

# HERITAGE IMPACT ASSESSMENT FOR A PROPOSED PHOTO-VOLTAIC FACILITY ON STEENROTS FONTEIN 168/1, BEAUFORT WEST MAGISTERIAL DISTRICT, WESTERN CAPE

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

Prepared for

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## EXECUTIVE SUMMARY

The UCT Archaeology Contracts Office was asked by the Council for Scientific and Industrial Research (CSIR) to assess the impacts to archaeological heritage resources from the proposed construction of a 10 MW photo-voltaic facility on the farm Steenrots Fontein 168/1 near Beaufort West. Specialist visual and palaeontological studies were conducted independently and are discussed in this report. The facility would comprise of photo-voltaic panels standing up to 3 m high and covering an area not exceeding 20 ha. The facility would link into the existing electrical infrastructure via a new 22 kV power line which will not exceed 1 km in length and may be either overhead or buried underground. Three alternative sites have been identified in an area already well developed with electrical infrastructure.

An existing substation occurs just west of the site and the N12 and several power lines traverse the area. The three sites are open and covered by sand and stones with occasional bedrock exposures. Grass cover was minimal and visibility was good.

Archaeological material was present on all three alternatives but was most frequently encountered on Alternative 1. Most is likely MSA and the artefacts are generally quite weathered. Historical material included fragments of a bottle and of an annular ware bowl. All these finds have been accorded low significance. While palaeontological resources of high significance occur in the area, the expected impacts from the proposed development are considered to be low. Alternative 3 will result in the least visual impact since it is not visible from the town and lies south of an area of high ground that screens it from the N1. Although close to the N12, the presence of other electrical infrastructure means that no significant change to the sense of place will result.

Subject to the approval of Heritage Western Cape, it is recommended from a heritage point of view that the proposed project be allowed to proceed. However, on the basis of visual and archaeological considerations, Alternative 3 in the southwest is strongly favoured over the other two. There are no other specific requirements from an archaeological and visual perspective, but the palaeontological study indicates that:

- The ECO should be made aware of the potential for finding fossils and should monitor any excavations into unweathered bedrock; and
- If fossils are uncovered, they should be reported and mitigation may be required.

### Declaration of independence:

I, Jayson Orton, am an independent specialist consultant who is in no way connected with the proponent, other than in terms of the delivery of consulting services.

I hold a Masters degree in archaeology and have been consulting since 2004 in the Northern, Eastern and Western Cape Provinces. I am an accredited Principal Investigator with the Association of Southern African Professional Archaeologists (ASAPA, member No. 233).

