Appendix D3a: Updated Archaeological Assessment/Addendum (2017 revision)

CURRICULUM VITAE

Name: Jonathan Michael Kaplan

Profession: Archaeologist/Heritage Practitioner

Date of Birth: 23-09-1961

Name of Company: Agency for Cultural Resource Management (ACRM)

Position: Director

Nationality: South African

ID Number: 6109235177089

Marital status: Married with two children

Languages:
First language: English
Other: Afrikaans

Contact details: 5 Stuart Road
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Qualifications:
- MA (Archaeology) University of Cape Town, 1989.

Professional registration:
- Association of Southern African Professional Archaeologists (ASAPA) Membership No. 253
- Registered with the South African Heritage Resources Agency (SAHRA)
- Association of Professional Heritage Practitioners (APHP)

Publications:
- Jerardino, A., Halkett, D., Hart, T., Kaplan, J., Navarro, R, & Nilssen, P. 2016 (in press). Filling-in the gaps and testing past scenarios on the central West Coast: hunter-gatherer subsistence and mobility at 'Deurspring 16' shell midden, Lamberts Bay, South Africa. South African Archaeological Bulletin
- Kaplan, J. & Mitchell, P. 2012. The archaeology of the Lesotho Highlands Water Project Phases 1A and 1 B. South African Humanities 24:1-32. KwaZulu Natal Museum.
- Sealy, J., Maggs, T., Jerardino, A. & Kaplan, J. 2004. Excavations at three shell middens at Melkbosstrand: variability among herder sites on Table Bay. South African Archaeological Bulletin 59:17-28.
- Kaplan, J. 1993. The state of archaeological information in the coastal zone from the Orange River to Ponta do Ouro. Report prepared for the Department of Environmental Affairs and Tourism. Agency for Cultural Resource Management.
- Kaplan, J. 1990. The Umhlatuzana Rock Shelter sequence: 100 000 years of Stone Age history. Natal Museum Journal of Humanities 2:1-94.

- Kaplan, J. 1989. 45 000 years of hunter-gatherer history at Umhlatuzana Rock Shelter: South African Archaeological Society Goodwin Series 6:7-16
- Kaplan, J. 1987. Settlement and Subsistence at Renbaan Cave. In Parkington, J. & Hall, M (Eds). Papers in the Prehistory of the Western Cape, South Africa. British Archaeological Reports International Series 332:237-261

Countries of work experience:
South Africa, Lesotho, Swaziland, Namibia, Botswana, Mozambique

Services offered:
- Archaeological Impact Assessments
- Heritage Impact Assessments
- Heritage Management Plans
- Heritage tourism
- Rock art recording
- Excavation and data analysis
- Monitoring of construction activities

Company profile:
ACRM was founded by Jonathan Kaplan in 1992 and is one of the oldest heritage consultancies in the country. Jonathan has completed more than 1500 Archaeological and Heritage Impact Assessments (HIA & AIAs), specialising in Stone Age, rock art and herder studies. He has undertaken baseline studies on large infrastructure projects, including the Lesotho Highlands Water Project, Maguga Dam (Swaziland), Namibia/Botswana Water Transfer Project, Sasol/ACO Gas Pipeline (South Africa & Mozambique), Corridor Sands (Mozambique) and numerous utility projects for Eskom, the Department of Transport and Public Works, local and provincial authorities, as well as private developers. Since 2010, ACRM has conducted baseline studies (Scoping and full EIA) on a large number of alternative energy (wind and photo-voltaic) projects in the Western and Northern Cape Provinces.

Jonathan has a MA degree in Archaeology (UCT 1989) and is an Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management (CRM) practitioner (Membership No 253).

ACRM has been registered since 1992.

Declaration:

I confirm that the above CV is an accurate description of my experience and qualifications.

Signature **Date**: 15 January, 2016

Agency for Cultural Resource Management
Specialists in Archaeological Studies and Heritage Resource Management

09 March, 2017

Att: Mr Bernard de Wit
EnviroAfrica cc
PO Box 5367
Somerset West
7135

Dear Mr de Wit,

ARCHAEOLOGICAL IMPACT ASSESSMENT ROMA ENERGY MOUNT ROPER PV PLANT ON FARM 321 NEAR KURUMAN, NORTHERN CAPE PROVINCE

An Archaeological Impact Assessment (AIA) for the Roma Energy Mount Roper Solar Energy Facility on Farm 321 near Kuruman (Ga-segonyana local Municipality) in the Northern Cape, was undertaken by ACRM in 2012[1] (Figures 1 & 2).

