

**ARCHAEOLOGICAL IMPACT ASSESSMENT  
THE PROPOSED WHITEBANK KEREN ENERGY  
SOLAR PLANT ON FARM 379 NEAR KURUMAN  
NORTHERN CAPE PROVINCE**

Prepared for:

**ENVIROAFRICA**

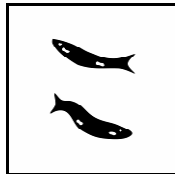
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## Executive summary

The Agency for Cultural Resource Management was appointed to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 10 MW Concentrated Photovoltaic (CPV) Energy Generation Facility on the Remainder Farm 379 Whitebank, about 13 kms northwest of Kuruman in the Northern Cape.

The proposed activity entails the construction of solar panels covering a footprint area of about 20 ha. The CPV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but much of the vegetation on the site will need to be cleared. Associated infrastructure includes internal access roads, trenches for underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction camp. The electricity generated from the project will be fed into the national grid at the Eskom Asbes substation which is situated alongside the site.

The subject property is covered in extremely dense thornveld vegetation, resulting in very poor archaeological visibility. There are a few barely visible cattle and game tracks that allowed for access, but movement over the site was severely constrained.

In terms of Section 38 (1) (c) (iii) of the National Heritage Resources Act 1999 (Act 25 of 1999), an Archaeological Impact Assessment of the proposed project is required if the footprint, area of the proposed development is more than 5000 m<sup>2</sup>.

The AIA forms part of the Environmental Basic Assessment process that is being conducted by EnviroAfrica cc.

The aim of the study is to locate and map archaeological sites/remains that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate any impacts.

A 1 day survey of the proposed site was undertaken by J. Kaplan on 3 March 2012, in which the following observations were made:

Thirty-two archaeological occurrences numbering about 70 stone implements were mapped with a hand held GPS device. Most of the tools are assigned to the Middle Stone Age, but a few ESA tools were also found, including one well crafted bifacial handaxe. No Later Stone Age lithics were recovered. The archaeological remains comprise an unusual, compelling and enigmatic collection, of tools, characterized by some large, heavy, chunky, implements with extensive retouch, step flaking, and utilization damage on blocks of banded ironstone. Lacking stratigraphic context, such tools almost defy description and their function is not clearly apparent. Several pointed flakes and retouched blade tools were also recovered, of which the latter were probably hafted onto shafts of wood and used as spears and stabbing tools. Only three scrapers were found.

Most of the tools are heavily burnished (indicating considerable antiquity), and many of the smaller flakes, chunks and blades are abraded suggesting that they have been rolled around by natural, processes such as erosion, water, or leaching of top soils. While no cores were recovered in the footprint area, it is apparent that some on-site knapping did take place, as several large chunks have been flaked and modified.

More than 94% of the tools found are made on banded ironstone, with the remainder in indurated shale, quartzite, and silcrete. There are large patches of ironstone gravels on the site, and these were clearly targeted by the Stone Age inhabitants at the time. Banded ironstone is known to have been a desirable raw material for making stone artefacts and occurs on a number of sites that have been documented by the archaeologist and others throughout the Northern Cape.

Given the constraints of the survey, most of the tools are spread quite thinly and unevenly over the surrounding landscape, but a few small scatters of implements were documented. While no evidence of any factory or workshop site, or the result of any human settlement was identified, some evidence of knapping was recorded.

As archaeological sites are concerned, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. In all likelihood the collection represents only a very small sample of what is expected to be present on the site, with many more tools hidden under the thick vegetation cover.

The enigmatic nature of the collection means that the archaeological remains on Remainder of Farm 379 Whitebank have been provisionally rated as having medium-low (Grade 3B-3C) local significance, subject to further investigation of the site.

As far could be established, there are no visible graves with headstones, stone cairns, or any other burial ground, or cemetery on the affected property.

In terms of the built environment, the proposed site has no significance, as there are no old buildings, stone ruins, structures, features, public memorials or monuments within the footprint area.

Indications are that in terms of archaeological heritage, the proposed activity (i. e. the construction of a solar energy farm) is viable, subject to further archaeological mitigation.