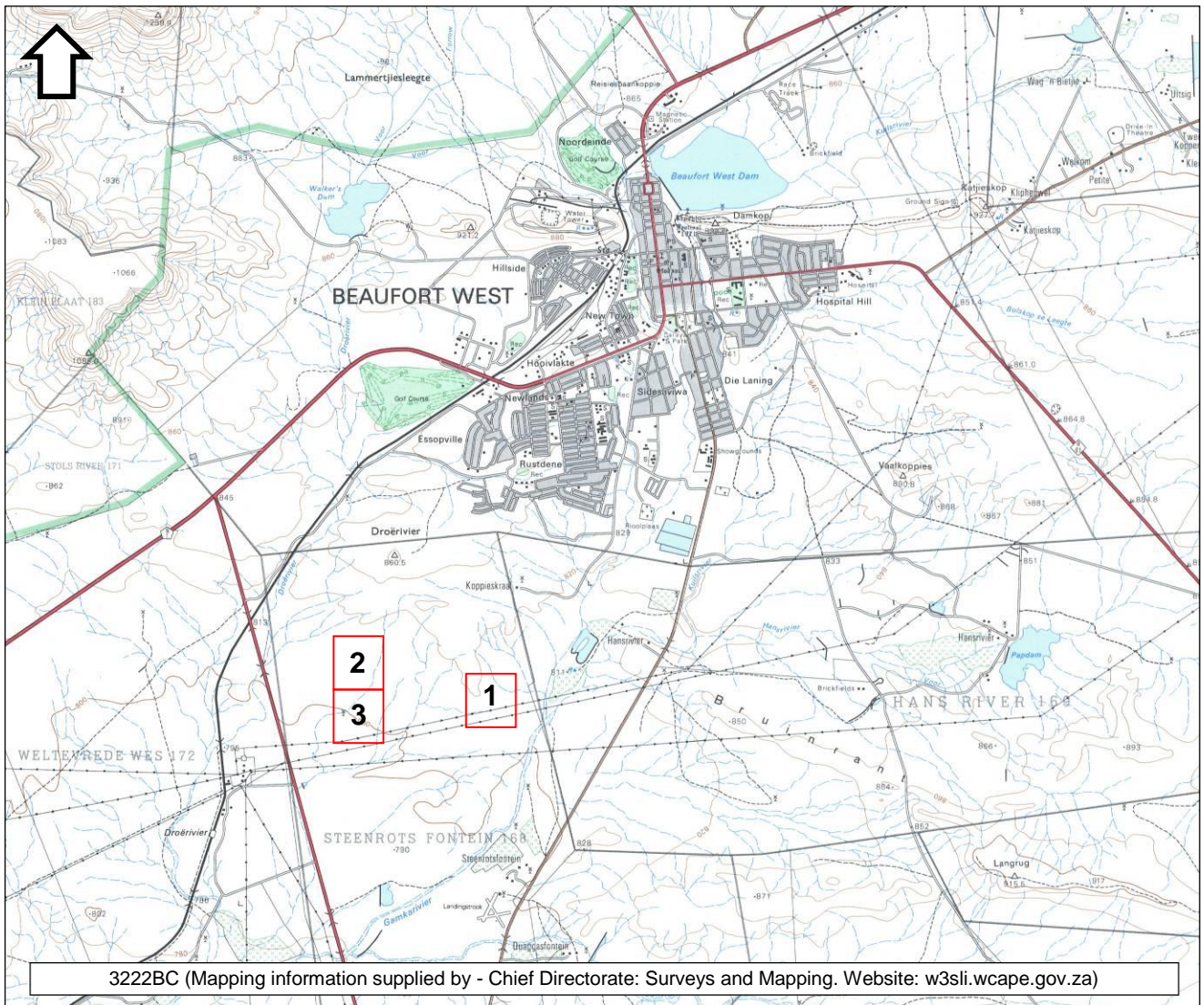


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# 1. INTRODUCTION

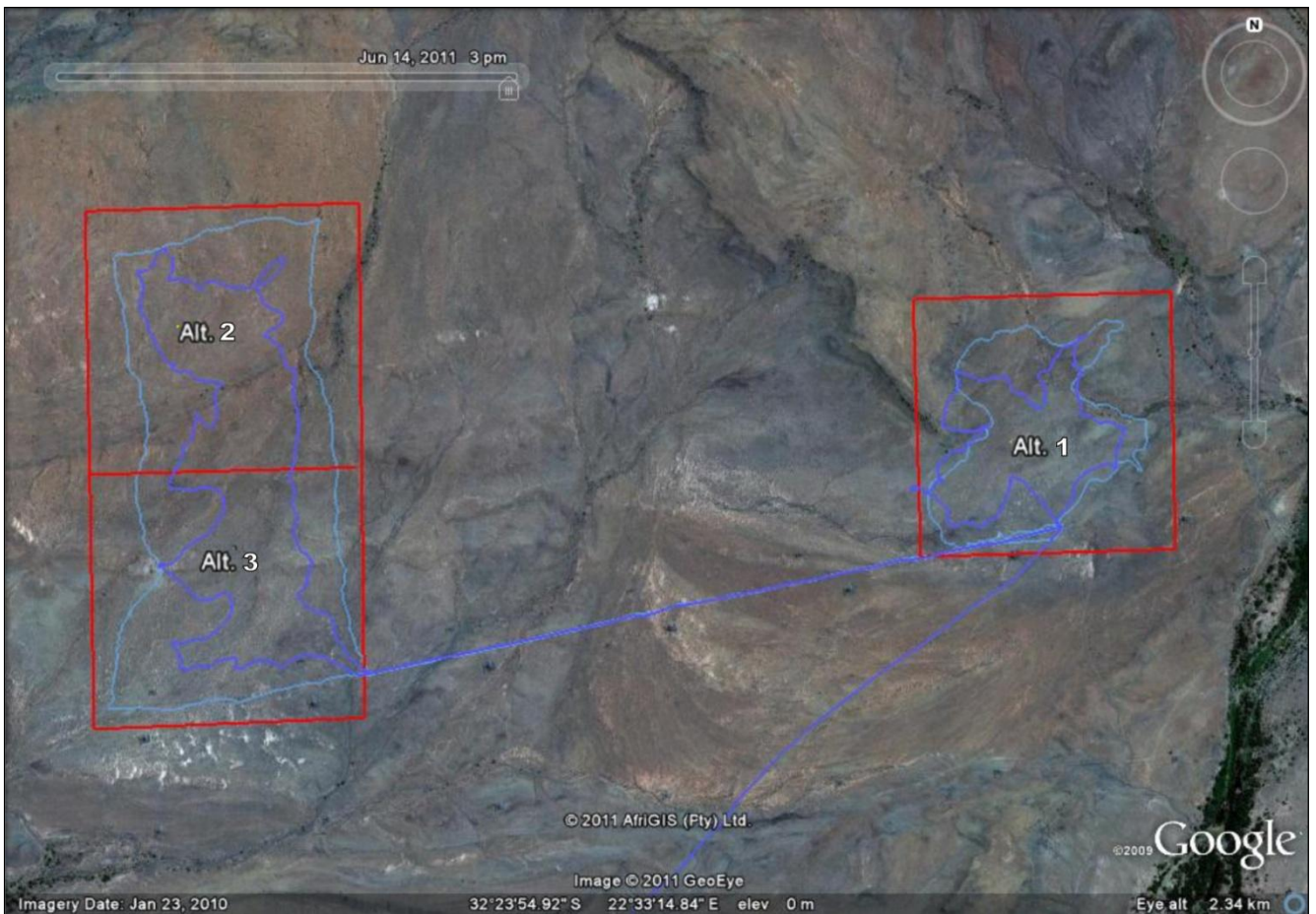
The UCT Archaeology Contracts Office was asked by the Council for Scientific and Industrial Research (CSIR) to assess the impacts to archaeological heritage resources from the proposed construction of a 10 MW photo-voltaic facility on the farm Steenrots Fontein 168/1 near Beaufort West. The facility would comprise of photo-voltaic panels standing up to 3 m high and covering an area not exceeding 20 ha. The facility would link into the existing electrical infrastructure via a new 22 kV power line which will not exceed 1 km in length and may be either overhead or buried underground. Three alternative sites have been identified in an area already well developed with electrical infrastructure (Figures 1 & 2).



**Figure 1:** Map showing the three alternative locations for the proposed facility.

Part of the terms of reference is to examine and summarise the findings of the sub-contracted desktop palaeontological and visual studies produced by Almond (2011) and Rahaman (2011) respectively. The results of these specialist reports are introduced in the conclusions and recommendations of the present report.





**Figure 2:** Aerial photograph showing the approximate footprints of the three alternative locations for the proposed facility and the walk paths (blue lines) recorded during the ground survey.

## 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 (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 3.1d).

Since the project is subject to an 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). A Notification of Intent to Develop form was submitted to HWC and the project is being conducted in response to a request from them for a Heritage Impact Assessment that contains studies on visual, archaeological and palaeontological impacts. The primary focus of this report is the archaeology, but reference is made to the other two components in the concluding sections.

### 3. METHODS

The three sites were examined on foot on the 14<sup>th</sup> June 2011. Finds were photographed and their co-ordinates were taken using a hand-held GPS receiver set to the WGS84 datum. The GPS was also used to record walk paths (Figure 2).

#### 3.1. Limitations

No limitations were experienced. The site was open and flat and visibility was generally good.

### 4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The three alternative sites are all relatively flat and covered by typical Karoo grassland. Relief does occur in the area, particularly immediately to the north of Alternative 1 and some 1 km distant from Alternatives 2 and 3. Many patches of exposed gravel were present on Alternative 1 and rather fewer on Alternative 3, which tended to be more sandy. The substrate at Alternative 1 and far northern part of Alternative 3 is mostly rocky. It is important to note that a change of elevation occurs between Alternatives 2 and 3 with the former being slightly higher thanks to the existence of a sill of bedrock across the site. Figures 3 to 9 show views that typify the landscape.