The following observations were made:

➢ 31 archaeological occurrences (numbering more than 50 stone implements) were recorded during the study. Most of the tools are assigned to the Middle Stone Age (MSA) and Later Stone Age (LSA), while only one Early Stone Age (ESA) biface was found. The tools comprised utilized and retouched pieces, round cores and chunks, while several large blade tools of the Fauresmith Industry were also noted. More than 90% of the lithics are made on locally available banded ironstone, with the remainder in indurated shale, chalcedony and quartzite. The tools are spread very thinly and unevenly over the surrounding landscape. Most of the implements were found on patches of ironstone gravels. The bulk of the site, however, is underlain by red Kalahari sands with little surface stone present.

No graves or typical grave markers were found during the study.

Grading of the archaeological remains

Despite the relatively small number of tools recorded, the archaeological remains have provisionally been rated as having *medium-low* (Grade 3B-3C) significance, subject to further investigation of the site.

The following recommendations were made:

1. The footprint area across the northern portion of the development site must be re-surveyed once the vegetation has been cleared from the site. Archaeological visibility will be higher and many more tools are likely to be encountered on the ironstone gravels which cover this portion of the farm. These should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological record.

[1] Kaplan, J. 2012. Archaeological Impact Assessment, proposed Mount Roper Roma Energy Solar Plan on Farm 321 near Kuruman, Northern Cape Province. Report prepared for EnviroAfrica. ACRM, Cape Town

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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 contracted archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (Natasha Higgit 021 462 4509).

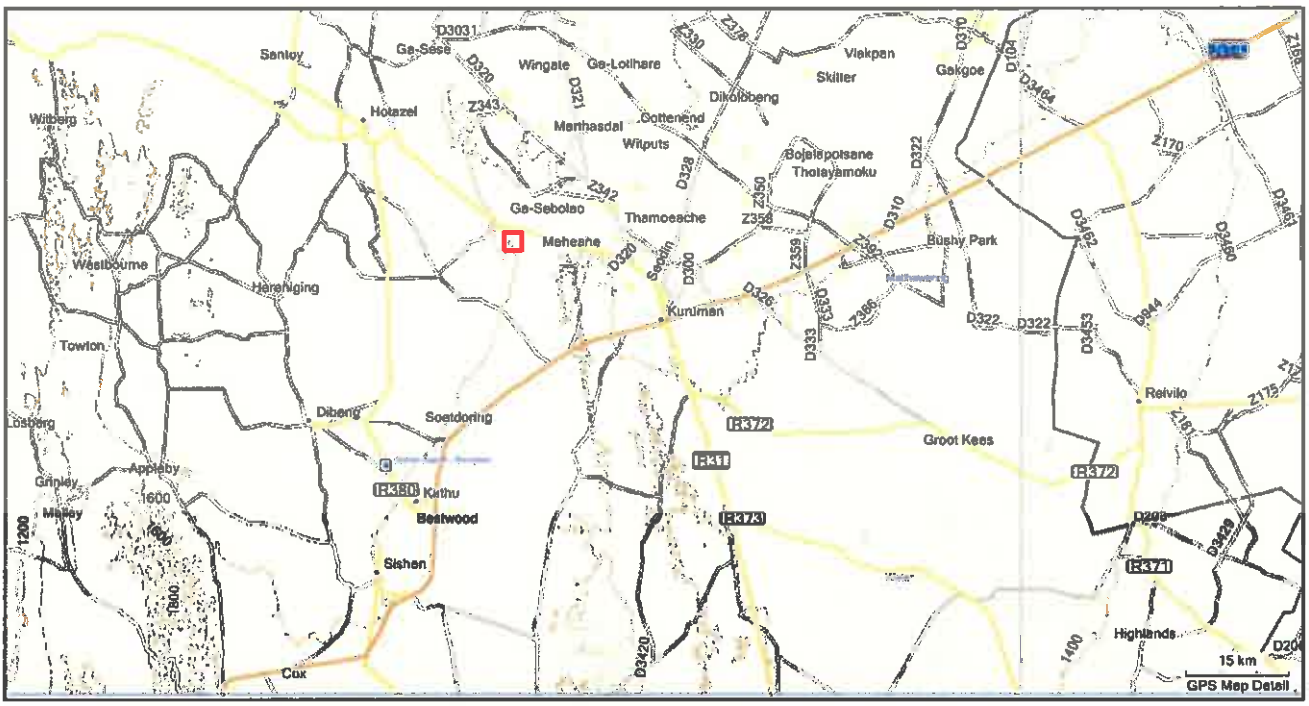

Figure 1. Locality map. Arrow indicates the study site (red polygon)

Figure 2. Google satellite map indicating the location of the proposed Mount Roper PV facility (red polygon)

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SAHRA reviewed the AIA report (File No. 9/2/055/0002) on 28 June, 2012 and supported the recommendations made by the heritage practitioner.

