

# HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED PROJECT BLUE WIND ENERGY FACILITY, KLEINZEE, NAMAKWA MAGISTERIAL DISTRICT, NORTHERN CAPE

(Assessment conducted under Section 38 (18) of the  
National Heritage Resources Act (No. 25 of 1999) as part of an EIA)

Prepared for

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## EXECUTIVE SUMMARY

ACO Associates cc was appointed by Savannah Environmental on behalf of WWK Development (Pty) Ltd to undertake a Heritage Impact Assessment for the proposed Project Blue Wind and Solar Energy Facilities (WEF & SEF) to be located just outside Kleinzee on the Namaqualand coast, Northern Cape. Eleven portions of land will be affected and a generating capacity of up to 215 MW is expected. The WEF will be developed in three phases with the SEF developed as a fourth phase.

The site is a typical Namaqualand landscape with rolling topography, low vegetation, occasional small pans, and eroding/deflating areas. Two low rocky hills are included along the western margin of the study area and a large, low hill with occasional rock outcrops is included in the northern part. Red sand dunes occur in places in the eastern part of the study area and a few farm and other roads cross the area including that linking Kleinzee and Port Nolloth.

The archaeology of the coastal strip is generally quite well understood as a result of the extensive survey and mitigation work carried out there. High quality data have been extracted from these sites but further inland very little work has been carried out. The scoping study for this project showed that significant archaeological material was present in at least one part of the project study area. Historical buildings are generally rare but do occur occasionally, most notably at Grootmis, just southwest of the study area.

The survey revealed a large number of archaeological sites including deflated ESA and MSA artefact scatters (one with bone), LSA shell scatters and *in situ* shell middens, formal graveyards, and old structures. In some areas vast quantities of archaeological material was found to occur and such areas can be considered archaeological cultural landscapes. The local landscape itself also has value particularly where it forms the context for the settlement of Grootmis. Particularly significant archaeological finds were an ESA/MSA scatter with fossil bones preserved and a massive area of small shell scatters and middens in close proximity to the Buffels River near the point where fresh water was permanently available during historic (and presumably also pre-colonial) times. The ESA material included predominantly flakes, cores and hand-axes but one cleaver was also found. MSA artefacts included flakes and cores and one bifacial point that may well be from the Still Bay period. LSA material included decorated pottery, retouched stone scrapers and *in situ* occurrences with generally higher research value.

Impacts to archaeological resources can generally be easily mitigated, although in some cases this would be time-consuming due to the extensive numbers of sites or occurrences to be impacted. The vast majority of sites to be impacted lie within the south-western turbine cluster of Phase 3 of the proposed development. Here one turbine is best omitted due to the high value of the site that it will impact. However, owing to the impacts to the landscape surrounding the historical settlement of Grootmis, it is considered best that the entire south-western turbine cluster be omitted from the project. The rest of the layout will have far more limited and easily manageable impacts that would be easily mitigated.

In general, high to medium significance impacts for archaeology will be reduced to low through mitigation but the landscape impacts around Grootmis cannot be mitigated and the significance of those impacts is considered to be high. It is concluded that, with the exception of the south-western turbine cluster, the project should be allowed to proceed.

The following recommendations are made:

- The south-western cluster of turbines (part of Phase 3) should be omitted entirely;
- Should the above recommendation not be enforced, then turbine M04-P3 is best omitted due to the high significance of site DKG2012/001 and the large amount of mitigation that is likely to be required there. If mitigation is carried out within the disturbance footprint then strict enforcement of no-go areas around the construction footprint is required during construction;

- The access road leading up the hill between the graveyards is best rerouted to reduce mitigation requirements, although the mitigation can be carried out if absolutely necessary;
- Prior to construction a final walk-down survey must be carried out in order to examine any areas not yet checked (including the SEF which was not thoroughly examined) and any turbine positions that have been changed or added subsequent to the Phase 1 survey;
- Archaeological mitigation as required must then be carried out, and
- If any unmarked pre-colonial burials are intersected during the construction phase of the project then these should be reported to SAHRA or an archaeologist so that appropriate action can be taken.

## Contents

<b>1. INTRODUCTION .....</b>	<b>5</b>
<b>2. HERITAGE LEGISLATION.....</b>	<b>8</b>
<b>3. METHODS.....</b>	<b>8</b>
3.1. Literature survey.....	8
3.2. Field survey.....	8
3.3. Impact assessment.....	8
3.4. Limitations.....	8
<b>4. DESCRIPTION OF THE AFFECTED ENVIRONMENT .....</b>	<b>9</b>
<b>5. HERITAGE CONTEXT.....</b>	<b>9</b>
<b>6. FINDINGS.....</b>	<b>13</b>
6.1. Archaeology.....	13
6.1.1. ESA/MSA artefact scatters.....	13
6.1.2. LSA artefact scatters.....	16
6.1.3. LSA shell middens and scatters.....	18
6.2. Built environment.....	20
6.2.1. Old workers' compound.....	20
6.2.2. Grootmis.....	21
6.2.3. Outlying farm structures.....	22
6.3. History.....	23
6.4. Graves and graveyards.....	24
6.4.1. Isolated graves.....	24
6.4.2. Graveyards.....	25
6.5. Sense of place, cultural landscapes and scenic routes.....	27
<b>7. DISCUSSION OF IMPACTS BY DEVELOPMENT PHASE.....</b>	<b>29</b>
<b>8. IMPACT ASSESSMENT.....</b>	<b>29</b>
<b>9. CONCLUSIONS.....</b>	<b>32</b>
<b>10. RECOMMENDATIONS.....</b>	<b>33</b>
<b>11. REFERENCES.....</b>	<b>33</b>
<b>APPENDIX 1: HERITAGE SITES.....</b>	<b>36</b>

## 1. INTRODUCTION

ACO Associates cc was appointed by Savannah Environmental on behalf of WWK Development (Pty) Ltd to undertake a Heritage Impact Assessment for the proposed Project Blue Wind and Solar Energy Facilities (WEF & SEF) to be located just outside Kleinzee and inland of the main diamond mining area on the Namaqualand coast, Northern Cape (Figures 1 & 2). The vast majority of the site lies within grazing or otherwise vacant land outside of the diamond mines and includes the following farm portions:

- Roode Vlei 189 Portion 3 (SEF);
- Predikant Vlei 190 portion 01 (WEF);
- Predikant Vlei 190 portion 03 (WEF & SEF);
- Predikant Vlei 190 portion 04 (WEF);
- Dreyers pan 192 remaining portion (WEF);
- Kleinzee 193 remaining portion (WEF);
- Dikgat 195 Portion 02 (WEF);
- Dikgat 195 Portion 04 (WEF & SEF);
- Dikgat 195 Portion 05 (WEF);
- Dikgat 195 Portion 07 (WEF); and
- Dikgat 195 Portion 09 (WEF).

The facility will be developed in four phases (Phase 1: 20 MW WEF, Phase 2: 56 MW WEF, Phase 3: 74 MW WEF, Phases 4 and 5: 65 MW SEF) and would have a maximum generating capacity of 215 MW (WEF: 150 MW & SEF: 65 MW). The facility would comprise of the following aspects:

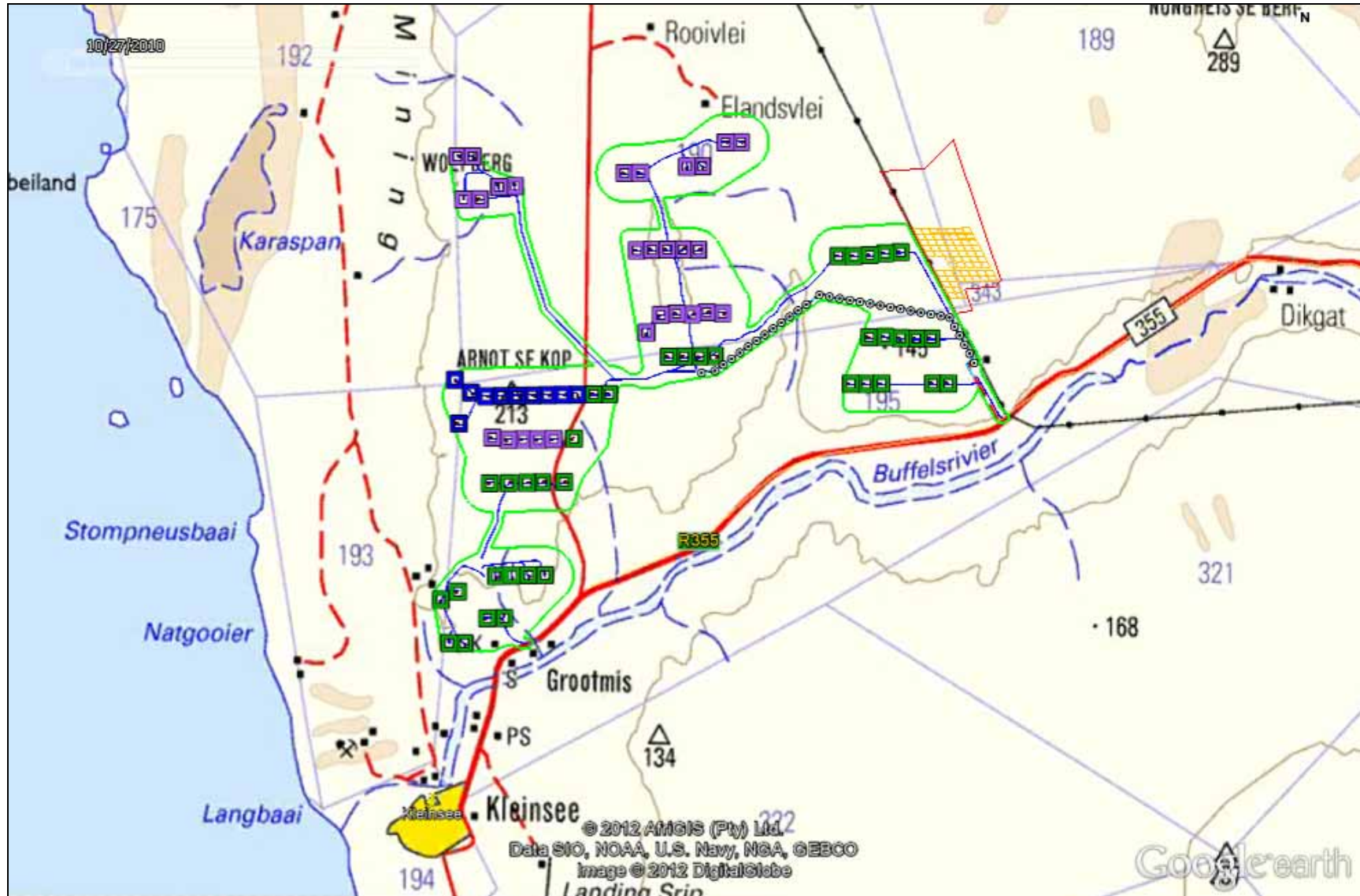
### Wind Energy Facility:

- Wind turbines and associated foundations and lay down areas;
- Cabling between the turbines, to be lain underground along access roads where practical, which will connect to a centralised point (i.e. an on-site substation);
- A 66 or up to 220 kV overhead power line to connect the facility to the existing Gromis substation;
- Internal roads (approximately 6 m in width) linking the wind turbines and other infrastructure on the site. Existing roads will be used as far as possible;
- A substation located within the facility (a high-voltage (HV) yard footprint of approximately 80 m x 90 m is proposed); and
- A workshop area for maintenance and storage.