**Figure 3:** View towards Beaufort West in the northeast from the southern edge of Alternative 1. Note the small hill on the far left hand side of the photograph.

### 5. HERITAGE CONTEXT

Stone Age artefacts pertaining to the Early (ESA) Middle (MSA) and Later (LSA) Stone Ages have been widely reported in the general vicinity of Beaufort West. These invariably occur in secondary contexts, often associated with gravel, having survived extensive erosion of the soils in which they were once deposited (Dreyer 2005; Halkett 2009; Kaplan 2006, 2007; Orton 2010; Webley & Hart 2010a, 2010b; Webley & Lanham 2011).

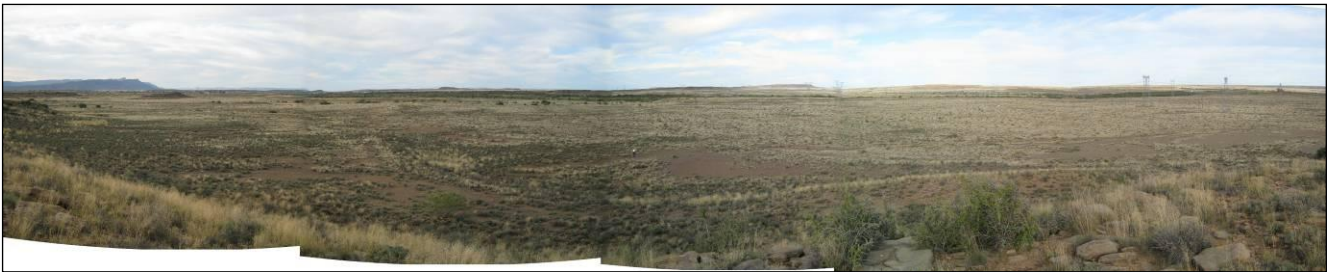




**Figure 4:** The hill along the northern edge of Alternative 1. Note the figure at the base of the hill for scale.



**Figure 5:** View of the edge of a typical gravel exposure on Alternative 1.



**Figure 6:** View southeast from the top of the hill along the northern edge of Alternative 1. The power lines on the right hand side run along the southern edge of this site alternative.



**Figure 7:** View southwest from the middle of Alternative 3. Note the power lines leading from east to west to the substation on the far right hand side of the photograph.

Historical resources are also sometimes encountered and these include farmsteads and their associated outbuildings, kraals and sometimes graves (Halkett 2009; Webley & Hart 2010b). To the northeast rock engravings are encountered on the dark dolerite boulders that characterise parts of the Karoo (Nelspoort Rock Art n.d.; Orton 2010; Parkington *et al.* 2008



**Figure 8:** View south from Alternative 2 showing exposed bedrock.



**Figure 9:** The change in slope between the lower-lying Alternative 3 (to the left) and 2 (to the right).

In terms of palaeontology, the Karoo, and particularly the Beaufort West area, are very rich. The Beaufort Group of rocks, comprising among others, mudstones, sandstones, conglomerates and calcretes, are extremely rich. In fact Almond and Pether (2008) note these deposits to be the richest source of late Permian tetrapod fauna from the Pangea/Gondwana land mass. Amphibians, reptiles, fish, bivalves, trace fossils and plants all occur.