The AIA report was submitted to the Department of Environment Affairs as part of the Environmental Impact Assessment process undertaken by EnviroAfrica cc.

However, the project did not proceed and the environmental authorization lapsed, necessitating a new Basic Assessment process, and re-submission of the archaeological assessment.

2. TERMS OF REFERENCE

ACRM has been instructed to:

1. Undertake a field assessment;
2. Confirm or re-evaluate the findings of the original study, and
3. Address cumulative impacts

3. FINDINGS

The proposed development site was visited on 22nd February 2017 (Figures 3-6), where two hours was spent walking the footprint area.

A track path of the survey was created (Figure 7).

A spreadsheet of waypoints and description of archaeological finds is presented in Table 1.

A collection of heritage resources and the context in which they were found is illustrated in Figures 8-13.


Figure 3. View of the proposed site facing north west

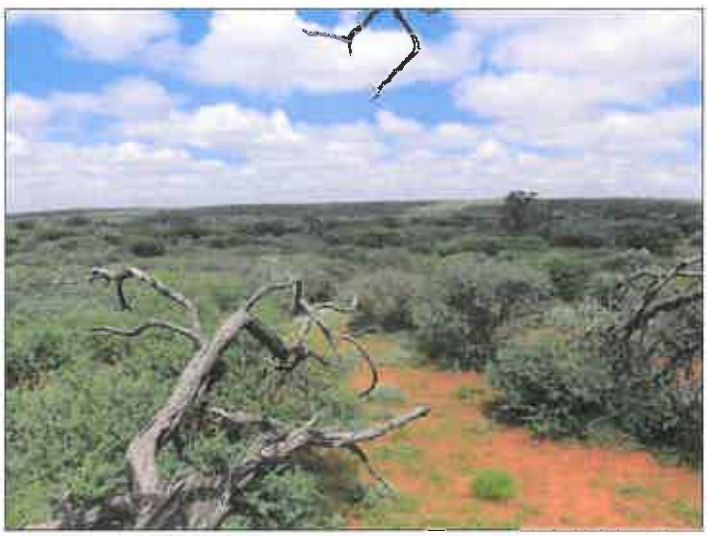
Figure 4. View of the site facing north west

Figure 5. View of the site facing west

Figure 6. View of the site facing west

Figure 7. Track paths in red and waypoints of archaeological finds (refer to Table 1). Note the location of the Eskom Riries substation

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Site	Name of farm	Lat/long	Description of finds	Grading	Suggested mitigation
	Farm 321 Mount Roper				
1241		S27° 20.694' E23° 11.256'	Flakes, chunks, retouched/utilized pieces, 1 round core, in banded ironstone, on extensive sheet of ironstone gravels alongside powerline servitude	3C (low)	None required
1251		S27° 20.721' E23° 11.308'	Banded ironstone retouched flake & chunks on patch of ironstone gravels	3C (low)	None required
1261		S27° 20.756' E23° 11.336'	Large banded ironstone MSA retouched flake/end scraper on patch of ironstone gravels	3C (low)	None required
1271		S27° 21.029' E23° 11.338'	Several worked pieces of banded ironstone (flake & chunks) on patch of ironstone gravels and cobbles.	3C (low)	None required
1291		S27° 20.999' E23° 11.274'	Large banded ironstone flake in road running down middle of the site	3C (low)	None required
1301		S27° 20.952' E23° 11.240'	Large patch of stone in middle of road, - a few flakes and chunks in banded ironstone	3C (low)	None required
1312		S27° 20.823' E23° 11.162'	Banded ironstone core	3C (low)	None required
1321		S27° 20.876' E23° 11.333'	Large end scraper in banded ironstone	3C (low)	None required
1331		S27° 21.015' E23° 11.299'	Small LSA banded ironstone scraper	3C (low)	None required
1341		S27° 20.989' E23° 11.286'	Patch of ironstone gravels – 2 banded ironstone retouched Fauresmith MSA blades & flake	3C (low)	None required
1351		S27° 20.915' E23° 11.225'	Flake & chunk in road	3C (low)	None required
1361		S27° 20.856' E23° 11.192'	Core and chunk in road - gravels	3C (low)	None required
1371		S27° 20.739' E23° 11.197'	Flake on red sands	3C (low)	None required

Table 1. Spreadsheet of waypoints and description of archaeological finds (2017 study)

Figure 8. Collection of stone tools (February 2017). Scale is in cm

Figure 9. Collection of stone tools (February 2017). Scale is in cm

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Figure 10. Site 1321. Scale in cm

Figure 11. Collection of tools (February 2017). Scale in cm

Figure 12. Site 1241. Context in which the remains were found

Figure 14. Site 1271. Context in which the remains were found

Figure 13. Site 1251. Context in which the remains were found

Figure 15. Site 1341. Context in which the remains were found

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4. CUMULATIVE IMPACTS ON ARCHAEOLOGICAL HERITAGE

According to the Department of Environmental Affairs (DEA) Renewable Energy EIA Application Database for renewable projects (new builds)[2], there is only one other renewable energy (RE) project planned within a 30km radius of Mt Roper. Despite the presence of this site, it will not impact on archaeological resources in the proposed PV site.

