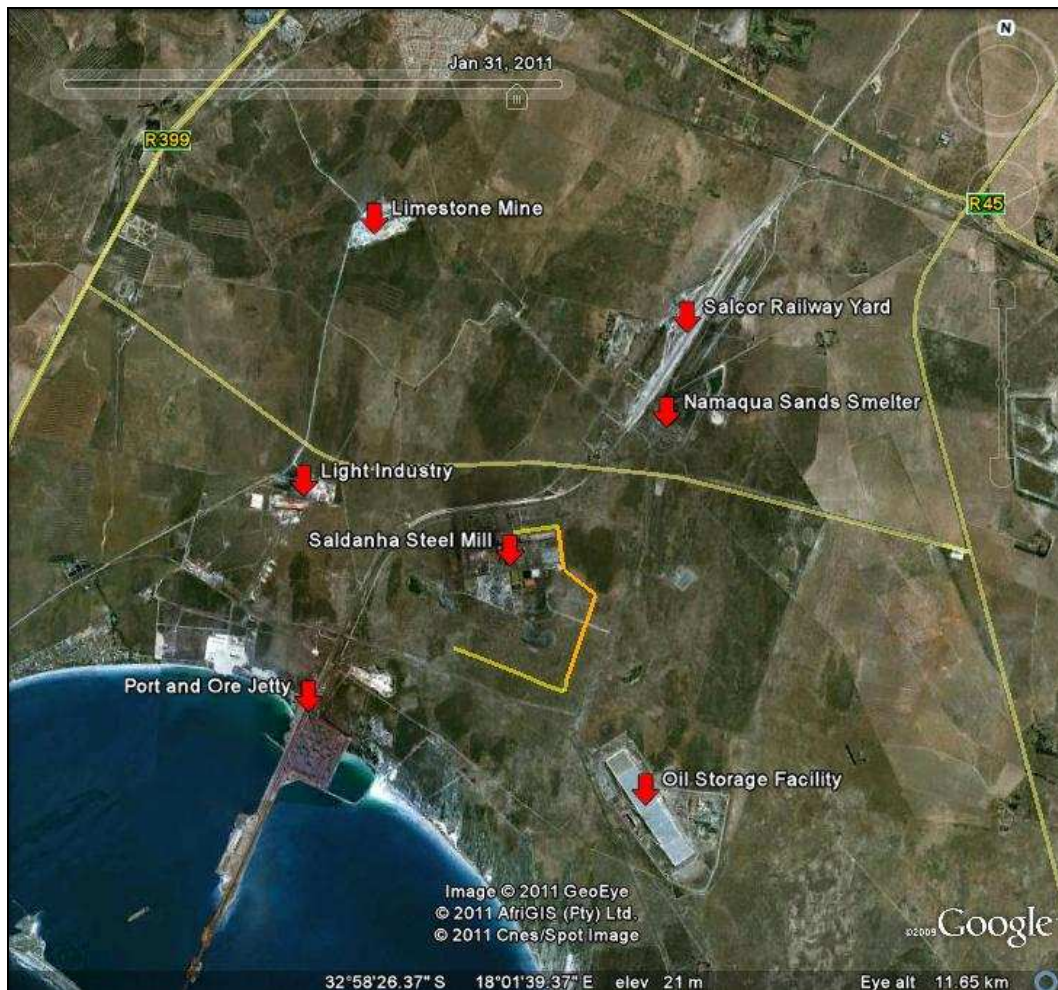


Figure 14: Aerial view of the general area showing the locations of the various industrial facilities in the area. The yellow and orange lines show the location of the proposed WEF and its associated power lines.



Figure 15: View towards the northwest and north showing the two roads that pass alongside the site. The turbines would be situated approximately behind the advertisement board. Saldanha Steel is visible on the right and other large warehouses in the Port area are visible in the background to the left.

7. ASSESSMENT OF IMPACTS

Impacts may occur to palaeontological heritage but, so long as an effort is made to locate and rescue fossils during excavations, these impacts are seen as positive. This is because they provide a window into the subsurface which is not otherwise available and enhances our understanding of palaeontology in the area. Without management fossils and important observations could be lost. Pether (2011) considers this loss irreversible. Even with management, there is a medium to high risk of losing palaeontological material and data. Fossil material from the general region has raised considerable academic interest both here and abroad with a number of academic publications highlighting this. The impacts can be summarised as in Table 1.

Table 1: Assessment of palaeontological impacts.

	Before mitigation	After mitigation
Extent	Regional - National	Regional - National
Intensity (magnitude)	Very High	Moderate
Duration	Permanent	Permanent
Probability	Probable	Probable
Significance	Medium-High	Medium
Status	Negative	Positive
Reversible	No	
Cumulative impacts	A number of deep excavations in this area have already been undertaken and fossils are lost each time. With proper management the impacts are positive, but with no management cumulative impacts are significant.	