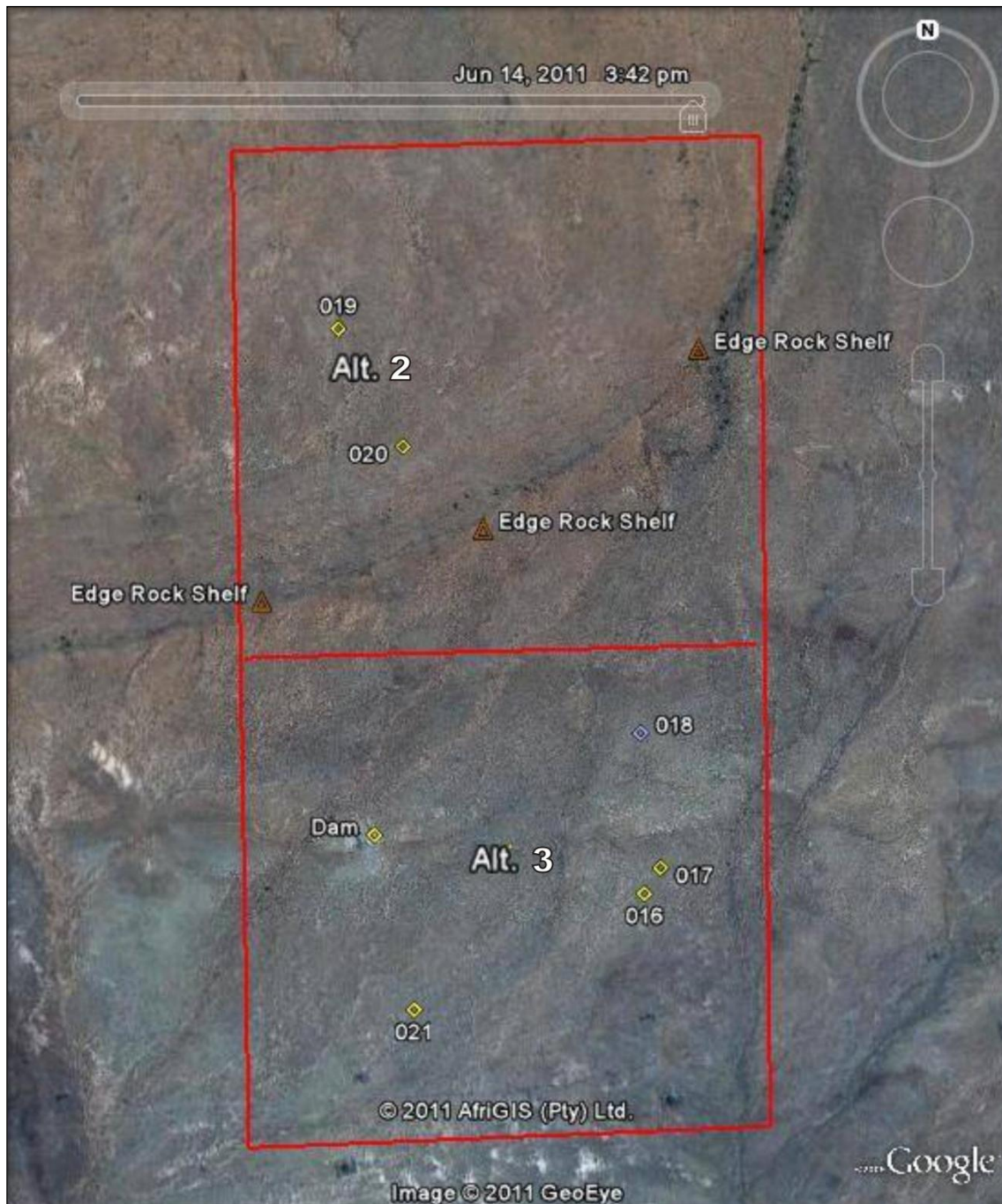
## 6. FINDINGS

A low density background scatter of pre-colonial stone artefacts and two scatters of historical material were found. Figures 10 and 11 show the distributions of recorded material across the three alternative sites. Since no proper archaeological sites were found no formal site numbers have been allocated. The points just refer to places where material was noted and recorded. In several other areas single isolated artefacts were found and not recorded.

### 6.1. Prehistoric archaeology

Although one area yielded a scatter of artefacts that could perhaps be termed an archaeological site (#9), no proper sites were found. Artefacts were found to be scattered widely throughout the study area, although they were clearly far more common on Alternative 1 than on either of the other two. The vast majority of finds were prehistoric and of these most were very well weathered and probably date to the Middle Stone Age (MSA). However, a number of fresher flakes were found and these may relate to the Later Stone Age (LSA). Although no diagnostic Early Stone Age (ESA) material was seen, it is quite likely that some of the severely weathered flakes and cores were ESA. Figures 12 to 20 show a range of artefacts with specific comments included in their captions. The scale in each case is in cm.