Apart from the Eskom Riries substation, overhead powerlines, and farming infrastructure on the property (fences, boreholes, earth dam, etc.), there are no other industrial-type developments surrounding the proposed PV facility.

5. CONCLUSION

A re-assessment of the proposed Roma Energy Mount Roper PV facility on Farm 321, confirms the observations made during the original archaeological study (Kaplan 2012), which found mainly dispersed scatters of stone implements associated with extensive ironstone gravels.

As long as the recommendations made in the 2012 study are adhered too, there are no objections to the proposed development, proceeding.

The recommendations must be included in the Environmental Management Plan (EMP) for the proposed development.

Yours sincerely

Jonathan Kaplan

[2] https://dea.maps.arcgis.com/apps/webappviewer/index.html?id=b8452ef22aeb4522953f1fb10e6dc79e

CURRICULUM VITAE

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Jonathan has a MA degree in Archaeology (UCT 1989) and is an Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management (CRM) practitioner (Membership No 253).

ACRM has been registered since 1992.

Declaration:

I confirm that the above CV is an accurate description of my experience and qualifications.

Signature **Date**: 15 January, 2016

Appendix D3a: Archaeological Impact Assessment
(Original report)

ARCHAEOLOGICAL IMPACT ASSESSMENT THE PROPOSED MOUNT ROPER ROMA ENERGY SOLAR PLANT ON FARM 321 NEAR KURUMAN NORTHERN CAPE PROVINCE

Prepared for:

ENVIROAFRICA
Att: Mr Bernard de Wit
PO Box 5367
Helderberg
7135
E-mail: Bernard@enviroafrica.co.za

On behalf of:

ROMA ENERGY MOUNT ROPER (PTY) LTD

By

Jonathan Kaplan
Agency for Cultural Resource Management
5 Stuart Road
Rondebosch
7700
Ph/Fax: 021 685 7589
Mobile: 082 321 0172
E-mail: acrm@wcaccess.co.za

MARCH
2012

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 Farm 321 Mount Roper, 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 Riries substation which is situated about 600 m north of the site.

The proposed site for the solar farm is located about 31 kms northwest of Kuruman alongside the R31. A large portion of the site is covered in dense thornveld vegetation, resulting in very poor archaeological visibility. This is particularly so across most of the northern portion of the footprint area, where access was severely constrained. There are, however, a number of gravel farm roads and game tracks that intersect the site, allowing for some movement across the landscape.

In terms of Section 38 (1) (c) (iii) of the National Heritage Resources Act 1999 (Act 25 of 1999), a Heritage Impact Assessment of the proposed project is required if the footprint, area of the proposed development is more than 5000 m².

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-one archaeological occurrences were mapped with a hand held GPS device. Most of the tools recorded during the survey are assigned to the Middle and Later Stone Age. Only one Early Stone Age biface (a possible handaxe) was recovered. The tools are spread fairly thinly and unevenly over the landscape, but tend to cluster across the northern portion of the property which is overlain by extensive sheets of ironstone gravels. The southern portion of the farm is covered in red sands where surface stone is virtually absent.

Most of the lithics recorded comprise modified (i. e. retouched and utilized) flakes and pieces of stone, but several retouched blade tools, and two pointed flakes were also found. Four scrapers were recovered, including one end scraper on a long blade, and three convex scrapers. Some of the tools are burnished, while others are also abraded (having been rolled about natural processes).

Several low density scatters of tools were documented on the gravels across the northern portion, while a very thin scatter of MSA flake tools (in indurated shale and ironstone) was recovered from alongside small, dry pan.

The western portion of the site is very degraded due to extensive grazing, trampling and infrastructure and a few dispersed flake tools were also found in this area. However, no evidence of any factory or workshop site, or the result of any human settlement was identified.

More than 90% of the tools found are made on banded ironstone with the remainder in indurated shale, chalcedony and quartzite. Sheets of ironstone gravels are prolific across the vegetated northern portion of the footprint area. Banded ironstone is known to have been a desirable raw material for making stone artefacts and occurs on a number of sites throughout the Northern Cape.

As archaeological sites are concerned, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. The collection recovered, however, most likely represents only a very small sample of what is expected to be present on the site, with many more tools hidden among the ironstone gravels under the vegetation cover across the northern footprint area.