Archaeological material was not observed on the study site and impacts are thus of very low significance. A small chance exists of finding buried archaeological material beneath the calcrete but this chance is not considered in the assessment of impacts contained in Table 2. They would otherwise be similar to the palaeontological impacts shown above. Cultural landscape issues are considered insignificant and thus rated the same as archaeology.

Table 1: Assessment of archaeological and cultural landscape impacts.

	Before mitigation	After mitigation
Extent	Site	n/a
Intensity (magnitude)	Negligible	n/a
Duration	Permanent	n/a
Probability	Improbable	n/a
Significance	Very low	n/a
Status	Negative	n/a
Reversible	No	
Cumulative impacts	No assessments in the immediate vicinity have yielded significant archaeology and none is present on this site. Cumulative impacts are thus insignificant.	

The small number of turbines planned for the proposed WEF and the nature of the surrounding industrial environment mean that the significance of the impact is reduced to some extent. Mitigation is not possible due to the immense height of the turbines. The impacts are summarised in Table 3.

Table 3: Assessment of visual impacts.

	Before mitigation	After mitigation
Extent	Local	n/a
Intensity (magnitude)	High	n/a
Duration	Long term	n/a
Probability	Probable	n/a
Significance	Moderate	n/a
Status	Negative	n/a
Reversible	Yes	
Cumulative impacts	Should other similar facilities be constructed in proximity then the cumulative impact would not be considered very significant here due to the generally industrial nature of the receiving environment.	

8. CONCLUSIONS

Overall, this assessment finds that the proposed WEF may be constructed. The region is generally suited to the proposed land use as it is within the heart of an area already housing much industry. Although visual impacts of high significance may be experienced at the local level, the industrial nature of the site serves to moderate them. Palaeontology is the primary type of heritage that is of concern but, with proper monitoring measures in place, the project may still proceed with low impacts.

9. RECOMMENDATIONS

It is recommended that the proposed WEF be allowed to proceed but the following should be taken into account:

- Palaeontological monitoring will be required during and after excavation of the foundations and cable trenches.
- Should fossil material be noted, suitable measures as determined by the practitioner on site must be taken. This would likely involve collection of fossils and description of

their context. A permit would need to be obtained but, due to the nature of the rescue work, this may need to be done retrospectively.

- If buried archaeological material is encountered, this should be reported to an archaeologist and/or palaeontologist for evaluation and, if required, planning of appropriate mitigatory measures.

10. REFERENCES

- Aurecon. 2011. Proposed ArcelorMittal: Saldanha Works Wind Energy Facility situated near Saldanha Bay, Western Cape: project notification and 30 day comment period. DEA Ref: 12/12/20/2339; NEAS Ref: DEA/EIA/0000383/2011. Background information document sent to I&APs 1st August 2011.
- Avery, G., Halkett, D., Orton, J., Steele, T. & Klein, R. 2008. The Ysterfontein 1 Middle Stone Age Rockshelter and the evolution of coastal foraging. *South African Archaeological Society Goodwin Series* 10: 66-89.
- Bateman, P. 1946. Archaeological notes on the Saldanha Bay district. *South African Archaeological Bulletin* 1: 41-45.
- Berger, L.R. & Parkington, J.E. 1995. A new hominid-bearing Pleistocene locality at Hoedjiespunt, South Africa. *American Journal of Physical Anthropology* 98: 601-609.
- Conard, N.J. & Kandel, A.W. 2006. The economics and settlement dynamics of the later Holocene inhabitants of near coastal environments in the West Coast National Park (South Africa). In Wotzka, H-P (ed) *Grundlegungen. Beiträge zur europäischen und afrikanischen Archäologie für Manfred K. H. Eggert*. Tübingen: Francke:329- 355.
- Conard, N. J., T. J. Prindiville and A. W. Kandel. 1999. The 1998 fieldwork on the Stone Age archaeology and palaeoecology of the Geelbek Dunes, West Coast National Park, South Africa. *Southern African Field Archaeology* 8:35-45.
- Dewar, G. 2010. Late Holocene burial cluster at Diaz Street Midden, Saldanha Bay, Western Cape, South Africa. *South African Archaeological Bulletin* 65: 26-34.
- Dietl, H., Kandel, A.W. & Conard, N.J. 2005. Middle Stone Age settlement and land use at the open-air sites of Geelbek and Anyskop, South Africa. *Journal of African Archaeology* 3: 233-244.
- Du Plessis, L. 2011. Proposed ISivunguvungu Wind Farm, Saldanha Western Cape Province Visual Impact Assessment as part of a Basic Assessment process. Report prepared for Isivunguvungu Wind Energy Converters (Pty) Ltd (I-WEC). La Montagne: MetroGIS.
- Fauvelle-Aymar, F.-X., Sadr, K., Bon, F. & Gronenborn, D. 2006. The visibility and invisibility of herders' kraals in southern Africa, with reference to a possible early contact period Khoekhoe kraal at KFS5, Western Cape. *Journal of African Archaeology* 4:253-271.
- Fransen, H. 2004. *The old buildings of the Cape*. Johannesburg & Cape Town: Jonathan Ball.