**Figure 10:** Aerial photograph of Alternatives 2 and 3 showing the locations of recorded archaeological material. The purple symbol (#18) denotes a historical (recent find) The edge of the rock shelf with higher ground on Alternative 2 and lower ground on Alternative 3 is also indicated.



**Figure 11:** Aerial photograph of Alternative 1 showing the locations of recorded archaeological material. The purple symbols (#8 & #14) denote historical material.



**Figure 12:** Stone artefacts from #2. That on the right appears to be a very heavily weather radial core, presumably ascribable to the ESA.





**Figure 13:** Stone artefacts from #3.



**Figure 14:** Stone artefacts from #4.



**Figure 15:** Stone artefacts from #6. The upper centre proximal flake fragment is a typical MSA artefact.



**Figure 16:** Stone artefacts from #9. This is the only scatter that came close to being an archaeological site rather than background scatter.



**Figure 17:** Location of scatter #9 in an area of eroding sediments.





**Figure 18:** Stone artefacts from #13. The five small artefacts at top centre are all in a similar material and were equally fresh. They likely indicate a LSA scatter.



**Figure 29:** Location of scatter #13.



**Figure 20:** Stone artefacts from #21.

## 6.2. Historical archaeology

Two of the points recorded on Alternative 1 marked the positions of scatters of historical material. #8 was a scatter of late 19<sup>th</sup> century annular ware (Figure 21). The fragments clearly relate to a single vessel that was broken in that area. From the rim and foot sherds present it appears to have been a bowl. At #14 a number of fragments of dark green wine bottle glass were found (Figure 22). They do not represent the entire bottle. On Alternative 3 the base of a single shot-gun cartridge was found (Figures 23 & 24). This cartridge was manufactured in a factory in Hasloch, Germany. An internet search failed to yield much of use but it seems that the factory may have closed at the end of World War II. However, this cartridge looks very well preserved and seems unlikely to be that old.



**Figure 21:** Fragments of annular ware from #8.



**Figure 22:** Fragments of dark green bottle glass from #14.



**Figures 23 & 24:** The base of a well preserved shot gun cartridge.

### 6.3. Built environment

No buildings are present within the study area but a small recent, circular brick and cement dam was present on Alternative 3. It has no heritage value.



**Figure 25:** The small cement and brick dam on Alternative 3.

## 7. CONCLUSIONS

Of the three site alternatives examined, Alternative 1 is seen as being the least desirable from an archaeological point of view, while Alternative 3 is most desirable.

### 7.1. Archaeological Impacts

Although archaeological material was widely distributed in low to very low densities across the three sites, none of it is deemed significant and will not hinder development. One of the functions of the impact assessment is to place such finds on record such that they may be destroyed if necessary. To this end it can be stated that no further archaeological work would be required on any of the three alternative sites. Nevertheless, the archaeological assessment finds Alternative 1 to be the most sensitive and Alternatives 2 and 3 less so. Impact assessment ratings for the three sites are provided in Tables 1 to 3. The nature of the impacts in each case would be the destruction and/or movement of archaeological artefacts on the ground surface. The overall significance rating for Alternative 1 is only slightly higher owing to the greater density of archaeological material on that site. No further mitigation over and above the photographic recording of artefacts conducted during this assessment is suggested.

**Table 1:** Assessment of archaeological impacts for Alternative 2.

	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local	Local
Intensity	Negligible	Negligible
Duration	Permanent	Permanent
Probability	Probable	Probable
Significance	Very low	Very low
Status	Negative	Negative
Reversible	No	
Cumulative impacts	The archaeological material present in the immediate vicinity is of very low significance and the loss of larger areas containing such material is not significant.	

**Table 2:** Assessment of archaeological impacts for Alternative 3.

	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local	Local
Intensity	Negligible	Negligible
Duration	Permanent	Permanent
Probability	Probable	Probable
Significance	Very low	Very low
Status	Negative	Negative
Reversible	No	
Cumulative impacts	The archaeological material present in the immediate vicinity is of very low significance and the loss of larger areas containing such material is not significant.	



**Table 3:** Assessment of archaeological impacts for Alternative 1.

	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local	Local
Intensity	Negligible	Negligible
Duration	Permanent	Permanent
Probability	Highly probable	Highly probable
Significance	Low	Low
Status	Negative	Negative
Reversible	No	
Cumulative impacts	The archaeological material present in the immediate vicinity is of very low significance and the loss of larger areas containing such material is not significant.	