Despite the relatively small number of tools counted, and the disturbed context in which many of them were found (gravel roads), the archaeological remains on Farm 321 Mount Roper have been provisionally rated as having medium-low (Grade 3B-3C) local significance, subject to further investigation of the site.

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, ruins, structures, public memorials or monuments in 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 Roma Energy Mount Roper Solar Energy Plant on Farm 321, the following recommendations are made:

1. The footprint area across the northern portion of the site 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 on the ironstone gravels which overlie this portion of the farm. These should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological remains.

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.

Table of Contents

1. INTRODUCTION

1.1 Background and brief

Roma Energy Mount Roper (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 Farm 321 Mount Roper northwest of Kuruman in the Northern Cape Province (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 Riries 66/11 kV substation which is situated about 600 m further to the north, alongside the R31. An existing powerline is located alongside the northern boundary of the footprint area, so no new transmission line is required for the project.

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 m² 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))
- 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) (xd)).

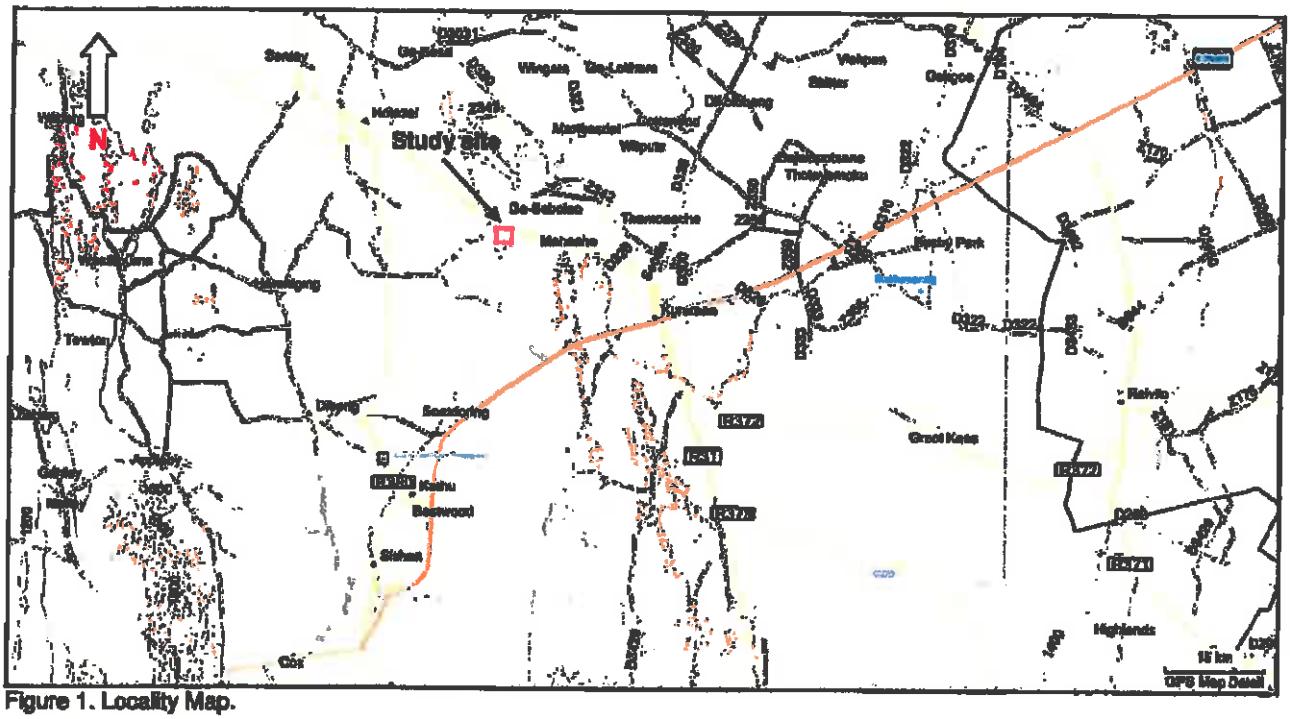

Figure 1. Locality Map.