### Solar Energy Facility:

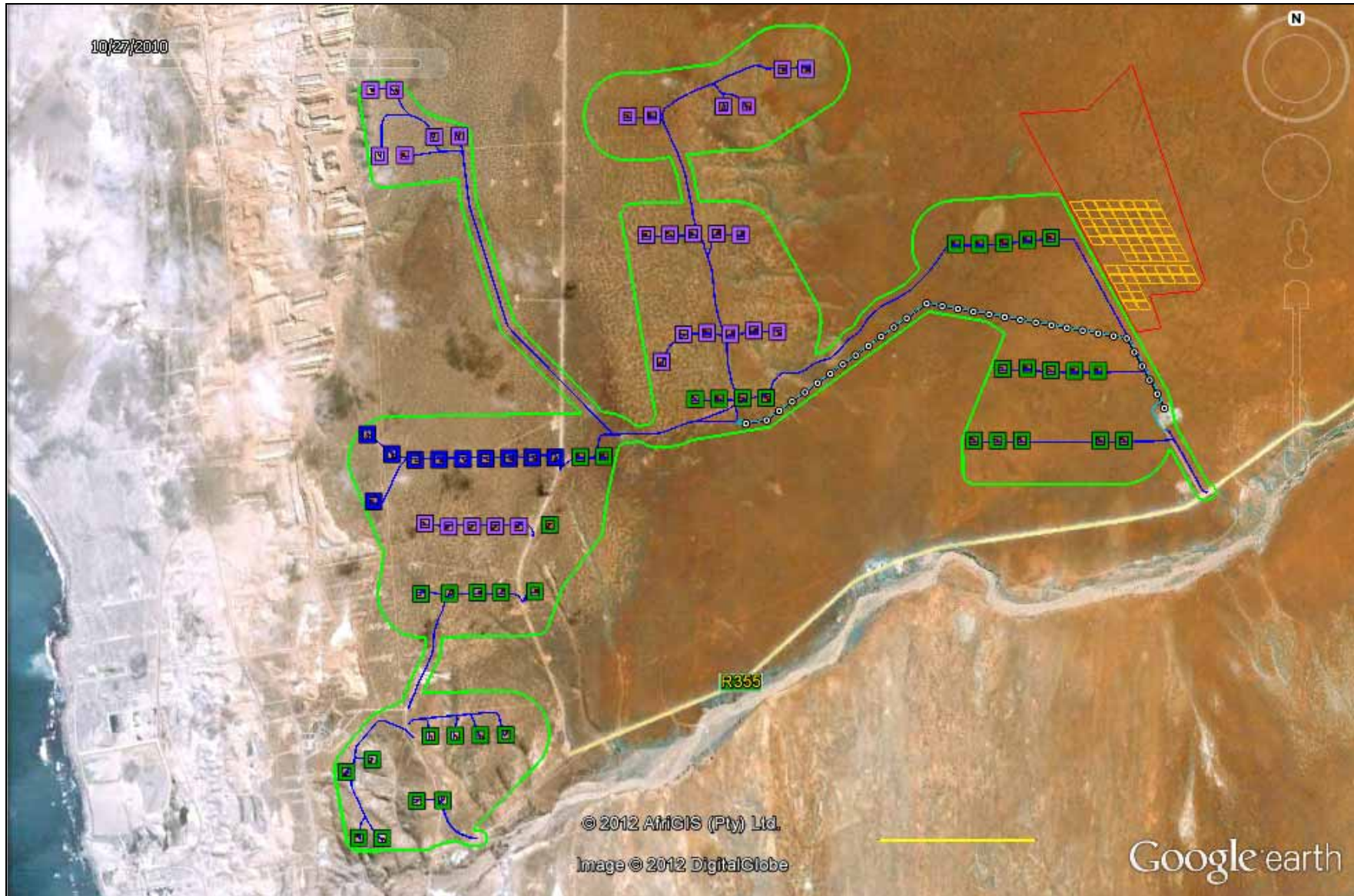
- Photo-voltaic panels and their foundations;
- Cabling between the panels to be lain underground where practical;
- A 66 or up to 220 kV overhead power line to connect the facility to the existing Gromis substation;
- Internal roads (approximately 6 m in width) linking the solar panels and other infrastructure on the site. Existing roads will be used as far as possible;
- A substation located within the facility for phase 4 (a high-voltage (HV) yard footprint of approximately 80 m x 90 m is proposed);
- A substation located within the facility for phase 5 (a high-voltage (HV) yard footprint of approximately 80 m x 90 m is proposed); if phase 4 and 5 can be built together then one substation might be enough; and
- A workshop area for maintenance and storage.

It is assumed that a number of these components would be shared by the wind and solar components as far as is possible. No alternative sites have been proposed for the development.



**Figure 1:** Map showing the location and layout of the proposed WEF relative to Kleinsee and Grootmis in the southwest. Phases 1 (blue squares), 2 (purple) and 3 (green) are indicated. The SEF is located on the far east with the yellow shapes indicating the layout area.





**Figure 2:** Aerial photograph showing the layout of the proposed WTF. Phases 1 (blue squares), 2 (purple) and 3 (green) are indicated. The SEF (Phase 4) is located in the east with the yellow shapes indicating the layout area. The yellow bar for scale at lower right is 2 km long.

## **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 being conducted as part of an Environmental Impact Assessment, the relevant heritage authorities are required to provide comment on the proposed development in order to facilitate final decision making by the Department of Environmental Affairs (DEA). The Northern Cape provincial authority, Ngwao Boswa Kapa Bokone, comments on built environment and cultural landscape issues, while the national authority, the South African Heritage Resources Agency, comments on archaeological issues.

## **3. METHODS**

### **3.1. Literature survey**

A survey of available literature was carried out to assess the general heritage context into which the WEF development would be set. This literature included published material and an extensive body of unpublished commercial reports.

### **3.2. Field survey**

The site was subjected to a foot survey on 13<sup>th</sup> to 16<sup>th</sup> May 2012. During the survey the positions of finds were recorded on a hand-held GPS receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape settings of the proposed development. The survey aimed to cover all areas that would be directly impacted by the proposed development but also examined a few wider areas where some shifting of infrastructure might be anticipated.

Note that, although the survey focused on the layout provided, all heritage found in the general study area was recorded.

### **3.3. Impact assessment**

The impact assessment is undertaken via a standardised rating table provided by Savannah Environmental. The various criteria are given numeric values such that the overall significance can be calculated by the following formula:  $\text{Significance} = (\text{Extent} + \text{Duration} + \text{Magnitude}) \times \text{Probability}$ . Low significance has a total of less than 30 points, while high significance has greater than 60 points with medium in between.

In assessing sites that would be directly impacted, it was decided to list all sites falling within 20 m of the proposed infrastructure as marked on the Google Earth file provided by the client. The reasons for employing a 20 m buffer are that there are inherent inaccuracies in both the GPS system and in the Google Earth program. The final assessment of what mitigation will actually be needed will have to be undertaken during a walk-down after the actual footprints have been surveyed and flagged on the ground.

### **3.4. Limitations**



The two turbines in the south-westernmost corner of the project area could not be surveyed during the field trip due to access restriction inside the mine area. The kind of material that is likely present there can be anticipated from nearby areas. The SEF component of the project was introduced at a late stage and, due to time constraints on site, survey coverage there was limited to the obvious landscape features visible.

#### **4. DESCRIPTION OF THE AFFECTED ENVIRONMENT**

The site ranges from flat, open shrubland to steeper rocky outcrops and is generally characterised by the rolling hills that are so typical of Namaqualand (Figures 3 - 5). However, several areas of distinctive relief are present. The south-western part, just north of the Buffels River and hamlet of Grootmis, is characterised by a small plateau of silcrete that has been deeply incised and eroded to form a series of interlinking valleys (Figure 6). In the central western part a prominent hill called Arnot se Kop is present (Figure 4) with the exposed gneiss at the edge of the palaeo-marine terrace dropping relatively steeply to its west, right at the edge of the WEF. The tallest hill in the study area is located at its north-western corner and is known as Wolfberg. It is sloping to its east but to the west it has rocky outcrops leading down to the coastal plain (Figure 7).

The ground is generally covered by low vegetation but open, deflated areas with exposed hard sediments occur in places. Substrates vary from rock, through silcrete and calcretised "heuweltjies" (termite mounds) to loose red sand and dunes (Figures 7 – 10). In the northwest occasional pans occur (Figure 11), while a few power lines and informal roads cross the study area (Figure 12).

#### **5. HERITAGE CONTEXT**

Palaeontological research in Namaqualand is sparse. However, a recent review of the palaeontological record as represented in the De Beers Namaqualand Mines by Pether (2008) provides details of many different paleontological features of scientific value. These are not reviewed here, suffice to say that they vary in depth with some important features being close to the surface, particularly close to the coast where raised beach sequences are frequently intersected. The inland areas, particularly where the gneiss bedrock is exposed or very near the surface will have very few, if any, fossils present.

Extensive archaeological surveys in this vicinity have been carried out between 1991 and 2007 with large numbers of archaeological sites being recorded and excavated (e.g. Halkett 2003; Halkett & Dewar 2007; Orton & Halkett 2005, 2006, 2007). A number of excavated sites from the immediate vicinity of the study area have yielded high quality data and have already formed the basis of a major research project (Dewar 2008) with a second currently underway (Orton, in prep.). In addition to Dewar (2008), several publications discussing the archaeology of the region have also appeared (e.g. Dewar *et al.* 2006; Dewar & Jerardino 2007; Orton 2007b, 2008a, 2008b, 2012; Orton *et al.* 2005). These show that people were living along the coastline throughout the latter half of the Holocene, and possibly earlier, subsisting off shellfish, seals and land animals. They left extensive collections of stone artefacts, pottery, ostrich eggshell beads and flasks but generally few other organic artefacts. Most sites are closer to the coast are shell middens and scatters containing the kinds of material described above, while many of those further inland are either small LSA scatters with no or minimal shell or background artefact scatters which tend to occur in any areas where the loose surface sands have been blown away.



**Figure 3:** View south towards the Buffels River valley from roughly the centre of the study area.



**Figure 4:** View eastwards from the far western part of the study area towards Arnot se Kop in the central western part of the study area.



**Figure 5:** View eastwards from the summit of Wolfberg showing the typical gently rolling topography so typical of the coastal plain of Namaqualand. The mountains of the southern Richtersveld are visible in the far left.



**Figure 6:** View towards the north of one of the series of valleys formed by erosion through the outcrop of silcrete in the south-western part of the study area. The silcrete edge is clearly visible in the foreground.





**Figure 7:** View north across Wolfberg showing its rocky nature.



**Figure 8:** View southwest across a quartz outcrop in the north of the study area.



**Figure 9:** Silcrete outcrop close to Grootmis.



**Figure 10:** Loose red sand in the eastern part of the study area.



**Figure 11:** Small pan in the north-western part of the study area.



**Figure 12:** Power line crossing the southern part of the study area towards Kleinzee.

A significant, but somewhat poor quality occurrence was found at AK2006/001G on the south-western edge of the study area (Orton 2008a; Figure 11). The site was poor in that only stone artefacts were present but nonetheless important, since it is the only known occurrence of late Pleistocene (c. 18 000 – 10 000 years ago) LSA material in Namaqualand. Unmarked burials are common in coastal Namaqualand but all thus far have been uncovered in the coastal mines. However, with its good sand cover, burials could be present almost anywhere on the Namaqualand coastal plain. Only one has ever been found in an archaeological excavation, just north of Kleinsee, in a site lying at the immediate south-western edge of the currently proposed WEF (AK2006/006; Orton 2007a), although one other has been excavated *in situ* (Kleinsee Museum n.d.).

Historical material is sparsely scattered in the general vicinity. Occasional farm houses are present on the landscape and the tiny village of Grootmis to the south of the study area has historical buildings in it. Contact period archaeology has been recorded at Hondeklipbaai where coastal shell middens contained historical material likely pertaining to indigenous people being used to load copper ore onto ships in the bay in the 19<sup>th</sup> century (Orton 2009).

## **6. FINDINGS**

The findings of the survey include heritage in varying forms, although the vast majority of finds are archaeological in nature. The various categories are dealt with in turn in the sections that follow.

### **6.1. Archaeology**

Archaeological sites took several forms which will be addressed in turn. While, the appendix provides a comprehensive listing of all the sites documented during the survey, this section seeks only to describe each type, show examples and highlight particularly important sites.

#### **6.1.1. ESA/MSA artefact scatters**

Such scatters occur widely throughout Namaqualand and are generally associated either with deflated areas where ferricrete or calcrete is exposed or with silcrete outcrops which are frequently quarried (quarries will be considered separately though). The present study area is no different (Figures 13 & 14). The artefacts are best considered as 'background scatters' rather than archaeological sites since their distribution is probably more strongly conditioned by the natural forces of erosion and deflation than by human (or hominin) agency.

In this area, these artefact scatters are made predominantly of quartz and silcrete but quartzite features fairly commonly as well (Figures 15 & 16). Although cryptocrystalline silica (CCS) is sometimes present, other materials are absent. Some scatters bear diagnostic artefacts that betray their ESA or MSA age. It is quite likely that many scatters are in fact of mixed age. Diagnostic artefacts include hand-axes (ESA) and flakes with faceted platforms (MSA).