- Hart, T. 2001. Phase 2 mitigatory archaeological excavations at Leentjiesklip 3 Club Mykonos, Langebaan. Unpublished report prepared for Club Mykonos, Langebaan. University of Cape Town, Archaeology Contracts Office.
- Hart, T. 2003. Heritage impact assessment of a portion of the farm Pienaars Poort owned by National Port Authority (NPA), Saldanha Bay. Unpublished report prepared for Philip Rosenthal, Environmental Engineer. Archaeology Contracts Office, University of Cape Town.
- Hart, T.J. G and Gribble J. 1998. Phase 2 archaeological sampling of Late Stone Age middens, Leentjiesklip 2, Langebaan. Unpublished report prepared for Langebaan Waterfront Pty Ltd. ACO. UCT.
- Hart, T.J.G. & Jerardino, A.M. 1998. Phase 2 archaeological sampling of Late Stone Age archaeological sites at Paradise Beach, Club Mykonos. Unpublished report prepared for CML Developers. ACO. UCT.
- Hart, T. & Pether, J. 2008. Phase 2 expansion of the Sishen - Saldanha Iron Ore Export Corridor, Saldanha Bay, Western Cape: heritage impact assessment (part 1), palaeontological impact assessment (part 2). Unpublished report prepared for Transnet. University of Cape Town: Archaeology Contracts Office.
- Kandel, A.W. & Conard, N.J. n.d. The archaeology of the Anyskop blowout of the West Coast Fossil Park. Unpublished report sourced accessed online at: <http://www.fossilpark.org.za/pdfs/academic-info-anyskop.pdf>. Accessed 01 November 2010.
- Kandel, A.W., Felix-Henningsen, P. & Conard, N.J. 2003. An overview of the spatial archaeology of the Geelbek Dunes, Western Cape, South Africa In: G. Füleký (Ed.) Papers of the 1st International Conference on Archaeology and Soils. BAR International S1163, pp. 37-44.
- Kandel, A.W. & Conard, N.J. 2005. Production sequences of ostrich eggshell beads and settlement dynamics in the Geelbek Dunes of the Western Cape, South Africa. *Journal of Archaeological Science* 32:1711-1721.
- Orton, J. 2007a. Archaeological and palaeontological assessment of two portions of a road alignment near Langebaan and Saldanha Bay, Vredenburg and Hopefield Magisterial Districts. Unpublished report prepared for The Environmental Partnership. University of Cape Town: Archaeology Contracts Office.
- Orton, J. 2009. Rescue excavation at Diaz Street Midden, Saldanha Bay, South Africa. *Azania: Archaeological Research in Africa* 44: 107-120.
- Orton, J. 2011. Heritage impact assessment for the proposed Uyekraal Wind Energy Facility, Hopefield Magisterial District, Western Cape. Unpublished report prepared for Savannah Environmental. University of Cape Town, Archaeology Contracts Office.
- Pether, J. 2011. Palaeontological Impact assessment (Desktop Study) proposed Isivunguvungu Wind Farm Saldanha Isivunguvungu Wind Energy Converters (Pty) Ltd

Wind Energy Facility, Saldanha Bay, Western Cape. Report prepared for Aurecon South Africa (Pty) Ltd. Kommetjie: John Pether.

Sadr, K., Smith, A., Plug, I., Orton, J. & Mutti, B. 2003. Herders and foragers on Kasteelberg: interim report on excavations 1999-2002. *South African Archaeological Bulletin* 58: 27 – 32.

Schrire, C., Deetz, J., Lubinsky, D. & Poggenpoel, C. 1990. The chronology of OPudepost 1, Cape, as inferred from an analysis of clay pipes. *Journal of Archaeological Science* 17: 269-300.

Smith, A.B. 2006. Excavations at Kasteelberg and the origins of the Khoekhoen in the Western Cape, South Africa. Oxford: BAR International Series 1537.

Smith, A.B., Sadr, K., Gribble, J. & Yates, R. 1991. Excavations in the South-Western Cape, South Africa, and the archaeological identity of prehistoric hunter-gatherers within the last 2000 years. *South African Archaeological Bulletin* 46: 71-91.

Stynder, D.D., Moggi-Cecchi, J., Berger, L.R. & Parkington, J.E. Human mandibular incisors from the late Middle Pleistocene locality of Hoedjiespunt 1, South Africa. *Journal of Human Evolution* 41: 369-383.

Webley, L., Orton, J. & Hart, T. 2010 Heritage impact assessment: proposed West Coast One Wind Energy Facility, Vredenburg District, Western Cape. Unpublished report prepared for Savannah Environmental. St James: ACO Associates.

**APPENDICES – PALAEOLOGY AND VISUAL SPECIALIST
REPORTS**

PALAEONTOLOGY SPECIALIST REPORT

VISUAL SPECIALIST REPORT