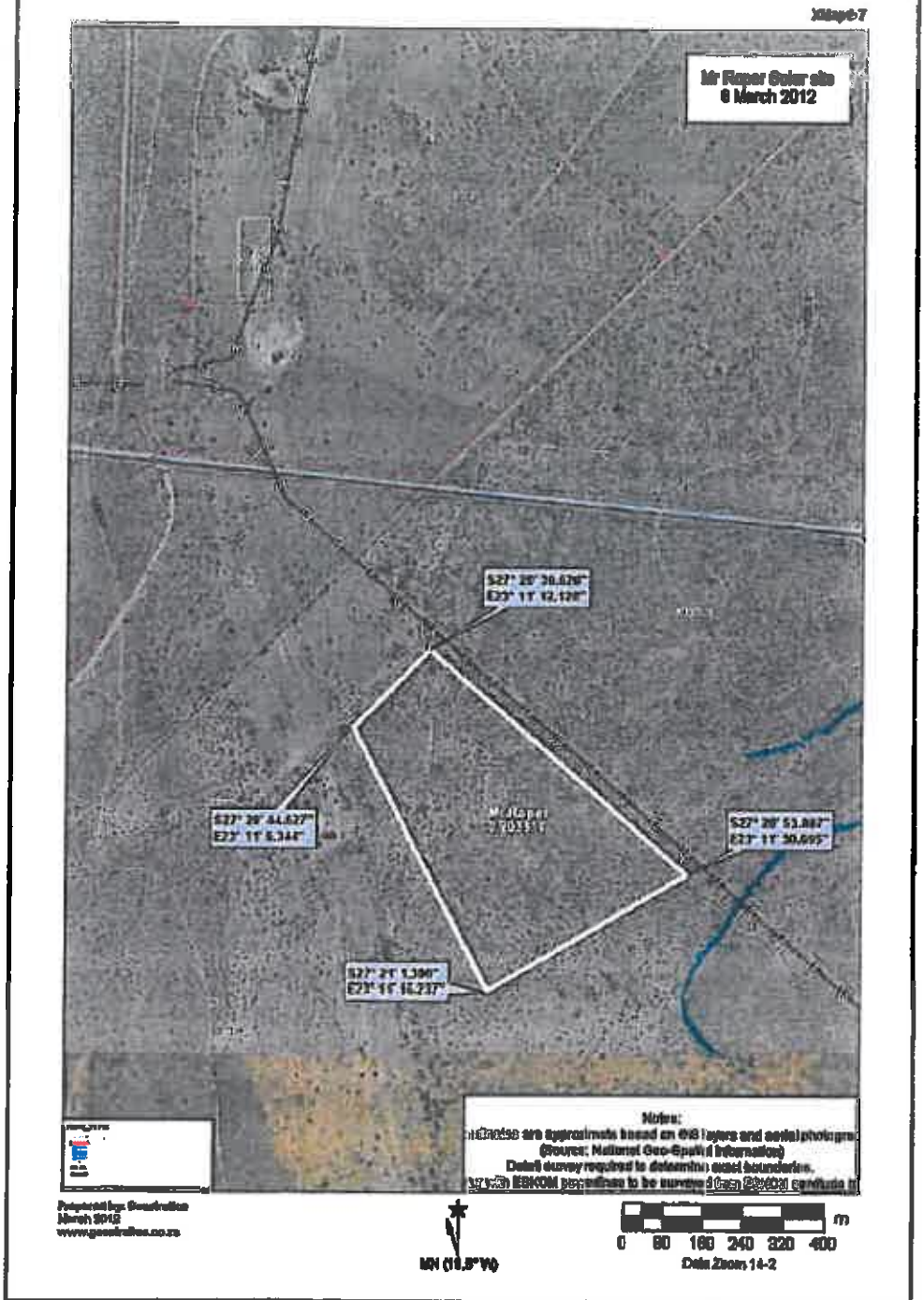

Figure 2. Satellite image showing the footprint area of the proposed Mount Roper Solar Energy Plant

Figure 3. Aerial photographing illustrating the proposed layout of the CPV panels for the Mount Roper Solar Energy Plant

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 Mount Roper Solar Energy Plant is illustrated in Figure 4.

The proposed site is situated about 31 kms northwest of Kuruman on the R31 between Kuruman and Hotazel. The site is located on the south side of the road, alongside the Eskom servitude. The Kuruman hills are located north and west of the proposed site. The proposed site is on fairly flat terrain. The northern portion is very heavily vegetated, and overlain by extensive sheets of ironstone gravels (Figures 5-13). The eastern portion is less vegetated, and covered in mostly soft red sands with little visible surface stone. The northern portion of the farm is severely degraded, overgrazed and heavily trampled by game (mainly antelope). Existing infrastructure comprises several dams/water holes, concrete drinking troughs, feeding bins, and dry pans. Gravel farm roads cross the property in the west and through the centre, and there are also numerous small game tracks that intersect the site. There are no significant landscape features in the footprint area. There are no streams, or water courses and surrounding land use is agriculture, game farms and vast tracts of vacant agriculture land.

There is some existing infrastructure related to game farming, but there are no old buildings, stone ruins, old structures or features on the proposed site.