**Figure 13:** The deflation at DKG2012/061 with ferruginous substrate exposed.



**Figure 14:** DKG2012/004 with quartz and silcrete artefacts on a ferruginous surface.



**Figure 15:** Quartz, quartzite and silcrete artefacts from DKG2012/039.



**Figure 16:** Quartz, quartzite and silcrete artefacts from PV2012/006.

Three artefact scatters are worth highlighting for various reasons. PV2012/004 is a small scatter in a deflated and eroded area. It has many large quartz artefacts but also others in quartz and quartzite. The most interesting artefact is a bifacial point in quartzite and made on a cortical flake from a cobble. It is broken and may also be unfinished but nonetheless may well have been of the sort commonly made during a period referred to as Still Bay and dated to about 74 000 and 69 000 years ago (Figure 17; Jacobs *et al.* 2008). Such artefacts have been found near Koingnaas (Halkett & Orton 2005) and Vredendal (Mackay *et al.* 2010).





**Figure 17:** Opposite edges and surfaces of the broken bifacial point from PV2012/004.

The second significant artefact scatter is DKG2012/053. This site had a selection of hand-axes that varied in shape, size and materials. Hand-axes are relatively commonly encountered throughout the Sandveld but very seldom in concentrations. Undoubtedly the most significant archaeological site found during the survey was DKG2012/001. This site also contained both ESA and MSA artefacts, although there were a greater number of diagnostic artefacts belonging to the ESA, mainly in the form of hand-axes. Other diagnostic artefacts included MSA flakes and radial cores. The reason for the great significance attributed to this site is the presence of fossil animal bones. Sadly these were in very poor condition and few could be positively identified. Among the identifiable ones were two equid (horse) teeth that belong either to the Cape Horse, *Equus capensis* or to *Hipparion* sp., both of which are long extinct (R. Klein, pers. comm. 2012). Figures 18 to 20 show these teeth with the first including what appears to be other teeth from the same jaw. Tortoise bones were also readily identifiable on the site and fragments of fossilised ostrich eggshell were also present. A single marine shell (*S. argenvillei*) was also found on the site but could have been a later drop. It is not always possible to tell if shell is fossilised since the telling features can develop over only a few thousand years.



**Figure 18:** The row of horse teeth from DKG2012/001.  
**Inset:** close-up of the occlusal surface of the large tooth.



**Figure 19:** The second horse tooth from DKG2012/001.



**Figure 20:** View eastwards towards the area containing DKG2012/001. The site lies in the lighter coloured, deflating area on the hill in the middle ground.

#### 6.1.2. LSA artefact scatters

Although ESA and MSA background scatters predominate, a few deflated scatters in similar contexts appeared to relate to the LSA. These are generally of quartz with crystal quartz being strongly evident in some and the artefacts are substantially smaller than those from the EA and MSA. Other perhaps more obviously LSA scatters occur on sandy hills (e.g. PV2012/042; Figure 21). A particular type of LSA site that occurs repeatedly in one area needs highlighting. These are small, usually quite ephemeral sites located in deflation hollows in the tops of sand dunes (Figures 22 & 23). A number of them occur on Predikant Vlei but more are present as a swarm in the PV layout area on Roode Vlei. All of them have only stone artefacts in them and vary from containing just four or five quartz artefacts to up to about 20 artefacts, sometimes including hammer stones and grind stones (Figure 24 & 25). Several similar sites have already been sampled from Mannels Vlei to the south of the Buffels River where they also contained ostrich eggshell fragments and beads as well as some pottery (Orton 2007a). All the beads were large and taken with the pottery suggest late occupation, perhaps within the last 1200 years.



**Figure 21:** PV2012/042





**Figure 22:** View of RV2012/004 from a distance showing the distinct dune in which the deflation was located.



**Figure 23:** View of the inside of the deflation at RV2012/010. This one was cut by a farm fence and road.



**Figure 24:** Artefacts from RV2012/006 with a hammer stone/core at lower left.



**Figure 25:** Artefacts from RV2012/010 with A well used upper grindstone at lower left.

Isolated Stone Age artefacts were regularly encountered throughout the study area but, due to their lack of context, have no value beyond a note of their presence. One such artefact worth mentioning is an ESA cleaver (Figure 26). These are generally infrequent in the South African LSA being heavily outnumbered by hand-axes. This example was found 150 m NW of DKG2012/001 on the next hill.



**Figure 26:** Opposite sides of the silcrete cleaver found near DKG2012/001.

### 6.1.3. LSA shell middens and scatters

These types of sites usually occur close to the coast but during this survey we documented a number of shell sites up to 10 km inland. Those furthest inland tend to be very small campsites, while larger middens occur nearer the coast in the south-western parts of the study area. There were no individual shell middens or scatters that were highly significant within the area to be impacted, although the just west of the south-western part is a large midden that has already had a substantial excavation. This midden was of very high significance and even contained a burial (Orton 2007a). Other sites in this area have also yielded material with high research value. One apparently very large midden that has already been truncated by a mine road will be directly impacted (Figure 27). This site, KZ2011/012, if similar to others nearby, could actually have high significance even though nothing besides marine shell was noted during the surface examination.

The furthest inland shell sites were small light shell scatters with occasional other categories of material such as stone artefacts and pottery associated with them (Figure 28). Some were isolated, some had a few patches but perhaps the most interesting set of shell scatters occurred on the crests of a number of heuweltjies all within close proximity of one another. Whether more such sites would have been present on the surrounding landscape remains unknown since the survey was, to a large degree, constrained by the layout of the proposed WEF. Although these sites generally had few other finds besides shell on them, occasional other items included quartz and silcrete stone artefacts, ostrich eggshell fragments, tortoise bone and thin-walled pottery.



**Figure 27:** The shell midden at KZ2011/012. The volume of shell disturbed by the road suggests there is a buried midden.



**Figure 28:** The PV2012/020 shell scatter. **Inset:** The thin-walled potsherd found on the scatter.



In the vicinity of the two graveyards at Grootmis we located an enormous complex of small shell scatters and middens (Figure 29). We noted approximately 200 discrete patches of shell but after a while gave up recording them individually. The site occupies an area of at least 300 m by 600 m and in all likelihood extends well beyond these limits. It has been named DKG2012/048. Scatters near the north-western and higher-lying part of the area were smaller than those towards the river. We moved through the area quickly but a number of artefacts were noted on various middens. These include quartz and CCS flaked artefacts, CCS sidescrapers and thumbnail scrapers, and pottery. The pottery at GPS point 283 was thin-walled and decorated with incised horizontal lines (Figure 30). A CCS thumbnail scraper was also present on this particular scatter. Near point 204 there was also a fragment of white refined earthenware and at point 235 there was a fragment of hand-painted refined earthenware. These European ceramics are late 19<sup>th</sup> century in age and are unlikely to relate to the shell scatters. This plethora of shell scatters is probably where it is because of the river. This is borne out by an annotation on a 1907 British Military map stating that Grootmis has an unlimited water supply (Source: Pietermaritzburg Archives). The graveyards and access road to one of them have impacted on some of the scatters in this complex (Figure 31).



**Figure 29:** Aerial view of the area around the two graveyards at Grootmis showing all the shell scatters designated cumulatively as DKG2012/048 and outlined by the yellow polygon.



**Figure 30:** Pottery fragments from point 283 on site DKG2012/048. Sherds on the far left show thickness and a CCS thumbnail scraper is on the right.



**Figure 31:** A shell midden cut through by the graveyard fence.

## 6.2. Built environment

No built environment elements will be directly impacted by the proposed WEF but several do occur in the vicinity and would receive indirect impacts through erosion of their context and sense of place.

### 6.2.1. Old workers' compound

This compound dates to the early days of mining at Kleinzee and was used to house workers inside the high security mine area during the week. They were only allowed out on weekends so as to reduce the security risk and number of searches that had to be performed. This system was stopped many years ago and the complex has now been excluded from the high security area. The buildings no doubt mostly date to the 1930s and 1940s and include a church (Figure 31 & 32). The architectural style is similar to that seen at Kleinzee and Port Nolloth and is characteristic of mining related structures in the region. Although the compound will certainly have intangible heritage and memory associated with it, this aspect would not be impacted and it is purely the visual impacts on the built environment that are of minor concern. The impacts are related to the alteration of the sense of place and landscape character through the addition of the turbines to a characteristically mining landscape with buildings typical of west coast mining towns.



**Figure 31:** View towards the northwest over the old workers' compound, north of Kleinzee. The large power lines are relatively recent additions to the mining landscape.





**Figure 32:** Close up of part of the old workers complex showing the church in the centre. The transformed mining areas can be seen in the background.

#### 6.2.2. Grootmis

This tiny settlement is located along the road between Kleinsee and Springbok, just 2.8 km from Kleinsee. It only has a handful of buildings, at least one of which is derelict. However, buildings with heritage value are present and include the church dated 1936 (Figure 33) and a large stone house that is likely early 20<sup>th</sup> century (Figure 34). A third old building has had all its openings closed up (Figure 35). We know from historical sources that there were at one time at least ten families residing in Grootmis and this suggests that the ruins of other structures may be present. Although a 1907 map indicates the presence of eight stone houses (see below), it is, of course, equally possible that some people were living in temporary dwellings such as matjieshuise. The settlement is a peculiar place with a unique character. The presence of wind turbines on the hill overlooking Grootmis would certainly detract from its character.



**Figure 33:** The church at Grootmis dated 1936.



**Figure 34:** Stone house at Grootmis.



**Figure 35:** Derelict historical building at Grootmis.

### 6.2.3. Outlying farm structures

The most significant other structure located lies to the north of the study area but is described here for the record. It is the Roovlei farm house (Figure 36). It is in a state of neglect but, with its roof still intact. The roof is the most important part of a historical structure, since once it is lost, the sun-baked mud bricks tend to dissolve in the rain. The Roovlei farm house is 19<sup>th</sup> century in age and seems to have been built in stages since part is of mud-brick and part of stone (Figure 37). Much of its joinery remains intact, no doubt due to its very remote location (Figure 38).



**Figure 36:** The western side of the Roovlei farm house.

The only other built structures were the remains of a house on a hill called Duikerkop on the farm Predikant Vlei (PV2012/037), a mid-20<sup>th</sup> century house (Elandsvlei, ?1950s, PV2012/014), and some recent small stock enclosures. Duikerkop was said to be the site of the original farm house for the farm (J. Steenkamp, prs. Comm. 2012) but no sign of anything pre-20<sup>th</sup> century was evident. The structure itself is made from home-made cement blocks and bricks (Figure 39) and a number of 20<sup>th</sup> century glass and ceramic fragments and other materials were strewn about the vicinity (Figure 40). Aside from the two ceramic fragments mentioned in the context of site DKG2012/048, the only other historical material seen was an isolated and very thick green wine bottle base on the plain immediately southeast of Wolfberg. It probably relates to someone travelling through that area during the 19<sup>th</sup> century.