With regard to the proposed development of the Keren Energy Whitebank Solar Energy Plant on Farm 379, the following recommendations are made:

1. The footprint area should be re-surveyed once the vegetation has been cleared from the site. Archaeological visibility will be much higher and many more stone tools are likely to be encountered. These should be recorded before any physical construction takes place on the site.
2. Should any unmarked human burials/remains or buried ostrich eggshell caches be uncovered, or exposed during construction activities, these must immediately, be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (SAHRA) (Att Ms Mariagrazia Galimberti 021 462 4502). Burials, etc must not be removed or disturbed until inspected by the archaeologist.

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## **1. INTRODUCTION**

### **1.1 Background and brief**

Keren Energy Whitebank (Pty) Ltd, appointed the Agency for Cultural Resource Management to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 10 MW Concentrated Photovoltaic (CPV) Energy Generation Facility on Remainder Farm 379 near Kuruman in the Northern Cape (Figures 1 & 2). The proposed development is situated within the Ga-Segonyana Local Municipality.

The Northern Cape has the highest levels of Solar Irradiance in South Africa, which makes the location of the proposed development ideal for solar energy generation. The renewable energy industry is currently experiencing an explosive growth worldwide. In South Africa, while such energy sources are not expected to replace the country's traditional reliance and dependency on coal-generated power, the National Energy Regulator of South Africa (NERSA) has published a favourable feed-in tariff structure for renewable energy that allows for independent clean energy producers to invest in renewable energy resources. The growing alternative energy industry is considered to be of national importance in anticipation of its contribution to electricity supply and reduced reliance of non-renewable energy sources.

It is in this context that the applicant proposes to construct a solar energy facility north west of Kuruman. The proposed activity entails the construction of about 140 CPV solar panels covering a footprint area of about 20 ha (Figure 3). The CPV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but much of the vegetation on the site will need to be cleared. Associated infrastructure includes single track internal access roads, trenches for underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction camp. The electricity generated from the project will be fed directly into the national grid at the Eskom Asbes substation which is situated alongside the site.

The AIA forms part of the Environmental Basic Assessment process that is being conducted by EnviroAfrica cc.

The aim of the study is to locate and map archaeological sites/remains that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate the impacts.

## **2. HERITAGE LEGISLATION**

The National Heritage Resources Act (Act No. 25 of 1999) makes provision for a compulsory Heritage Impact Assessment (HIA) when an area exceeding 5000 m<sup>2</sup> is being developed. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))

Archaeological study proposed solar energy plant on Farm 379 near Kuruman

- Buildings or structures older than 60 years (Section 34);
- Archaeological sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