There are no visible graves, burials sites or stone cairns in the footprint area

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

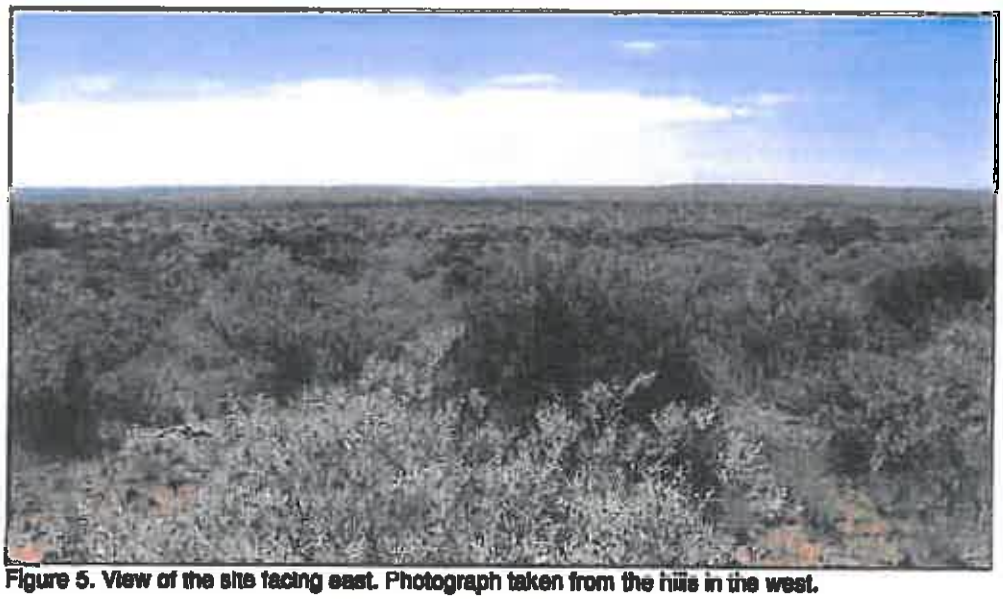

Figure 5. View of the site facing east. Photograph taken from the hills in the west.

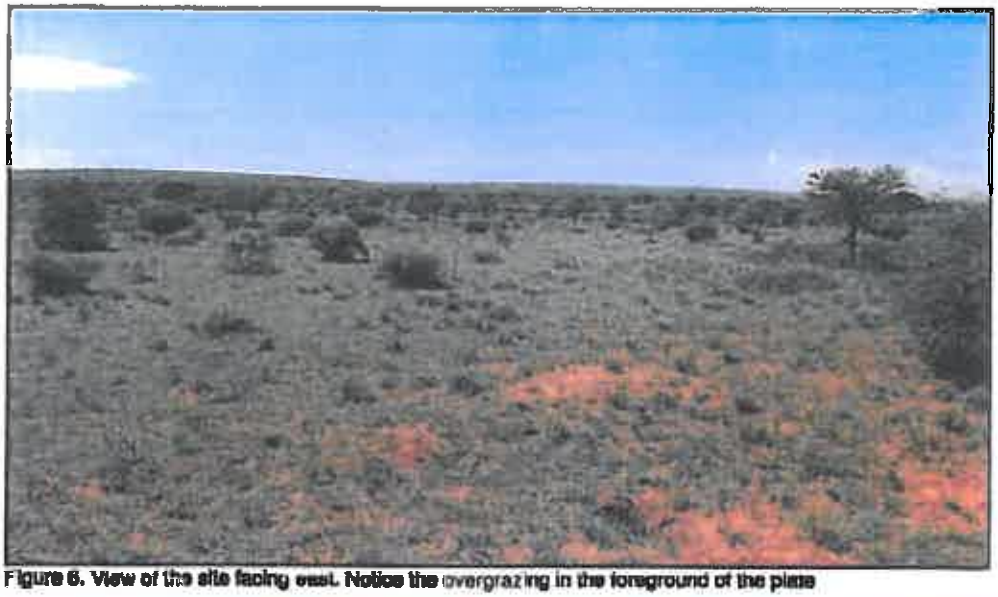

Figure 6. View of the site facing east. Notice the overgrazing in the foreground of the plate