**Figure 37:** The Roovlei farm house as seen from the northwest.



**Figure 38:** The eastern side of the Roovlei farm house.



**Figure 39:** The ruin on Duikerkop (PV2012/037).



**Figure 40:** 20<sup>th</sup> century artefacts from Duikerkop.

### 6.3. History

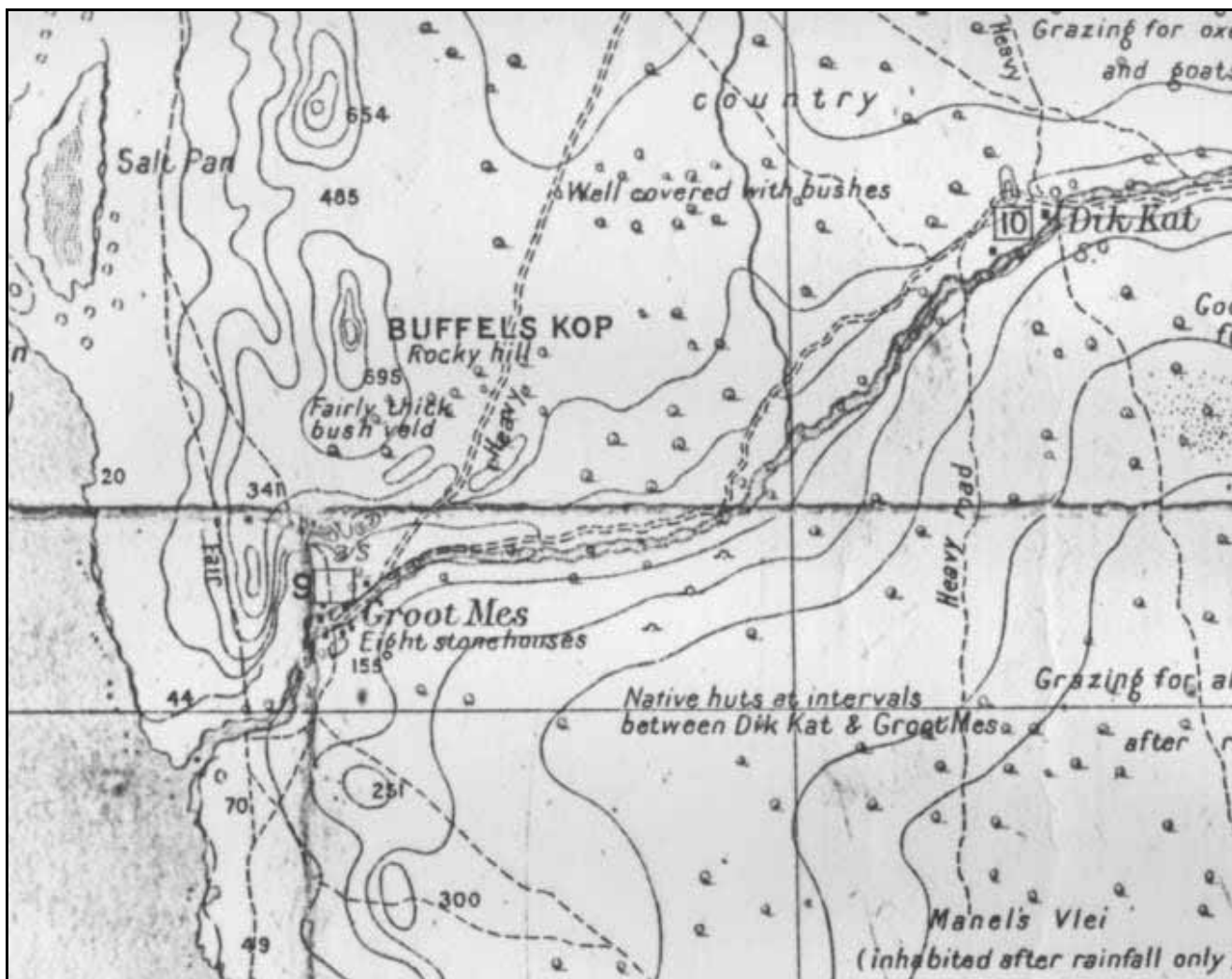
The earliest references to Grootmis date to William Paterson's travels through Namaqualand between 1777 and 1779 (Forbes & Rourke 1980). While travelling to the mouth of the Buffels River, he stopped at a farm called Renoster Kop Fontein, which is thought by Forbes and Rourke (1980) to be the farm Grootmis. Either way, the reference tells us that Europeans had already settled in the area by the late 18<sup>th</sup> century.

References to Grootmis are scarce. However, Schaeffer (2008) has published the writings of a young minister, W.J. Conradie, stationed at Garies between 1886 and 1895 and who was responsible for the entire Namaqualand region. He used to travel to Grootmis to hold a service there each February. Conradie describes the five day journey from Garies to Grootmis, a settlement of some 10 families. More than 100 people came to his services, some from far afield, showing that the settlement was central to the region. Where the services were held is not stated but the current church only dates to 1936.

The only historical map that could be sourced was one prepared by the British Military in 1907 (Figure 40; Source: Pietermaritzburg Archives). This map shows Grootmis (spelled "Groot Mes") as a settlement of eight stone houses and indicates "Dik Kat" further upstream. Another caption



shows "native huts at intervals between Dik Kat and Groot Mes" indicating that the Khoekhoen were living in the area at the time.



**Figure 40:** Extract from a British Military Map of the Port Nolloth and O'Okiep areas (dated 1907; Source: Pietermaritzburg Archives).

According to Kotze (1943) there were 42 coloured school children and 78 white school children attending school in Grootmis in 1938. The Dutch Reformed Church at Grootmis also dates from the same period, suggesting that this was the period of maximum expansion of the hamlet.

The graveyard at Grootmis contains headstones dating to the 1990s, suggesting a link with this hamlet into recent times.

## 6.4. Graves and graveyards

### 6.4.1. Isolated graves

Isolated, unmarked human burials occur frequently in the coastal dunes where archaeological sites are far more numerous. Although one burial has been excavated from a site immediately west of the south-western part of the proposed WEF area, such burials are far less likely to be unearthed in the areas under consideration here. Although not guaranteed, burials are more often than not associated with occupation sites and, if significant sites are avoided, then the chance of intersecting burials would likely be extremely low.

A stone cairn was found at DKG2012/019. Whether this is a recent accumulation of rocks is unknown, but there is a small chance it might represent a burial. Laidler (1929) reported stone cairn burials from the Kamiesberg region but this observation has not been corroborated. Similar burials are common near Augrabies Falls but unknown from the Sandveld. The cairn is mostly of lumps of silcrete but two quartzite cobbles are also included in it.



**Figure 41:** The stone cairn at DKG2012/019.

#### 6.4.2. Graveyards

Two formal graveyards occur just outside Grootmis. One is a 'European' graveyard (Figure 42) and the other 'coloured' (Figure 43). The earliest marked graves in the 'European' one date to 1905. However, there are numerous unmarked graves which may pre-date this. The majority of named graves in the cemetery are those of the Kotze, Muller and Goosen families, but other families are also represented. The 'coloured' graveyard is very interesting in that a large number of the graves have been covered with large limpet shells (Figure 43). These shells are apparently purely for decorative purposes (J. Steenkamp, pers. comm., 2012) but the symbolic value of white items is often evident in various contexts and shells have been seen scattered lightly over graves in various parts of western South Africa. A variety of headstones is present ranging from formal stone ones dated 1968 and 1970 on six African graves (background in Figure 44) to simple natural stones and/or pieces of wood on the rest (Figure 45). Two wooden headstones have surviving lettering, one in paint (Figure 46) and the other created through application of a large number of small nails (Figure 47). The latter has failed to survive the ravages of time as the untreated wood has split and the nails fallen out.



**Figure 42:** The 'European' graveyard at Grootmis. The road to Springbok is in the lower right hand corner of the photograph.





**Figure 43:** The 'coloured' graveyard at Grootmis with many shell-covered graves.



**Figure 44:** The 'coloured' graveyard at Grootmis with formal graves in the background.



**Figure 45:** Informal graves at the 'coloured' graveyard.



**Figure 46:** Painted detail indicating N.H. Cloete Born 30-10-1971 and died 19-04-1973 (likely).



**Figure 47:** Nailed detail indicating a birth on 21-01-19?? (possibly 1951/1957) and death on 14-01-19?? (possibly 1958).



## 6.5. Sense of place, cultural landscapes and scenic routes

This is a less tangible aspect of heritage that needs to be considered in the assessment of impacts. It relates to the qualities of the landscape, either natural or man-made and considers the “general feel” of the place when one is in the vicinity. In Namaqualand, the overwhelming sense one gets is of large open spaces, gently rolling hills and remoteness – a natural landscape. The only area where a natural landscape would have its sense of place altered is the northern and eastern parts of the proposed WEF site situated far from the majority of man-made objects.

Natural landscapes become cultural landscapes when significant human interventions have taken place. Two areas are of concern in this regard; both relate to the south-western area of the proposed WEF (Figure 48).



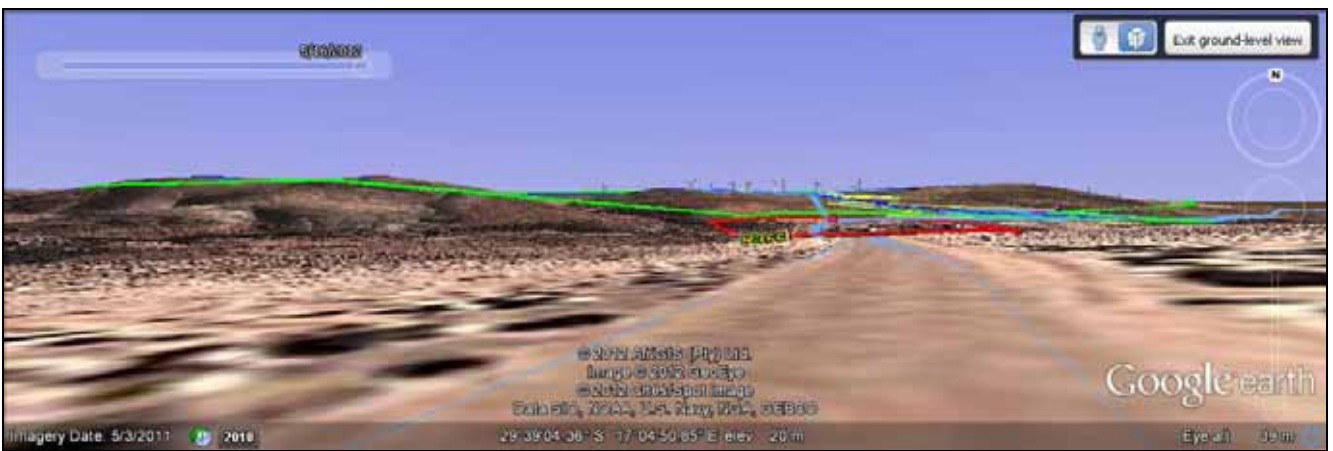
**Figure 48:** Panoramic photograph showing the visual reach of the south-western part of the study area. Given that the turbines will exceed 100 m in height, this reach will be greatly increased compared to that from ground level. The left arrow points to Grootmis and that on the right to Kleinzee.

Despite its small size, the settlement of Grootmis has plenty of historic character and, being unspoilt, can be regarded as a cultural landscape with good qualities. The nearby graveyards are considered part of this cultural landscape. The open cast coastal mines are not visible from Grootmis, which further contributes to the high quality of the sense of place. The gravel roads add to the very rural and remote feel of the place. The turbines would be clearly visible from the settlement and would impact dramatically on its landscape adding an industrial character to the area (Figures 49 to 51). Similarly, the mine workers’ compound discussed above can also be regarded as a cultural landscape. It is also affected by the south-western cluster of turbines.

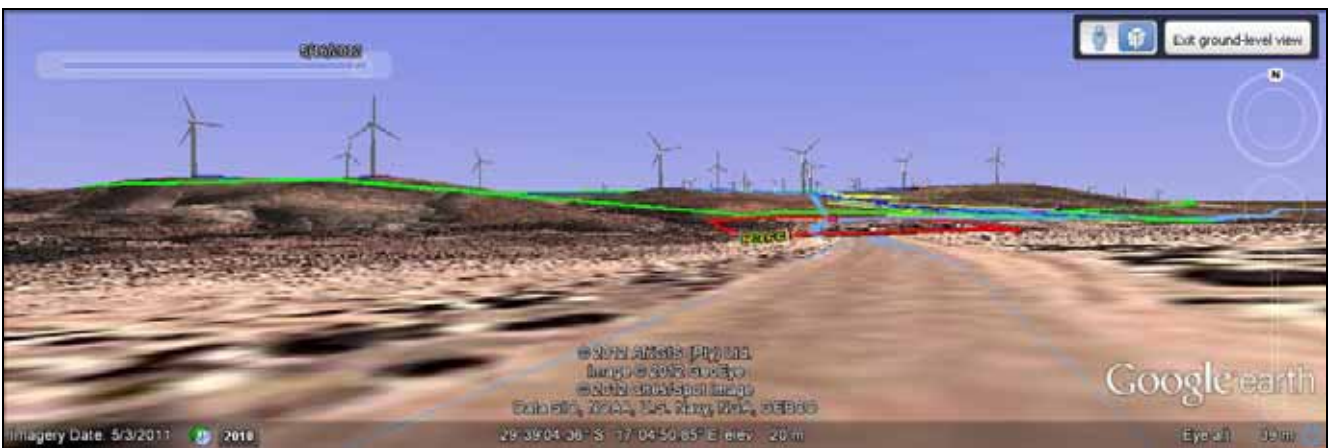
The entire vicinity of the silcrete outcrop in the south-western area can be regarded as a prehistoric cultural landscape due to the immense numbers of artefacts and sites found in the area. The silcrete outcrop itself served as the source of stone material for the makers of the ESA and MSA artefacts and, as such, the place would have been imbued with value for this reason. Artefacts pertaining to the LSA are also present as witnessed by half a deeply grooved lower grindstone in one place (KZ2011/015). It is not known how extensive this silcrete layer is, but we can be certain that wherever the silcrete is located there will be thousands of associated artefacts. This pattern has been proved at several other local areas. Similarly, DKG2012/048, although labelled as one site here, is really an archaeological landscape created due to the presence of available water nearby.



**Figure 49:** View northwards towards Grootmis and the south-western part of the study area (on the skyline).



**Figure 50:** Google Earth three-dimensional view looking north from Grootmis towards the proposed WEF. Only turbines from Phases 1 and 2 are included on the landscape. The red outline encircles Grootmis.