## 7.2. Palaeontological Impacts

This aspect of the assessment was covered by Almond (2011) as a separate desktop specialist report. It was found that the continental sediments of the Teekloof Formation (Poortjie Member) of the Lower Beaufort Group (Karoo Supergroup) would be impacted by any required excavations. The palaeontological sensitivity of the Beaufort Group sediments in the study area is thus considered to be very high. However, given the presence of much recent superficial sediment and the fact the extensive, deep bedrock excavations will not be required, the overall significance of negative impacts to fossil heritage is considered to be low. It is still required, however, that the ECO monitor any excavations into unweathered bedrock and report any fossils that are revealed.

**Table 4:** Assessment of palaeontological impacts for all Alternatives.

	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local	Local
Intensity	Low (but with possible localised areas of High intensity)	Low
Duration	Permanent	Permanent
Probability	Improbable	Improbable
Significance	Low	Low
Status	Negative	Positive
Reversible	No	
Cumulative impacts	Not stated in the specialist report but assumed to be relatively low due to the extensive nature of geological strata. It should be noted that the revealing and subsequent study of fossils through new excavations for development actually constitutes a positive impact as the material cannot be studied on the natural surface.	

## 7.3. Visual Impacts

This aspect of the assessment was covered by Renee Rahaman as a separate desktop specialist report. It was found that the landscape is already transformed by electrical infrastructure and that impacts to the sense of place would be low. Because the panels would primarily face north, their visibility from the N12 that passes the site to its west would be somewhat reduced. Field observations by the present author (JO) furthermore suggest that visibility of Alternatives 2 and 3 from the N1 is very minimal and that the view towards the facility from the west (the only place on the N1 from which one can see the area) would be dominated by the existing Droërvier Substation. One can see the south-western edge of

Beaufort West from Alternative 1 and it thus thought that this option should be the least favoured. Among the remaining two, the presence of an area of raised bedrock on Alternative 2 (Figure 10) suggests that Alternative 3 should be favoured. This alternative is also closest to the existing substation and power lines and would thus result in the least cumulative impact on the landscape from new power lines. No mitigation is suggested for visual impacts.

**Table 5:** Assessment of visual impacts for Alternative 2.

	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local	n/a
Intensity	Low-Medium	n/a
Duration	Long term	n/a
Probability	Highly probable	n/a
Significance	Low-Medium	n/a
Status	Negative	n/a
Reversible	Yes	
Cumulative impacts	Other proximate PV projects are unknown, but the present project will add to the existing electrical infrastructure in the area.	

**Table 6:** Assessment of visual impacts for Alternative 3.

	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local	n/a
Intensity	Low	n/a
Duration	Long term	n/a
Probability	Highly probable	n/a
Significance	Low	n/a
Status	Negative	n/a
Reversible	Yes	
Cumulative impacts	Other proximate PV projects are unknown, but the present project will add to the existing electrical infrastructure in the area. This option would result in the shortest length of new power line.	

**Table 7:** Assessment of visual impacts for Alternative 1.

	<b>Before mitigation</b>	<b>After mitigation</b>
Extent	Local	n/a
Intensity	Medium	n/a
Duration	Long term	n/a
Probability	Highly probable	n/a
Significance	Medium	n/a
Status	Negative	n/a
Reversible	Yes	
Cumulative impacts	Other proximate PV projects are unknown, but the present project will add to the existing electrical infrastructure in the area.	

## 8. RECOMMENDATIONS

Subject to the approval of Heritage Western Cape, it is recommended from a heritage point of view that the proposed project be allowed to proceed. However, on the basis of visual and archaeological considerations, Alternative 3 in the southwest is strongly favoured over the other two. There are no other specific requirements from an archaeological and visual perspective, but the palaeontological study indicates that:

- The ECO should be made aware of the potential for finding fossils and should monitor any excavations into unweathered bedrock; and
- If fossils are uncovered, they should be reported and mitigation may be required.

## 9. REFERENCES

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## **10. INVESTIGATION TEAM**

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