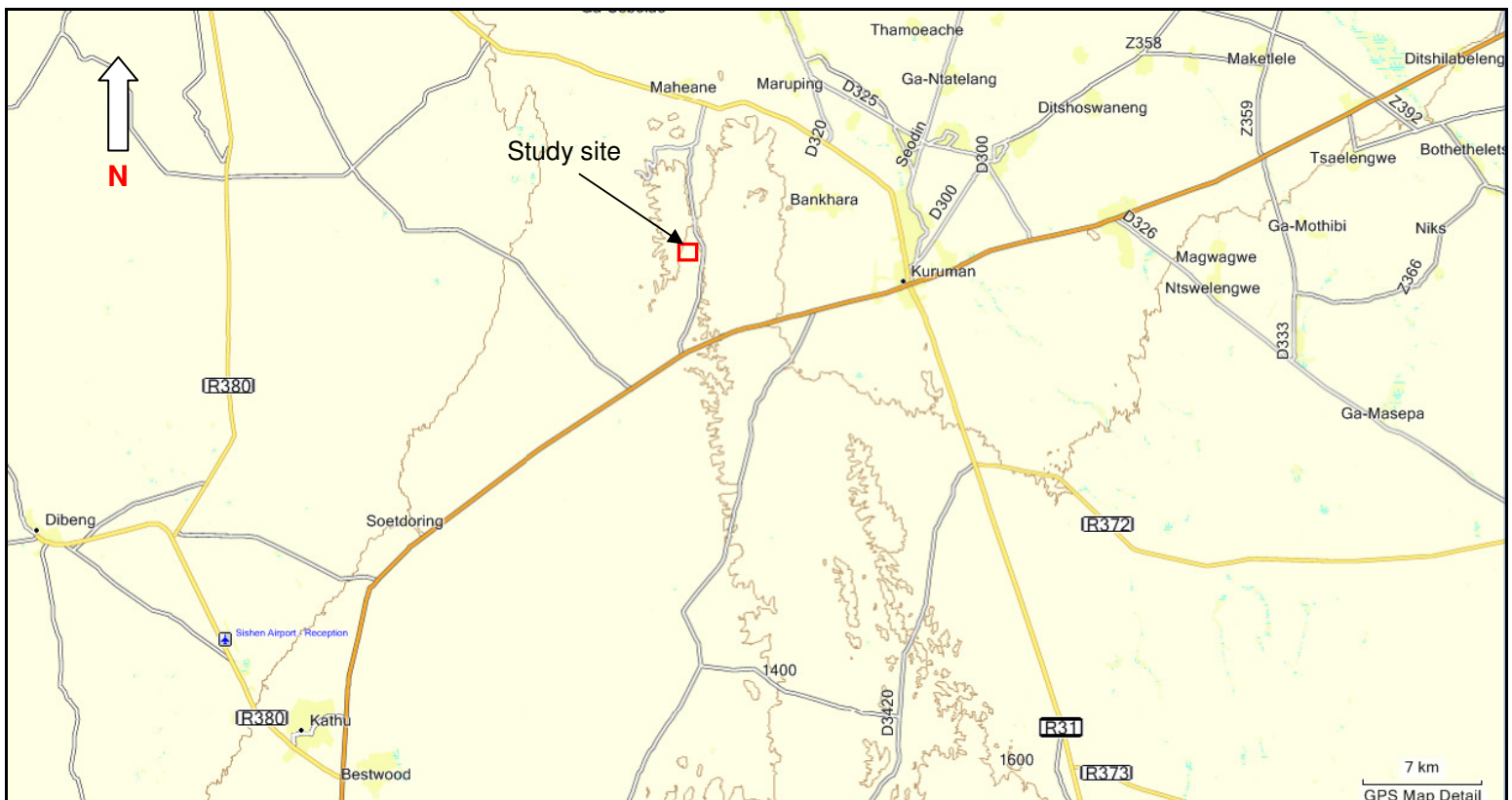


Figure 1. Locality Map.