**Figure 51:** Google Earth three-dimensional view looking north from Grootmis towards the proposed WEF. All turbines (Phases 1, 2 & 3) are included on the landscape. The red outline encircles Grootmis.

The two roads implicated in the proposed development cannot be considered scenic routes of high significance since they are very remote and carry little traffic. However, that linking Springbok

and Kleinzee along the Buffels River is slightly more significant. As such, development of the south-western component of the WEF will have slightly greater scenic route impacts.

## **7. DISCUSSION OF IMPACTS BY DEVELOPMENT PHASE**

The proposed WEF and SEF have been planned to be constructed in four phases (Figure 2). These will have variable degrees of impact:

- Phase 1 is relatively small and there will not be great impacts from the turbines. Just four hours of archaeological mitigation are required if the current layout is implemented. However, the access road that bisects the two graveyards at Grootmis will result in extensive impacts to numerous shell scatters spread over a wide area and this is estimated to require about 50 to 60 hours of work to mitigate should this alignment be used. An alternative alignment is strongly favoured here.
- Phase 2, though larger, will not have impacts of high significance on the heritage of the area. However, some archaeological mitigation will be required, particularly in the far north where the cluster of small shell scatters on heuweltjies was located. Construction of turbines would necessitate five hours worth of mitigation of the impacted sites, although due to the need to treat the cluster of shell scatters as one larger site three further hours would need to be allocated there.
- Phase 3 of the project will have extensive impacts to archaeological resources as well as to the sense of place of Grootmis and visual impacts around the settlement. These impacts all relate to the south-western turbine cluster and it is recommended for this reason that the entire cluster be omitted from the proposed development. Sense of place and visual impacts cannot be mitigated with such tall structures as wind turbines. Mitigation of archaeological resources to be impacted by Phase 3 would total 101 hours with two sites being minimum estimates (16 and 40 hours respectively). The ESA/MSA site at DKG2012/001 in particular is very sensitive and is probably better considered a no-go area due to its research value. It is affected by just one turbine. All 101 hours of mitigation are accounted for by the south-western turbine cluster.
- Phase 4 of the project will impact several small archaeological sites (artefacts scatters in hollows on top of sand dunes) which would require seven hours worth of mitigation work. Despite limited survey coverage in this area, it is not expected that many more archaeological finds will be present in this area. However, some further mitigation may be required if new sites are found during the walk-down survey.

## **8. IMPACT ASSESSMENT**

The assessment of Phase 1 impacts is limited to archaeology since impacts to the landscape are considered to be insignificant (Table 1). However, the one very large archaeological site which will be impacted by the access road has a profound effect on the rating so, to illustrate this, a separate table has been included to show impacts without this site being damaged (Table 2). Should a suitable alternative alignment for the access road be found then Table 2 is probably a realistic reflection of what the impacts would be. Mitigation would nonetheless be easy to accomplish, though should the present road alignment be retained then it will be a time-consuming exercise.

**Table 1:** Assessment of impacts to heritage resources for Phase 1 including the access road through DKG2012/048.

<b>Nature:</b>		
	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Small (0)
Probability	Definite (5)	Probable (3)
Significance	High (65)	Low (18)
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Mitigation:	Archaeological excavation and sampling	
Cumulative impacts	There are probably hundreds of thousands of archaeological sites in the Namaqualand Sandveld and loss (with mitigation) of some will thus not be significant.	

**Table 2:** Assessment of impacts to heritage resources for Phase 1 excluding the access road through DKG2012/048.

<b>Nature:</b>		
	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Small (0)
Probability	Definite (5)	Improbable (2)
Significance	Medium (40)	Low (12)
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Mitigation:	Archaeological excavation and sampling	
Cumulative impacts	There are probably hundreds of thousands of archaeological sites in the Namaqualand Sandveld and loss (with mitigation) of some will thus not be significant.	

The assessment of Phase 1 impacts is limited to archaeology since impacts to the landscape are considered to be insignificant (Table 3).

**Table 3:** Assessment of impacts to heritage resources for Phase 2.

<b>Nature:</b>		
	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Small (0)
Probability	Definite (5)	Improbable (2)
Significance	Medium (45)	Low (12)
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Mitigation:	Archaeological excavation and sampling	
Cumulative impacts	There are probably hundreds of thousands of archaeological sites in the Namaqualand Sandveld and loss (with mitigation) of some will thus not be significant.	

With Phase 3 the archaeological mitigation would not change the overall significance of the impacts much since, although archaeological impacts would be reduced, the landscape impacts cannot be mitigated. However, the overall magnitude of impacts is slightly reduced if full archaeological mitigation is carried out (Table 4).

**Table 4:** Assessment of impacts to heritage resources for Phase 3.

<b>Nature:</b>		
	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local (4)	Local (4)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	High (85)	High (75)
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources?	Archaeology: Yes Landscape: No	
Can impacts be mitigated?	Archaeology: Yes Landscape: No	
Mitigation:	Archaeology: excavation and sampling Landscape: none possible	
Cumulative impacts	There are probably hundreds of thousands of archaeological sites in the Namaqualand Sandveld and loss (with mitigation) of some will thus not be significant. No other similar facilities are planned in very close proximity to Grootmis and the proposed ESKOM facility to the south of Kleinzee will not introduce further impacts to Grootmis.	

The assessment of Phase 4 impacts is limited to archaeology since impacts to the landscape are considered to be insignificant (Table 5).

**Table 5:** Assessment of impacts to heritage resources for Phase 4.

<b>Nature:</b>		
	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Small (0)
Probability	Definite (5)	Improbable (2)
Significance	Medium (40)	Low (12)
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Mitigation:	Archaeological excavation and sampling	
Cumulative impacts	There are probably hundreds of thousands of archaeological sites in the Namaqualand Sandveld and loss (with mitigation) of some will thus not be significant.	

## 9. CONCLUSIONS

Overall, from a heritage point of view, the proposed WEF & SEF may be constructed in the study area. However, it is apparent that the south-western component of Phase 3 will pose significant visual and landscape impacts to heritage resources that cannot be suitably mitigated. There is also a very high density of archaeological sites in this area. Given the combined impacts, it seems best that this component of the project be excluded. The remainder of the proposed project will result in manageable impacts that can easily be mitigated and there are no objections to those areas being developed.

The archaeological mitigation required will consist of formal excavation of sites in order to capture artefacts and food refuse from them. These finds inform on the way of life of the occupants of the sites and radiocarbon dating of organic materials (usually marine shell) tells us approximately when the people were there. Radiocarbon dating is costly and would not be suggested for all sites, but it would be important to date a representative selection of those excavated.

Mitigation of sites falling within archaeological cultural landscapes can be more problematic than excavation of isolated sites. Where a number of sites clearly relate to one another, as is the case at PV2012/020 to PV2012/028, these should be mitigated together. The area within the south-western turbine cluster has a large number of sites which would require a substantial mitigation project. DKG2012/048, falling within the access road, is of great concern. Given the likely reason for the presence of so many shell scatters and middens, it is quite possible that further similar scatters and middens may be located under the ground surface. Should this be the case then the estimated number of hours for mitigation would rise dramatically. This should be taken into account if mitigation of this complex is to proceed. The ESA/MSA site with fossil bone is the most important archaeological site found. Given that just one turbine is affected, it is perhaps best to simply omit this one turbine (notwithstanding the fact that we suggest omission of the entire south-western cluster).



## 10. RECOMMENDATIONS

Although the south-western component of the proposed WEF should be excluded, it is recommended that the remainder of the project be allowed to proceed. The following recommendations are made:

- The south-western cluster of turbines (part of Phase 3) should be omitted entirely;
- Should the above recommendation not be enforced then turbine M04-P3 is best omitted due to the high significance of site DKG2012/001 and the large amount of mitigation that is likely required there. If mitigation is carried out within the disturbance footprint then strict enforcement of no-go areas around the construction footprint is required during construction;
- The access road leading up the hill between the graveyards should be rerouted to reduce mitigation requirements, although the mitigation can be carried out if absolutely necessary;
- Prior to construction a final walk-down survey must be carried out in order to examine any areas not yet checked (including the SEF which was not thoroughly examined) and any turbine positions that have been changed or added subsequent to the Phase 1 survey;
- Archaeological mitigation as required must then be carried out, and
- If any unmarked pre-colonial burials are intersected during the construction phase of the project then these should be reported to SAHRA or an archaeologist so that appropriate action can be taken.

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## APPENDIX 1: HERITAGE SITES

**Table 1:** List of all archaeological and other heritage occurrences encountered during the survey. All new sites recorded in 2011 and 2012 are listed, but from the one earlier survey in this area (Orton & Halkett 2007) only those sites falling within the project area are listed. Sites requiring mitigation are in bold with those under direct threat from the proposed development highlighted in red. Estimated mitigation time for each is indicated. Multiple points for a site (listed as A, B, etc) indicate multiple patches of archaeological material that were deemed to be related. Note that although significance is not indicated, those sites with mitigation requirements are deemed to be of archaeological significance (usually low to medium, but occasionally high), while those with no mitigation indicated are of low significance. The number of hours listed under mitigation can be taken as a proxy for the level of archaeological significance. Development phase is indicated only for sites that will be directly impacted by the proposed WEF with 'rd' in brackets indicating an earlier phase due to road impact. 'SS (rd)' denotes sites in the substation road. For ease of reference, development phase is colour-coded following Figure 2.

Abbreviations as follows:

Shell: Ga: *C. granatina*, Gs: *S. granularis*, Arg: *S. argenvillei*, Barb: *S. barbara*, Burn: *Burnupena* sp., c/m: *Choromytilus meridionalis*  
Other: Qtz: quartz, Silc: Silcrete, CCS: cryptocrystalline silica, Oz: quartzite, OES: ostrich eggshell, LG: lower grindstone, UG: upper grindstone, HS: hammer stone

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
<b>DREYERS PAN (2011)</b>									
DP2011/001	A132	S29 36 09.4 E17 04 23.7	Shell scatter/midden	20	Ga, Gs	Qtz, HS, bone		1	
DP2011/002	A136	S29 36 14.4 E17 04 32.9	Artefact scatter	-		Qtz, 2 HS	Extensive background scatter, possibly some LSA here	2	1
DP2011/003	A137	S29 36 29.4 E17 04 32.8	Shell scatter/midden	20	Ga, Gs, Arg, Barb	Qtz, HS, Pottery		3	
DP2011/004	A138	S29 36 07.6 E17 04 21.7	Shell scatter	10	Ga, Gs	Qtz, OES		1	
DP2011/005	A139	S29 36 06.2 E17 04 17.4	Quarry	40		Qtz	Flaked quartz outcrop	-	
<b>Kleinzee (2011)</b>									
KZ2011/001	A133	S29 36 14.4 E17 04 32.9	Artefact scatter	-		Qtz	Extensive background scatter	-	
KZ2011/002	A134	S29 36 29.4 E17 04 32.8	Artefact scatter	20		Qtz	Extensive background scatter	-	
KZ2011/003	A135	S29 36 17.1 E17 04 34.8	Artefact scatter	-			Extensive background scatter	-	
KZ2011/004	A140	S29 38 20.5 E17 03 59.7		10		Qtz, Silc		-	



Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
KZ2011/005	A141	S29 38 20.6 E17 04 02.5	Artefact scatter	-		Qtz, Qz, Silc		-	
KZ2011/006	A142	S29 38 20.4 E17 04 03.7	Artefact scatter	-		Qtz, Qz, Silc		-	
<b>KZ2011/007</b>	<b>A143</b>	S29 38 19.3 E17 04 06.0	<b>Artefact scatter</b>	-		<b>Qtz, Qz, Silc</b>		<b>1</b>	
KZ2011/008	A144	S29 38 18.9 E17 04 11.8	Artefact scatter	-		Qtz, Qz, Silc	Exposed in road	-	
<b>KZ2011/009</b>	<b>A145</b>	S29 38 18.3 E17 04 11.6	<b>Shell midden</b>	<b>30</b>	<b>Ga, Gs, Arg</b>	<b>Qtz, Silc, kreef</b>	<b>Cut by road</b>	<b>8</b>	
<b>KZ2011/010</b>	<b>A146</b>	S29 38 16.1 E17 04 17.5	<b>Shell midden</b>	<b>30</b>	<b>Ga, Gs, Arg</b>	<b>Pottery</b>		<b>8</b>	
<b>KZ2011/011</b>	<b>A147</b>	<b>S29 38 16.0 E17 04 21.0</b>	<b>Artefact scatter &amp; quarry</b>	-		<b>Qtz, Silc</b>	<b>Exposed in road, quarried bedrock exposed</b>	<b>1</b>	<b>3</b>
<b>KZ2011/012</b>	<b>A148</b>	<b>S29 38 16.9 E17 04 20.9</b>	<b>Shell midden</b>	<b>40</b>	<b>Ga, Gs, Arg, Barb</b>		<b>Cut by road, huge site</b>	<b>16 (at least)</b>	<b>3</b>
<b>KZ2011/013</b>	<b>A149</b>	S29 38 17.5 E17 04 21.6	<b>Shell midden</b>	<b>8</b>	<b>Ga, Gs, Arg</b>			<b>2</b>	
KZ2011/014	A150	S29 38 17.4 E17 04 22.5	Artefact scatter	20		Qtz, Silc	Exposed in road	-	
KZ2011/015	A151	S29 38 19.1 E17 04 26.1	Artefact scatter	-		LG, Silc, Qtz	Isolated grindstone but extensive artefact scatter	-	<b>3</b>
<b>KZ2011/016</b>	<b>A152</b>	<b>S29 38 20.6 E17 04 19.7</b>	<b>Shell scatter</b>	<b>30</b>	<b>Ga, Gs, Arg</b>	<b>Silcrete denticulate</b>		<b>1</b>	<b>3</b>
<b>KZ2011/017</b>	<b>A153</b>	<b>S29 38 20.9 E17 04 18.6</b>	<b>Shell midden</b>	<b>20</b>	<b>Ga, Gs, Arg</b>	<b>Qtz</b>		<b>3</b>	<b>3</b>
<b>KZ2011/018</b>	<b>A154</b>	<b>S29 38 23.4 E17 04 17.3</b>	<b>Shell scatter</b>	<b>30</b>	<b>Ga, Gs, Arg</b>	<b>Qtz, Silc</b>		<b>2</b>	<b>3</b>
<b>KZ2011/019</b>	<b>A155</b>	<b>S29 38 25.0 E17 04 17.5</b>	<b>Shell midden</b>	<b>20</b>	<b>Ga, Gs, Arg</b>	<b>Qtz, Silc, OES</b>		<b>3</b>	<b>3</b>
KZ2011/020	A156	S29 38 26.6 E17 04 16.9	Artefact scatter	-		Silc	Extensive background scatter	-	<b>3</b>
KZ2011/021	A157	S29 38 24.2 E17 04 13.9	Artefact scatter	-		Silc	Extensive background scatter	-	
KZ2011/022	A158	S29 38 24.1 E17 04 05.8	Artefact scatter	-		Qtz, Silc		-	
KZ2011/023	A159	S29 38 22.3 E17 04 05.6	Artefact scatter	-		Qtz, Silc		-	
KZ2011/024	A160	S29 38 24.0 E17 03 58.4	Shell scatter	10	Ga, Gs, Arg		Recorded before	-	
<b>PREDIKANT VLEI (2011)</b>									
PV2011/001	A184	S29 34 10.2 E17 05 12.2	Artefact scatter	-		Qtz, Silc	On hardpan exposure	-	

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
PV2011/002	A185	S29 34 09.8 E17 05 16.1	Artefact scatter	-		Qtz	On hardpan exposure	-	
<b>PREDIKANT VLEI (2012)</b>									
PV2012/001	346	S29 35 27.1 E17 07 02.8	Artefact scatter	-		Qtz, 'other' anvil	Two patches	-	
PV2012/002	347	S29 35 34.7 E17 06 53.0	Artefact scatter	-		Qtz, Qz, Silc	Background scatter inside pan	-	
PV2012/003	348	S29 35 34.3 E17 06 51.7	Artefact scatter	-		Qtz, Silc	Inside pan	-	
<b>PV2012/004</b>	<b>349</b>	<b>S29 35 37.3 E17 06 44.9</b>	<b>Artefact scatter</b>	-		<b>Qtz, Qz, Silc, HS, huge qtz core &amp; flakes, also small qtz. Qz bifacial point</b>	<b>Large qtz artefacts have algae on them. Bifacial point broken, could be a Still Bay point.</b>	<b>2</b>	<b>2</b>
PV2012/005	350	S29 34 47.8 E17 07 04.8	Artefact scatter	-		Qtz	Extensive low density scatter over hilltop	-	2
PV2012/006	L060, L061	S29 34 43.3 E17 07 05.8 S29 34 42.9 E17 07 07.5	Artefact scatter	-		Qtz, Silc, Qz	Qtz outcrop just upslope of scatter	-	
PV2012/007	L062	S29 34 42.9 E17 07 18.0	Artefact scatter	-		Qtz, Qz, Silc	Deflation hollow	-	
PV2012/008	317	S29 33 38.8 E17 07 49.3	Artefact scatter	-		Qtz	Qtz available as seams and outcrops on this granite hill. Low density artefact scatter.	-	
PV2012/009	318	S29 33 38.0 E17 07 39.1	Artefact scatter	-		Qtz	On hardpan	-	
<b>PV2012/010</b>	<b>319</b>	<b>S29 33 36.8 E17 07 30.4</b>	<b>Artefact scatter</b>	-		<b>Qtz, rare Silc</b>	<b>On rocky/gravel area</b>	-	<b>2</b>
PV2012/011	320	S29 33 48.6 E17 07 23.8	Artefact scatter	-		Qtz, OES		-	
PV2012/012	321	S29 33 50.4 E17 07 26.1	Quarry	-		Qtz	Quartz outcrop heavily hammered until no platforms remained.	-	
<b>PV2012/013</b>	<b>323-325</b>	<b>S29 33 55.9 E17 07 19.9 S29 33 55.9 E17 07 19.6 S29 33 55.6 E17 07 19.6</b>	<b>Shell scatters</b>	<b>8m, 5m, 5m</b>	<b>Ga, Gs Ga, Gs, Arg Ga, Gs</b>	<b>Qtz, OES OES CCS, OES</b>	<b>Three related shell patches</b>	<b>4</b>	
PV2012/014	316	S29 33 19.0 E17 07 29.5	House	-			Elandsvlei farm house, ?1950s	-	
<b>PV2012/015</b>	<b>326</b>	<b>S29 33 51.5 E17 07 15.2</b>	<b>Artefact scatter</b>	-		<b>Qtz, OES</b>	<b>?LSA</b>	-	<b>2</b>
<b>PV2012/016</b>	<b>328</b>	<b>S29 33 48.3 E17 07 14.0</b>	<b>Quarry</b>	-		<b>Qtz</b>	<b>Quarried outcrop surrounded by ephemeral qtz scatter</b>	-	<b>2</b>
PV2012/017	L051	S29 33 45.7 E17 07 07.1	Artefact scatter	-		Qtz, Silc, CCS	Artefacts around a pan	-	

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
PV2012/018	L052	S29 33 48.7 E17 06 52.1	Artefact scatter	-		Qtz	Artefacts around a pan	-	
PV2012/019	330	S29 33 58.4 E17 07 07.2	Shell scatter	3	Ga, Gs, Arg		Only 1 Arg fragment	-	
<b>PV2012/020</b>	<b>332</b>	<b>S29 33 54.6 E17 06 39.6</b>	<b>Shell scatter</b>	<b>8</b>	<b>Ga, Gs</b>	<b>Thin-walled pottery</b>	<b>On heuweltjie</b>	<b>1</b>	<b>(2)</b>
<b>PV2012/021</b>	<b>333</b>	<b>S29 33 57.2 E17 06 29.4</b>	<b>Artefact scatter</b>	<b>-</b>		<b>Qtz, OES</b>	<b>On heuweltjie</b>	<b>1</b>	<b>2</b>
PV2012/022	334	S29 33 58.6 E17 06 38.9	Artefact scatter	-		Qtz, OES	MSA radial core in nearby gravel patch	-	
<b>PV2012/023</b>	<b>335</b>	<b>S29 33 59.1 E17 06 40.5</b>	<b>Shell scatter</b>	<b>5</b>	<b>Ga, Gs</b>	<b>Oes, tortoise bone</b>		<b>1</b>	<b>(2)</b>
<b>PV2012/024</b>	<b>L053</b>	<b>S29 33 52.9 E17 06 48.6</b>	<b>Shell scatter</b>	<b>2</b>	<b>Ga, Gs</b>		<b>Small scatter</b>	<b>1</b>	<b>2</b>
PV2012/025	L054	S29 33 55.5 E17 06 36.1	Shell scatter	5	Ga, Gs, Arg	Qtz, Silc, OES	Ephemeral scatter	-	
PV2012/026	L055	S29 33 53.3 E17 06 38.3	Shell scatter	5	Ga, Gs			-	
<b>PV2012/027</b>	<b>L056</b>	<b>S29 33 53.4 E17 06 42.4</b>	<b>Shell scatter</b>	<b>10</b>	<b>Ga, Gs</b>	<b>Qtz, Qz</b>		<b>1</b>	<b>(2)</b>
PV2012/028	L057	S29 33 49.3 E17 06 47.0	Artefact scatter	5	Ga, Gs	Qtz, OES	Ephemeral scatter	-	
<b>PV2012/029</b>	<b>337</b>	<b>S29 32 41.7 E17 06 41.3</b>	<b>House</b>	<b>-</b>			<b>Roovlei farm house, 19<sup>th</sup> century</b>	<b>Permit</b>	
PV2012/030	L066	S29 34 53.5 E17 09 04.8	Artefact scatter	-		Qtz, Qz LG	Dunetop deflation hollow	1	
PV2012/031	367	S29 34 44.6 E17 09 07.1	Artefact scatter	-		Qtz, Qz HS, other stone fragments	Dunetop deflation hollow	-	
<b>PV2012/032</b>	<b>368-370</b>	<b>S29 34 46.6 E17 09 10.6 S29 34 48.2 E17 09 13.2 S29 34 48.1 E17 09 14.7</b>	<b>Artefact scatter</b>	<b>-</b>		<b>Qtz, Qz</b>	<b>Ephemeral, widespread artefacts on slope of large hill leading up towards PV2012/033</b>	<b>-</b>	<b>3</b>
<b>PV2012/033</b>	<b>371</b>	<b>S29 34 50.2 E17 09 16.3</b>	<b>Quarry</b>	<b>-</b>		<b>Qtz</b>	<b>Flakes &amp; outcrop on hilltop. Outcrop old and weathered but scars evident</b>	<b>-</b>	<b>3</b>
PV2012/034	L067	S29 34 41.5 E17 09 14.2	Artefact scatter	-		Qtz, Silc	Diagnostic MSA blade	-	
PV2012/035	372	S29 34 44.5 E17 09 20.4	Quarry	-		Qtz	As above	-	
PV2012/036	L068	S29 34 42.6 E17 09 23.8	Ruin	2 x 6			Paving and building rubble, possibly stoep for corrugated iron house?	-	

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
PV2012/037	L069	S29 34 41.1 E17 09 27.1	Ruin				Remains of a structure made of home-made cement bricks and blocks. Caravan alongside. Apparently original structure for the farm was on this hill called "Duikerkop". Plenty of 20 <sup>th</sup> century rubbish scattered about.	-	
PV2012/038	373	S29 34 42.6 E17 09 31.1	Artefact scatter	-		Qtz	Deflation	-	
PV2012/039	374	S29 34 44.9 E17 09 37.8	Artefact scatter	-		Qtz, CCS	Dunetop deflation, ephemeral	-	
PV2012/040	375	S29 34 59.7 E17 05 25.3	Artefact scatter	-		Qtz	Widespread, ephemeral, mostly in low areas between heuweltjies	-	
PV2012/041	377	S29 35 21.8 E17 05 33.9	Artefact scatter	-		Qtz, cobble, HS	On calcretised heuweltjie	-	
PV2012/042	322	S29 33 55.3 E17 07 19.7	Artefact scatter	-		Qtz	On sandy hilltop, LSA	-	
<b>DIKGAT (2011)</b>									
DKG2011/001	A161	S29 38 57.4 E17 04 59.2	Shell scatter	20	Ga, Gs, Arg				
DKG2011/002	A162	S29 37 52.7 E17 04 49.7	Artefact scatter	-		Qtz, Qz, Silc	Exposed background scatter	-	3
DKG2011/003	A163	S29 37 53.1 E17 04 51.3	Ephemeral shell scatter	5	Ga, Gs			-	
DKG2011/004	A164	S29 37 53.6 E17 04 51.7	Artefact scatter	-		Qtz, Qz, Silc	Exposed background scatter	-	
DKG2011/005	A165	S29 38 54.2 E17 04 59.7	Shell scatter	?	?	?	Recorded from car	?	
DKG2011/006	A166	S29 38 56.1 E17 04 59.3	Shell scatter	?	?	?	Recorded from car	?	
DKG2011/007	A167	S29 38 56.8 E17 05 07.6	Shell scatter	?	?	?	Recorded from car	?	
DKG2011/008	A168	S29 36 15.0 E17 05 52.4	Artefact scatter	-		Qtz, Silc	Background scatter	-	2
DKG2011/009	A169	S29 36 16.4 E17 05 38.0	Artefact scatter	-		Qtz, Silc	Background scatter	-	2
DKG2011/010	A170	S29 36 17.5 E17 05 30.4	Artefact scatter	-		Qtz, Silc	Background scatter	-	
DKG2011/011	A171	S29 36 17.4 E17 05 26.4	Artefact scatter	-		Qtz, Silc	Background scatter	-	
DKG2011/012	A172	S29 36 17.0 E17 05 24.3	Artefact scatter	-		Qtz	Exposed in deflation	-	2
DKG2011/013	A173	S29 36 16.9 E17 05 16.0	Artefact scatter	-		Qtz	Higher density than 172	-	2



Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2011/014	A174	S29 36 16.0 E17 05 13.9	Artefact scatter	-		Qtz	Higher density than 172	-	1
DKG2011/015	A175	S29 36 17.1 E17 05 11.1	Artefact scatter	-		Qtz, Qz, Sil	Dense patch in eroding area	-	1
<b>DKG2011/016</b>	<b>A176</b>	<b>S29 36 17.2 E17 05 10.3</b>	<b>Shell scatter</b>	<b>10</b>	<b>Ga, Gs</b>	<b>Qtz, HS</b>		<b>2</b>	<b>1</b>
DKG2011/017	A177	S29 36 22.9 E17 05 10.8	Artefact scatter	-		Qtz, Qz, Sil		-	
DKG2011/018	A178	S29 36 15.8 E17 04 37.7	Artefact scatter	-		Qtz	Deflation area	-	
DKG2011/019	A179	S29 36 18.1 E17 04 36.8	Artefact scatter	-		Qtz	Deflation area	-	
DKG2011/020	A180	S29 36 30.4 E17 05 09.4	Artefact scatter	-		Qtz, HS (?UG)	Deflation area	-	
DKG2011/021	A181	S29 36 29.4 E17 05 16.4	Artefact scatter	-		Qtz, Qz, Silc, CCS	Deflation area	-	
DKG2011/022	A182	S29 36 16.2 E17 06 05.2	Artefact scatter	-		Qtz, Qz, Silc	On hardpan exposure	-	2 (rd)
DKG2011/023	A183, L058	S29 36 17.2 E17 06 00.8	Artefact scatter	-		Qtz, Silc, HS	On hardpan exposure	-	2 (rd)
DKG2011/024	A186 - A199	S29 38 37.4 E17 05 02.5 S29 38 37.8 E17 05 02.9 S29 38 38.4 E17 05 02.7 S29 38 38.6 E17 05 03.1 S29 38 39.0 E17 05 03.1 S29 38 38.6 E17 05 03.5 S29 38 38.4 E17 05 03.8 S29 38 38.0 E17 05 03.5 S29 38 37.6 E17 05 03.3 S29 38 37.4 E17 05 03.1 S29 38 37.0 E17 05 03.3 S29 38 37.9 E17 05 03.9 S29 38 38.7 E17 05 04.0 S29 38 39.1 E17 05 04.1	Shell scatters	5 - 20	Ga, Gs, Arg, Burn, c/m	Qtz, CCS, OES ; 188: CCS MRP; 190: pottery	Multiple shell scatters over 70 m x 40 m	16	
DKG2011/025	A200	S29 38 36.2 E17 05 05.4 S29 38 35.5 E17 05 07.2 S29 38 36.9 E17 05 08.4 S29 38 39.5 E17 05 08.7 S29 38 39.6 E17 05 05.7	Artefact scatter	20	Gs, Arg	Qtz, Silc, GS, HS, manuports			
<b>DKG2011/026</b>	<b>A201</b>	<b>S29 38 40.0 E17 05 02.7</b>	<b>Shell scatter</b>	<b>10</b>	<b>Ga, Gs</b>	<b>Silc, OES</b>		<b>1</b>	<b>3</b>
DKG2011/027	A202 - 205	S29 38 39.9 E17 04 57.7 S29 38 39.8 E17 04 57.1 S29 38 40.2 E17 04 56.9 S29 38 40.7 E17 04 56.2 S29 38 40.0 E17 04 56.3	Shell scatters	10	Ga, Gs	Silc	Five patches	5	

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2011/028	A206	S29 38 38.6 E17 04 56.4	Shell scatter	10	Ga, Gs, Arg			1	
DKG2011/029	A207	S29 38 38.3 E17 04 56.9	Shell scatter	5	Ga, Gs, Arg			1	
DKG2011/030	A208	S29 38 38.3 E17 04 57.2	Shell scatter	3 (x2)	Ga, Gs, Arg, Barb		Two patches	2	
DKG2011/031	A209	S29 38 37.3 E17 04 57.6	Ephemeral shell scatter	10	Ga, Gs, Arg			-	
DKG2011/032	A210	S29 38 36.0 E17 04 53.2	Shell midden	5	Ga, Gs, Arg			2	3
DKG2011/033	A211	S29 38 35.6 E17 04 53.0	Shell midden	5	Ga, Gs, Arg			2	3
DKG2011/034	A212	S29 38 35.4 E17 04 53.1	Shell midden	5	Ga, Gs, Arg			2	3
DKG2011/035	A213	S29 38 35.8 E17 04 53.6	Shell midden	20	Ga, Gs, Arg	Bone		2	3
DKG2011/036	A214	S29 38 35.8 E17 04 56.5	Shell scatter	15	Ga, Gs, Arg, Barb	Bone, OES		2	3
DKG2011/037	A215	S29 38 34.1 E17 04 55.8	Shell midden	10	Ga, Gs, Arg, Barb	Silcrete		1	
DKG2011/038	A216	S29 38 35.5 E17 04 57.0	Ephemeral shell scatter	3	Ga, Gs			-	
DKG2011/039	A217	S29 38 37.3 E17 04 58.5	Shell scatter	5	Ga, Gs			1	
DKG2011/040	A218	S29 38 37.2 E17 04 59.3	Shell scatter	10	Ga, Gs, Arg, Barb			1	3
DKG2011/041	A219	S29 38 56.7 E17 05 07.8	Graveyard					Avoid	
DIKGAT (2012)									

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2012/001	107-115 378-386	S29 38 14.0 E17 05 08.9 S29 38 12.4 E17 05 08.8 S29 38 11.1 E17 05 09.0 S29 38 10.4 E17 05 08.7 S29 38 09.7 E17 05 07.8 S29 38 08.7 E17 05 09.1 S29 38 06.8 E17 05 08.8 S29 38 04.5 E17 05 11.5 S29 38 02.6 E17 05 12.0 S29 38 03.6 E17 05 11.6 S29 38 05.5 E17 05 11.3 S29 38 06.9 E17 05 10.2 S29 38 08.6 E17 05 08.2 S29 38 14.4 E17 05 09.9 S29 38 15.6 E17 05 08.2 S29 38 16.8 E17 05 07.7 S29 38 19.4 E17 05 06.4 S29 38 20.5 E17 05 05.9	Artefact and fossil bone scatter	550 x 100	Arg	Qtz, Qz, Silc.  Several scatters/clusters of fossil bone, snail and OES in various parts of the site. Bone includes two Equid teeth (? Equus capensis, ?Hipparion)	Southern slopes of site have only stone artefacts.  This site is low density but very extensive. There are both diagnostic ESA and MSA artefacts.	Avoid or at least 40 for impact area	3
DKG2012/002	387	S29 38 21.4 E17 05 02.9 S29 38 19.7 E17 05 02.4	Quarry	-		Silcrete	Quarry in valley. Fairly fine-grained silcrete	-	
DKG2012/003	106	S29 38 09.3 E17 05 12.2	Artefact scatter	-		Qtz, Silc			
DKG2012/004	388	S29 38 20.9 E17 05 00.7	Artefact scatter	-		Qtz, Silc	Extensive scatter on slope above quarry	-	
DKG2012/005	389	S29 38 18.9 E17 04 59.9	Artefact scatter	-		Qtz, Silc		-	
DKG2012/006	390	S29 38 15.1 E17 05 00.4	Artefact scatter	-		Qtz, Silc	Massive area	-	
DKG2012/007	391	S29 38 12.8 E17 04 56.9	Artefact scatter	-		Qtz, Silc, anvil, ?HS	Extensive, with cobbles	2	3
DKG2012/008	392	S29 38 12.8 E17 04 55.9	Shell scatter	25	Ga, Gs, Arg, Barb	Qtz, CCS, CCS MRP	3 patches, Arg & Barb seem to dominate	4	3
DKG2012/009	393	S29 38 10.9 E17 04 53.9	Artefact scatter	-		Qtz, Qz, Silc		-	
DKG2012/010	119	S29 38 10.1 E17 04 56.8	Shell scatter	10	Ga, Gs, Arg, Barb			1	3
DKG2012/011	120	S29 38 10.2 E17 04 55.8	Shell midden	20	Ga, Gs, Arg, Barb	Qz, tabular qz, OES	Mostly scatter but <i>in situ</i> section in small dune	4	3
DKG2012/012	121	S29 38 09.5 E17 04 55.0	Shell scatter	8	Ga, Gs, Arg, Barb			1	3
DKG2012/013	122	S29 38 08.3 E17 04 55.1	Shell scatter	15	Ga, Gs, Arg	CCS, bone		1	3
DKG2012/014	123	S29 38 08.0 E17 04 55.8	Shell scatter	8	Ga, Gs, Arg			1	3
DKG2012/015	117	S29 38 08.2 E17 04 58.0	Artefact scatter	-		Qtz, Silc, manuports		-	

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2012/016	118	S29 38 06.8 E17 04 58.3	Artefact scatter	-		Qtz, Silc		-	
DKG2012/017	116	S29 38 02.0 E17 04 52.6	Shell scatter	-	Ga, Gs	OES	Ephemeral	-	3
DKG2012/018	394	S29 38 03.3 E17 04 50.6	Artefact scatter	-		Qtz, Silc		-	3
DKG2012/019	L019	S29 38 03.4 E17 04 53.0	Cairn	2		Silc, Qz cobbles	Circular cairn with just 2 qz cobbles, ?recent. Qtz artefacts in vicinity. Test for burial	1	
DKG2012/020	395 396 397 398	S29 38 01.3 E17 04 48.9 S29 38 00.8 E17 04 49.4 S29 38 00.9 E17 04 49.0 S29 38 01.1 E17 04 49.5	Shell scatter	5 - 10	Ga, Gs, Arg, Barb	OES, dec pottery	4 patches, 5-6 mm thick pottery on 3 patches, one with pointed base	6	
DKG2012/021	400-402	S29 38 01.6 E17 04 47.6 S29 38 02.0 E17 04 47.5 S29 38 01.9 E17 04 47.0	Shell scatter	5	Ga, Gs, Arg, Barb	Pottery, c. 5 mm, OES	Pottery on 401 only, No OES & Barb on 402	2	
DKG2012/022	399	S29 38 01.6 E17 04 48.4	Shell scatter	-	Ga, Gs, Arg, Barb	OES	Ephemeral	-	
DKG2012/023	403	S29 38 02.5 E17 04 46.5	Shell scatter	-	Ga, Gs	OES	Exposed in road	-	
DKG2012/024	96	S29 38 02.3 E17 04 47.4	Shell midden	12	Ga, Gs	OES, decorated pottery		1	
DKG2012/024	286	S29 38 38.8 E17 05 04.1	Shell scatter	-	Ga, Gs, Arg		Low density	-	
DKG2012/025	125	S29 38 02.4 E17 04 48.2	Shell scatter	8	Ga, Gs, Arg			1	
DKG2012/026	124	S29 38 02.3 E17 04 48.8	Shell scatter	8	Ga, Gs, Arg	OES		1	
DKG2012/027	126	S29 38 06.4 E17 04 47.6	Shell scatter	5	Ga, Gs, Arg	OES		1	
DKG2012/028	L071	S29 38 08.4 E17 05 01.4	Artefact scatter			Qtz, Silc, OES	On calcrete	-	
DKG2012/029	L015 L016	S29 38 01.9 E17 05 03.6	Artefact scatter	-		Qtz, Qz, Silc		-	3
DKG2012/030	L017	S29 38 03.7 E17 05 04.1	Artefact scatter	-		Silc	On calcrete	-	3
DKG2012/031	97	S29 38 00.8 E17 05 04.0	Artefact scatter	-		Qtz, Silc		-	
DKG2012/032	98	S29 38 00.2 E17 05 10.9	Artefact scatter	-		Qtz, Silc		-	
DKG2012/033	L013	S29 38 01.6 E17 05 14.0	Artefact scatter	-		Qtz		-	3



Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2012/034	L012	S29 38 02.2 E17 05 19.6	Artefact scatter	-		Qtz, Qz	On calcrete	-	
DKG2012/035	L011	S29 38 01.0 E17 05 23.0	Artefact scatter	-		Qtz, Qz, Silc, HS, cores	Deflated area	-	3
DKG2012/036	L010	S29 37 59.7 E17 05 23.7	Artefact scatter	-		Silc, Qz	Recent bone and disturbance	-	3
DKG2012/037	99	S29 37 59.5 E17 05 28.6	Artefact scatter	-		Qtz	Extensive scatter	-	
DKG2012/038	100	S29 38 04.3 E17 05 27.8	Quarry	-		Qtz, Silc	Quarried quartz outcrop	-	
DKG2012/039	101	S29 38 05.8 E17 05 30.2	Artefact scatter	-		Qtz, Silc	Extensive scatter	1	3
DKG2012/040	102	S29 38 07.3 E17 05 31.2	Artefact scatter	-		Qtz, Qz, Silc	Two discrete & dense patches of c. 15 m diameter each	4	3
DKG2012/041	103	S29 38 06.4 E17 05 31.1	Shell scatter	-	Ga, Gs	OES	Ephemeral	-	
DKG2012/042	104	S29 38 05.3 E17 05 30.6	Shell scatter	-	Ga, Gs		Ephemeral	-	
DKG2012/043	105	S29 38 00.3 E17 05 26.3	Shell scatter	8	Ga, Gs				3
DKG2012/044	405 406 407 408 409	S29 38 31.8 E17 05 02.1 S29 38 31.8 E17 05 02.6 S29 38 31.5 E17 05 02.8 S29 38 31.3 E17 05 03.2 S29 38 30.9 E17 05 03.2	Shell scatter	20 5 10 10 15	Ga, Gs, Arg, Barb	Qtz, Silc, CCS on 409		2	
DKG2012/045	404	S29 38 32.9 E17 05 01.3	Artefact scatter	-	Unknown		On brown silcrete outcrop, occasional shells	-	
DKG2012/046	410	S29 38 32.9 E17 05 02.7	Artefact scatter	-		Qtz, Silc	Dense scatter	-	
DKG2012/047	287	S29 38 41.8 E17 05 04.0	Artefact scatter	-		Qtz, Silc	Large area of low density artefact scatter.	-	1 (rd)

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2012/048	141-283 288-315 L026-L050	S29 38 47.5 E17 05 01.6 S29 38 52.7 E17 05 06.5 S29 38 55.7 E17 05 03.8 S29 38 57.0 E17 05 05.3 S29 38 54.5 E17 05 15.2 S29 38 49.6 E17 05 23.6 S29 38 44.5 E17 05 15.3 S29 38 46.9 E17 05 07.4	Shell scatters and Shell middens	600 x 300 m	Ga, Gs, Arg, Barb	Qtz, CCS, CCS scrapers, pottery (some decorated) 282 – CCS thumbnail scraper. 283 – thin walled pottery with horizontal incised lines & CCS thumbnail scraper.	Massive area of shell scatters and middens (450 x 300 m surveyed but probably extends further), larger sites lower on the slope. Co-ordinates indicate observed outer limits but area likely larger. Mitigation estimate difficult – value given is estimate for planned road only. 204 – incl. white refined earthenware fragment. 235 – incl. hand-painted refined earthenware fragment.	50-60	1 (rd)
DKG2012/049	411	S29 38 36.7 E17 04 58.5	Shell scatter	-	Ga, Gs		Ephemeral	-	3
DKG2012/050	412	S29 38 37.2 E17 04 55.6	Shell scatter	5x15	Ga, Gs	Qtz, Silc		2	
DKG2012/051	413	S29 38 37.4 E17 04 54.4	Shell scatter	10	Ga, Gs, Arg	Qtz		1	
DKG2012/052	414	S29 38 37.9 E17 04 54.4	Shell scatter	8	Ga, Gs	Silc, OES, pottery		2	
DKG2012/053	415	S29 38 36.3 E17 04 51.5	Artefact scatter	-		Qtz, Silc, 7 hand-axes	Hand-axes vary in shape and size ( <i>in situ</i> recording)	2	3
DKG2012/054	416	S29 38 36.8 E17 04 48.1	Artefact scatter	-		Silc	Scatter around silcrete outcrop	-	3
DKG2012/055	417	S29 38 35.7 E17 04 50.4	Shell scatter	10	Ga, Gs, Arg, Barb	Qtz, silc, OES		2	3
DKG2012/056	418	S29 38 31.5 E17 04 57.4	Artefact scatter	-		Silc	Very dense scatter	1	
DKG2012/057	127	S29 37 33.0 E17 04 57.6	Artefact scatter	-		Qtz, Silc, occasional manuports		-	3
DKG2012/058	128	S29 37 21.9 E17 05 00.9	Artefact scatter	-		Qtz, Silc	Along road	-	3
DKG2012/059	129	S29 37 10.7 E17 05 04.5	Artefact scatter	-		Qtz, Silc	Along road	-	3
DKG2012/060	130	S29 37 09.7 E17 05 07.6	Artefact scatter	-		Qtz, Silc, faceted platform flake	Dense scatter, diagnostic MSA flake	-	3
DKG2012/061	131	S29 37 11.8 E17 05 23.7	Artefact scatter	-		Qtz, Qz, Silc, CCS		-	3

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2012/062	132	S29 37 12.9 E17 05 31.8	Artefact scatter	-		Qtz, Silc	Silcrete is rare	-	
DKG2012/063	133	S29 37 13.4 E17 05 44.7	Artefact scatter	-		Qtz, Qz, Silc		-	
DKG2012/064	134	S29 37 13.1 E17 05 42.0	Artefact scatter	-		Qtz, Qz, Silc		-	3
DKG2012/065	135	S29 36 41.0 E17 05 43.9 S29 36 40.7 E17 05 44.8 S29 36 40.1 E17 05 45.1 S29 36 39.0 E17 05 46.1 S29 36 41.7 E17 05 45.0	Artefact scatter	-	Ga	Qtz, Qz, Silc, CCS	Large area of hardpan next to pan that holds water at times. Spatial patterning present. Needs <i>in situ</i> recording of most with limited sampling.	16	
DKG2012/066	136	S29 36 42.2 E17 05 40.7	Artefact scatter	-		Qtz, Silc, rare manuports		-	
DKG2012/067	137	S29 36 42.8 E17 05 32.9	Shell scatter	-	Ga	Qtz, Silc		-	2
DKG2012/068	138	S29 36 44.6 E17 05 44.0	Artefact scatter	-		Qtz, rare Qz and Silc		-	2
DKG2012/069	L023	S29 36 42.7 E17 05 20.0	Artefact scatter	-		Qtz		-	2
DKG2012/070	L022	S29 36 44.2 E17 05 02.7	Artefact scatter	-		Qtz		-	2
DKG2012/071	L020	S29 38 04.7 E17 04 51.8	Artefact scatter	-		Qtz, qz, cobble		-	3
DKG2012/072	139	S29 36 16.5 E17 04 49.5	Artefact scatter	-		Qtz, Silc		-	1
DKG2012/073	140	S29 36 18.2 E17 04 46.2	Artefact scatter	-		Qtz		-	
DKG2012/074	L025	S29 36 14.3 E17 04 38.2	Artefact scatter	-		Qtz, Silc		-	1
DKG2012/075	338	S29 36 15.1 E17 06 11.9	Shell scatter	5 & 2	Ga, Gs	Qtz, pottery	Pottery on second, more ephemeral scatter only	1	2 (rd)
DKG2012/076	340	S29 36 04.5 E17 06 28.0	Artefact scatter	30		Qtz, Qz	Ephemeral scatter, Qtz includes crystal qtz	-	
DKG2012/077	343	S29 36 04.4 E17 06 55.4	Artefact scatter	-		Qtz		-	
DKG2012/078	344	S29 36 00.8 E17 07 04.7	Artefact scatter	-		Qtz	On hardpan, possibly same as DKG2007/017	-	2 (rd)
DKG2012/079	345	S29 35 54.5 E17 07 18.6	Artefact scatter	-		Qtz	Extensive, on hardpan	-	
DKG2012/080	351	S29 35 44.8 E17 08 59.9	Artefact scatter	-		Qtz, Silc, CCS, LG, UG, OES	Dunetop deflation hollow, LSA	1	
DKG2012/081	366	S29 35 38.1 E17 08 48.6	Artefact scatter	-		Qtz, Qz, Silc	?ploughed deflation	-	
DKG2012/082	L014	S29 38 06.5 E17 05 19.7	Artefact scatter	-		Qtz, Qz		-	

Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2012/083	-	S29 38 49.0 E17 05 16.4	Graveyard	-				Avoid	
<b>FARM 343 (2012)</b>									
F343-2012/001	352	S29 35 08.9 E17 11 00.8	Artefact scatter	-		Qtz	Dunetop deflation hollow, LSA	1	
<b>RODE VLEY (2012)</b>									
RV2012/001	353	S29 34 58.0 E17 11 03.9	Artefact scatter	-		Qtz, Qz HS	Dunetop deflation hollow, artefacts in one of two hollows here only	1	
RV2012/002	354	S29 34 55.6 E17 10 41.3	Artefact scatter	-		Qtz	Dunetop deflation hollow, Very ephemeral due to heavy sheep trampling, artefacts in one of two hollows here only	-	4
RV2012/003	355	S29 34 51.4 E17 10 38.6	Artefact scatter	-		Qtz, Qz, Qz cobbles & frags	Dunetop deflation hollow	1	4
RV2012/004	356	S29 34 45.8 E17 10 38.1	Artefact scatter	-		Qtz, Qz/SS UG/HS	Dunetop deflation hollow, artefacts in one of two hollows here only	1	4
RV2012/005	357-359	S29 34 40.6 E17 10 40.7 S29 34 40.8 E17 10 41.6 S29 34 40.0 E17 10 41.5	Artefact scatter	-		Qtz, CS Qtz, granite frag Qtz, CS, Silc, Qz LG	Three hollows in one large deflation hollow, 359 is the largest one	3	4
RV2012/006	360	S29 34 36.8 E17 10 38.3	Artefact scatter	-		Qtz fl & cores, Qz/SS cobble core/HS	Dunetop deflation hollow	1	4
RV2012/007	361	S29 34 38.7 E17 10 35.0	Artefact scatter	-		Qtz, CCS, OES	Dunetop deflation hollow	1	4
RV2012/008	362	S29 34 33.3 E17 10 22.9	Artefact scatter	-		Qtz, igneous fragments, OES	Dune with a few partial deflations	-	4
RV2012/009	363	S29 34 17.8 E17 10 44.1	Artefact scatter	-		Qtz	Dunetop deflation hollow	-	
RV2012/010	364	S29 34 26.6 E17 10 47.4	Artefact scatter	-		Qtz, Qz, CCS, UG	Dunetop deflation hollow	1	
RV2012/011	365	S29 34 30.7 E17 10 46.0	Artefact scatter	-		Qtz, Qz, HS	Dunetop deflation hollow	-	
<b>DIKGAT (2007)</b>									
DKG2007/006	-	S29 35 37.5 E17 08 07.8	Artefact scatter			Qtz, Silc		-	
DKG2007/008	-	S29 35 41.3 E17 08 07.7	Shell scatter		Ga, Gs, Arg			1	



Name	Field number	GPS co-ordinate	Brief description	Size	Shell	Other	Comment	Mitigation (hrs)	Dev. phase
DKG2007/014	-	S29 35 53.9 E17 07 27.9	Artefact scatter			Qtz, Qz, Silc		-	
DKG2007/015	-	S29 35 55.5 E17 07 20.6	Artefact scatter			Qtz, Qz, Silc, CCS		-	SS (rd)
DKG2007/016	-	S29 35 51.0 E17 07 17.7	Artefact scatter			Qtz		-	
DKG2007/017	-	S29 36 01.4 E17 07 04.4	Artefact scatter			Qtz, Silc		-	SS (rd)