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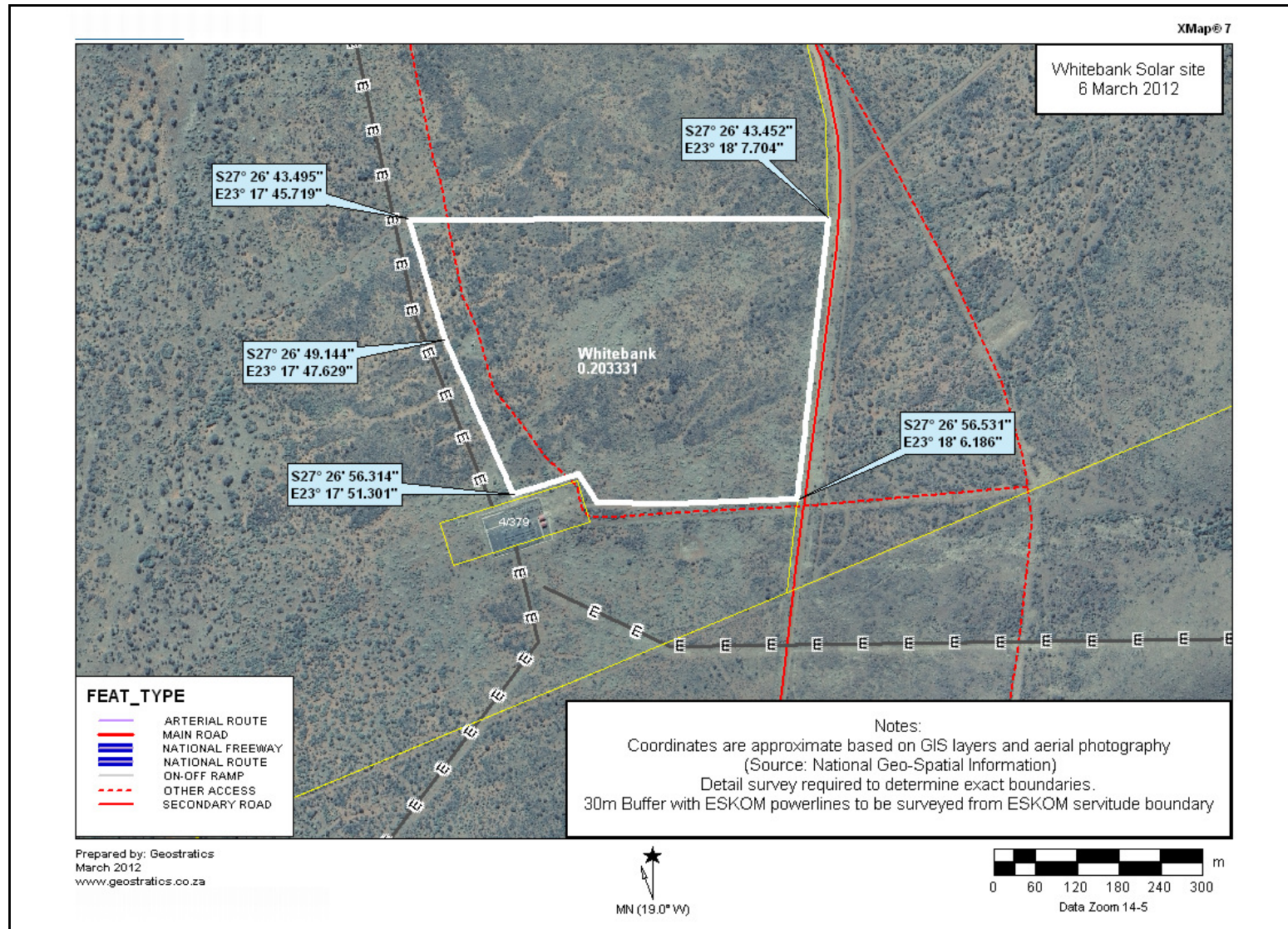


Figure 2. Satellite image showing the footprint area of the proposed Whitebank Solar Energy Plant

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Figure 3. Aerial photographing illustrating the proposed layout of the CPV panels.



### **3. TERMS OF REFERENCE**

The terms of reference for the study were to.

- Determine whether there are likely to be any important archaeological resources that may potentially be impacted by the proposed project, including the erection of the solar panels, internal access roads, trenches for underground cables, and any other associated infrastructure;
- Indicate any constraints that would need to be taken into account in considering the development proposal;
- Identify potentially sensitive archaeological areas, and
- Recommend any further mitigation action.

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

An aerial photograph indicating the location site of the proposed Whitebank Solar Energy Plant is illustrated in Figure 4. The proposed site is situated about 13 kms northwest of Kuruman. Access to the property is via DR3454, a gravel road that turns off the N12. The Kuruman hills are located north and west of the proposed site. The proposed site slopes fairly gently from the east to the southwest. There are a few barely visible cattle and game tracks that allow for access to the site, There are some larger patches of grassland on the property where cattle and game have been grazing, but the bulk of the 20 ha site is covered in very thick thorny vegetation (Kuruman Thornveld).

There are areas on the site that are covered in gravels of banded ironstone, and even larger areas that are covered in red sands where surface stone is virtually absent. There are no significant landscape features on the site, and surrounding land use is grazing and vast tracts of vacant land. An, Eskom servitude is located alongside the western boundary which connects to the existing Eskom Asbes 66/11 Kv substation in the south western corner of the property.

There are no old buildings, stone ruins, structures or features on the proposed site.

As far as could be established, there are no visible graves within the footprint area of the proposed solar farm.

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Figure 4. Aerial photograph of the proposed site in relation to Kuruman



Figure 5. View of the site facing north west



Figure 6. view of the site facing south. The red building in the background is the Asbes substation



Figure 7. View of the site facing south east. Note the thick grassland vegetation in the foreground of the plate



Figure 8. View of the site facing south east. Some ironstone gravels can be seen in the foreground of the plate



Figure 9. View of the site facing south. Note the extremely thick Kuruman Thornveld vegetation which is between 1 and 3 m high in places

## **5. STUDY APPROACH**

### **5.1 Method of survey**

A survey of the proposed footprint area was undertaken by J Kaplan on 3 March, 2012.

A trackpath of the survey was created (refer to Figure 10).

All archaeological occurrences documented during the study were mapped in-situ using a hand-held Garmin Oregon 300 GPS device set on the map datum WGS 84.

A collection of tools were photographed, including the context in which some of the artefacts were found.

A desk top study was also done.

### **5.2 Constraints and limitations**

The proposed site is almost completely covered in dense Kuruman Thornveld vegetation, resulting in very low archaeological visibility. The site is virtually impenetrable in many places. Access was severely restricted and this was a major constraint when approaching the study.

### **5.3 Identification of potential risks**

Potentially important archaeological heritage (i. e. stone implements) may be impacted by the proposed development. Vegetation clearing operations, in preparation of the site for development, will very likely expose scatters of stone implements on the surface of the site.

### **5.4 Results of the desk top study**

The archaeology of the Northern Cape is rich and varied covering long spans of human history. According to Beaumont et al (1995:240) “thousands of square kilometres of Bushmanland are covered by a low density lithic scatter”. Webley & Halkett (2008) have noted that there has been very little archaeological work undertaken north of Kuruman, but there are reports of rock engravings to the north of the town. Most of our knowledge of the archaeology of the region is largely dependent on the work undertaken by Humphreys & Thackeray (1983) to the south of Kuruman, and on the Ghaap escarpment, as well as that of Beaumont (1990). J. Kaplan (2012) has recently undertaken an AIA for a proposed solar power farm about 30 kms north of Kuruman alongside the R31. While the footprint area for the proposed solar facility is quite heavily vegetated, low density, and dispersed scatters of both Early, Middle and Later Stone Age remains were encountered.

## **6. FINDINGS**

A description of the archaeological finds located during the study is presented in Table 2 in Appendix I.

Thirty-two archaeological occurrences numbering about 70 stone implements were mapped with a hand held GPS device (Figure 10). Most of the tools are assigned to the Middle Stone Age, but a few ESA flake tools were also found, including a bifacial handaxe (184), and several bifaces (200 & 203). No Later Stone Age lithics were recovered. The archaeological remains comprise an unusual and enigmatic collection, of tools, characterized by some large, heavy, chunky, implements with extensive retouch, step flaking, and utilization damage on blocks of banded ironstone. Lacking stratigraphic context, such tools almost defy description and their function is not readily apparent. Several pointed flakes and retouched blade tools were also recovered and these were probably hafted onto shafts of wood and used as spears or stabbing tools. Only three scrapers were found

Most of the tools are heavily burnished (indicating their considerable antiquity), and many of the smaller flakes, chunks and blades are also abraded suggesting that they have been rolled around by natural, processes such as erosion, water, or leaching of top soils. While no cores were recovered in the footprint area, it is apparent that some on-site knapping did take place, as several large chunks have been flaked and modified.

More than 94% of the tools found are made on banded ironstone, with the remainder in indurated shale, quartzite, and silcrete. There are large patches of ironstone gravels on the site, and these were clearly targeted by the Stone Age inhabitants at the time. Banded ironstone is known to have been a desirable raw material for making stone artefacts and occurs on a number of sites that have been documented by the archaeologist and others throughout the Northern Cape.

Given the constraints of the survey, most of the tools are spread quite thinly and unevenly over the surrounding landscape, but a few small scatters of implements were documented. While no evidence of any factory or workshop site, or the result of any human settlement was identified, some evidence of knapping was recorded.

As archaeological sites are concerned, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. In all likelihood the collection represents only a very small sample of what is expected to be present on the site, with many more tools hidden under the thick vegetation cover.

A collection of tools documented during the study and the context in which some of them were found are illustrated in Figures 11-20.

### **6.1 Significance of the archaeological remains**

The enigmatic nature of the collection means that the archaeological remains on Remainder of Farm 379 Whitebank have been provisionally rated as having medium-low (Grade 3B-3C) local significance, subject to further investigation of the site.

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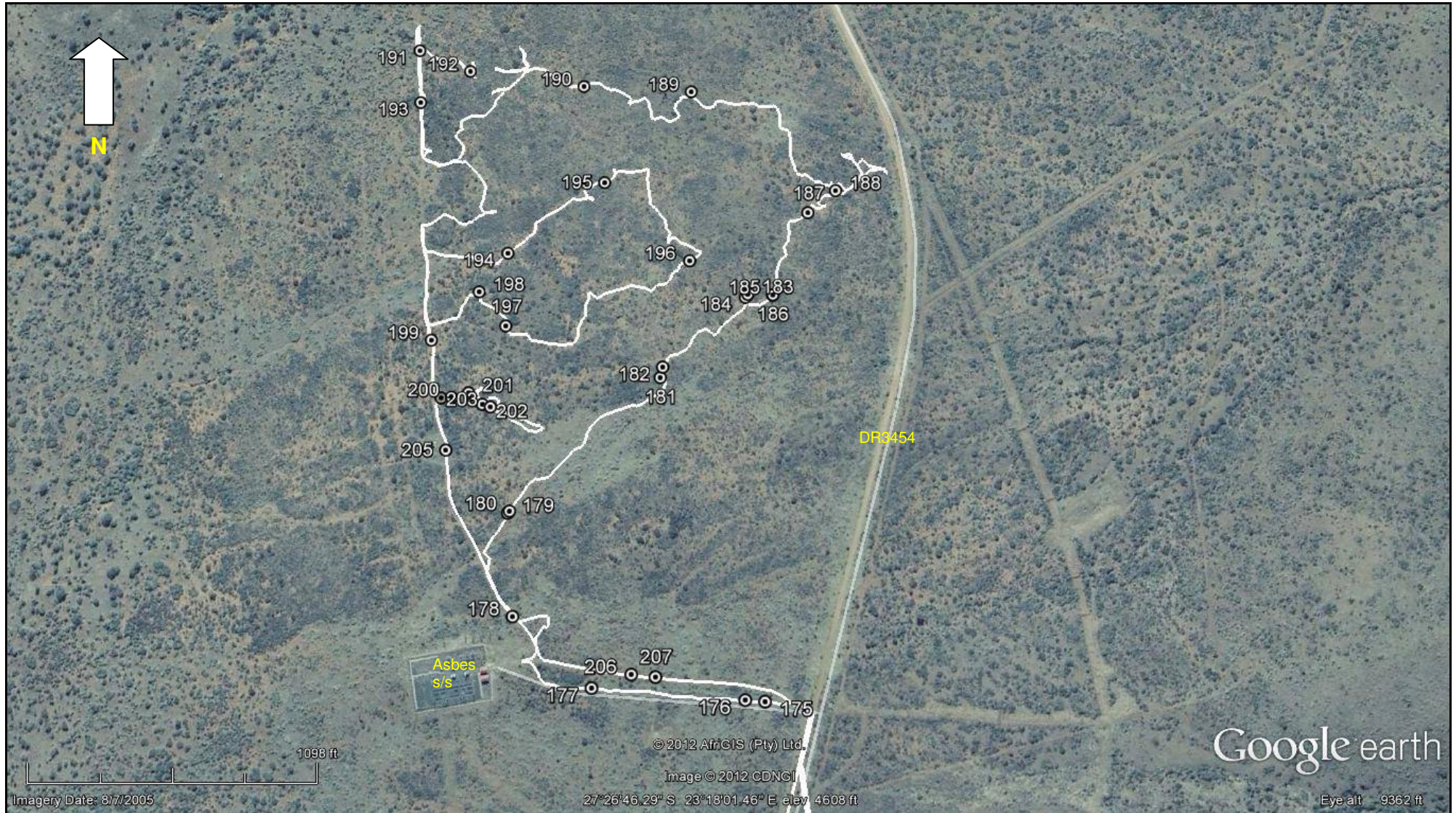


Figure 10. Track paths and waypoints of archaeological finds (refer to Table 2 in Appendix I)

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Figure 11. 175. Scale is in cm



Figure 14. 183/184. Scale is in cm



Figure 12. 176

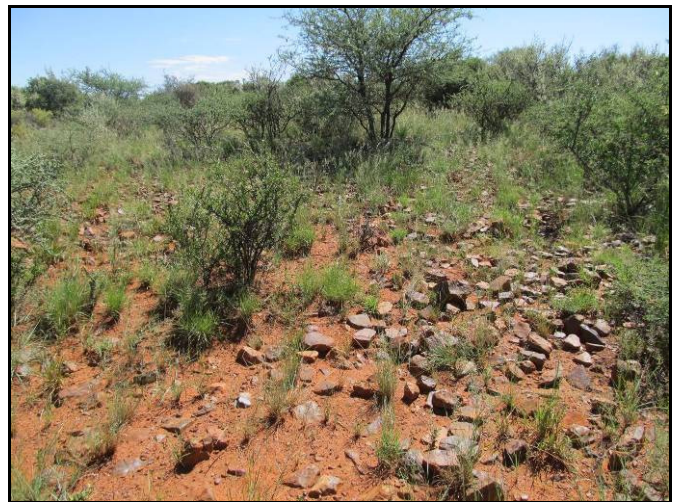


Figure 15. 183/184. Context in which the tools were found



Figure 13. 183. Evidence of stone knapping on the site



Figure 16. 180 & 183. Scale is in cm





Figure 17. 189 Scale is in cm



Figure 20. 205. Scale is in cm



Figure 18. 192. Scale is in cm



Figure 21. Collection of tools. Scale is in cm



Figure 19. 200 Scale is in cm



Figure 22. Collection of tools. Scale is in cm



Figure 23. 183 & 185



Figure 24. 205. Scale is in cm

## 6.2 The built environment

In terms of the built environment, the area has no significance, as there are no old buildings, structures, stone ruins, or features in the footprint area.

## 7. ASSESSMENT OF IMPACTS

The proposed Keren Energy Whitebank Solar Energy Plant will impact on an unusual and compelling collection of Middle Stone Age implements, characterized by heavy, chunky, retouched, step flaked and utilized tools, including a small sample of bifacial pointed flakes, blades, retouched flakes and scrapers. In all likelihood the tools recovered represent only a very small sample of what is expected to be present on the site, which is covered in very dense vegetation (Table 1).

<b>Potential impacts on archaeological heritage</b>	
Extent of impact:	Site specific
Duration of impact;	Permanent
Intensity	Low
Probability of occurrence:	Probable
Significance without mitigation	Medium-high
Significance with mitigation	Positive
Confidence:	High

Table 1. Assessment of archaeological impacts.

## **8. CONCLUSION**

Development of the proposed Keren Energy Whitebank Solar Energy Plant will impact on potentially significant pre-colonial archaeological heritage. Larger numbers of stone implements will very likely be exposed during vegetation clearing operations, in the course of preparation of the site for development. Such tools are likely to occur in-situ as very little disturbance has taken place on the site to date. Evidence for workshop sites, activity areas, or human settlement may be identified.

Indications are, however, that in terms of the archaeological heritage, the proposed activity (i. e. the construction of a solar energy farm) is viable, subject to further archaeological investigation.

## **9. RECOMMENDATIONS**

With regard to the proposed development of the Whitebank Solar Energy Plant on Remainder Farm 379 Whitebank, near Kuruman, the following recommendations are made:

1. The footprint area should be re-surveyed once the vegetation has been cleared from the site. Archaeological visibility will be much higher and many more stone tools are likely to be encountered. These should be recorded before any physical construction takes place on the site.
2. Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (SAHRA) (Att Ms Mariagrazia Galimberti 021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

## 10. REFERENCES

Beaumont, P. 1990. Kathu Pan. Guide to archaeological sites in the Northern Cape. Southern African Association of Archaeologists Post-Conference Excursion: 9-13 September 1990.

Beaumont, P.B. & Vogel, J.C. 1984. Spatial patterning of the ceramic Later Stone Age in the Northern Cape Province, South Africa. In: Hall, M., Avery, G., Avery, D.M., Wilson, M.L. & Humphreys, A.J.B. (eds) *Frontiers: southern African archaeology today*: 80-95. Oxford: British Archaeological Reports International Series 207.

Humphreys, A.J.B. & Thackeray, A. I. 1983. Ghaap and Gariep: Later Stone Age studies in the Northern Cape. The South African Archaeological Society Monograph Series No 2. Cape Town.

Kaplan, J. 2012. Agency for Cultural Resource Management, the proposed Mount Roper Roma Solar Plant on Farm Mount Roper 321 near Kuruman, Northern Cape. Report prepared for EnviroAfrica. Agency for Cultural Resource Management.

Webley, L & Halkett, D. 2008. Phase 1 Heritage Impact Assessment: proposed prospecting on the Farm Adams 328 and Erin 316 Kuruman, Ga-Segonyana Municipality. in the Northern Cape. Report prepared for Zama Mining Resources (Pty) Ltd. Archaeology Contracts Office, Department of Archaeology, University of Cape Town.

Appendix I

Archaeological study proposed solar energy plant on Farm 379 near Kuruman

Name of Site	Name of Farm	Lat/Long	Finds
	Remainder Farm 379 Whitebank		
175		S27 26.948 E23 18.076	Thick utilized flake in old access road
176		S27 26.949 E23 18.062	Large utilised/retouched blade
177		S27 26.955 E23 17.956	Large possible convex and side retouched scraper
178		S27 26.918 E23 17.894	Flat MRP/scraper
179		S27 26.855 E23 17.879	Utilized flake
180		S27 26.854 E23 17.880	Large adze like tool on block of b. ironstone
181		S27 26.758 E23 17.973	Triangular shaped MSA, weathered retouched/utilized
182		S27 26.751 E23 17.973	Chunky utilized flake
183		S27 26.698 E23 18.027	Large retouched flake/chunk
184		S27 26.700 E23 18.025	ESA biface/ <b>handaxe</b> - quartzite
185		S27 26.696 E23 18.045	Long, pointed chunky and retouched blade
187		S27 26.640 E23 18.062	Triangular shaped MSA utilized flake
188		S27 26.624 E23 18.080	Several retouched and utilised pieces on patch of gravel
189		S27 26.568 E23 17.966	Several retouched and utilised flakes and blade on patch of gravel, including large flaked/knapped chunks
190		S27 26.573 E23 17.886	X 2 large retouched flakes
191		S27 26.560 E23 17.760	Pointed MSA flake in servitude
192		S27 26.570 E23 17.800	Thick slab of b. ironstone, retouched, and several ?MSA flakes, inc. MRP
193		S27 26.596 E23 17.767	Stone in servitude – 1-2 worked pieces
194		S27 26.689 E23 17.850	Retouched, burnished blade in drainage channel
195		S27 26.636 E23 17.912	Double sided misc retouched chunky blade
196		S27 26.680 E23 17.982	MSA bifacial flake, flaked chunk, <b>silcrete</b> side scraper, retouched flake on patch of ironstone gravel
197		S27 26.737 E23 17.857	Large flake, x 2 chunky cobbles, miscellaneous retouched biface (?MSA), broken flake in indurated shale, flat retouched MSA flake, large misc. retouched flake
198		S27 26.717 E23 17.834	Large flat 'flake' retouched/utilized, silcrete flake, large thick retouched chunky flake on slab on banded ironstone – patch of gravel
199		S27 26.752 E23 17.805	MSA flake, flaked chunk, broken flake, fat chunky retouched flake, large retouched chunky slab
200		S27 26.787 E23 17.826	Large thick cleaver like biface (?ESA) with steep misc retouch
201		S27 26.783 E23 17.838	Large slab retouched edge, small MSA flake
202		S27 26.789 E23 17.849	Flat silcrete utilised and retouched MSA flake
203		S27 26.790 E23 17.855	Large crude biface (?handaxe), broken MSA flake, fat chunky blade flake on ironstone gravel patch
204		S27 26.788 E23 17.819	Large, chunky, MSA flake
205		S27 26.821 E23 17.828	Large side retouched pointed flake, MSA chunk, large blade tool on heavy slab of ironstone
206		S27 26.943 E23 17.982	Large chunky, burnished misc retouched flake ?MSA in Eskom road
207		S27 26.943 E23 17.999	Large round burnished core in Eskom road

Table 2. Spreadsheet of waypoints and description of archaeological finds. Unless otherwise stated, all implements are in banded iron stone