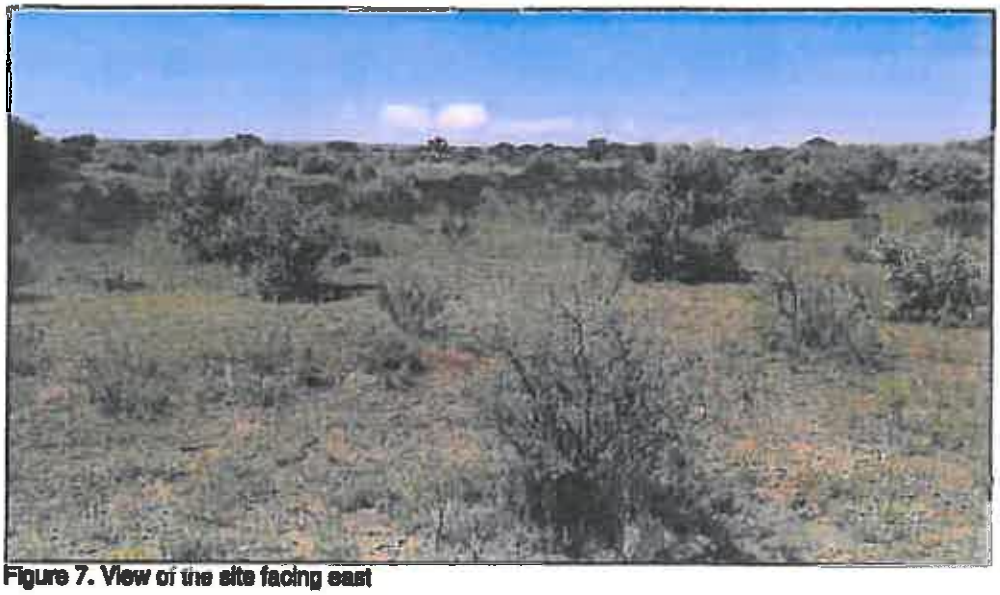

Figure 7. View of the site facing east

Figure 8. View of the site facing east. Note the powerline servitude (the northern boundary of the site) to the left of the plate

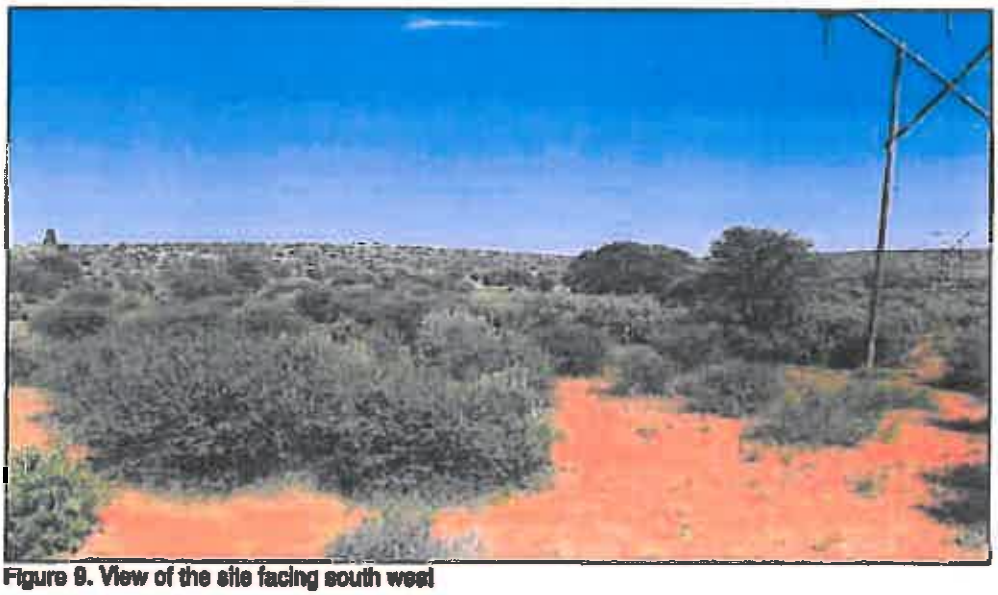

Figure 9. View of the site facing south west

Figure 10. Ironstone gravels in the powerline servitude

Figure 12. Ironstone gravels on edge of dam/waterhole

Figure 11. Ironstone gravels in road

Figure 13. Ironstone gravels in northern portion of the site

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 northern portion of the footprint area is covered in dense Kuruman Thornveld vegetation resulting in very low archaeological visibility. Access to this area was therefore severely restricted, and this was a major constraint when approaching the study. While the southern portion of the site is also covered in vegetation, this is not so dense, and access was therefore easier in places and archaeological visibility consequently much better. As a result of grazing, open grassland vegetation also covers portions of the farm in the south.

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 the northern portion of the site, in preparation of the site for development, will very likely expose scatters of stone implements on the surface which is overlain by gravels of banded ironstone, where stone implements are likely to be found.

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 13 kms northwest of Kuruman. While the footprint area for the proposed solar facility is covered in extremely dense Thornveld vegetation dispersed scatters of Middle and some Early Stone Age implements were encountered.

6. FINDINGS

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

Thirty-one archaeological occurrences were mapped with a hand held GPS device (refer to Figure 10). Most of the tools recorded during the survey are assigned to the Middle and Later Stone Age and only one Early Stone Age biface, a possible handaxe (154), was recovered. Most of the tools are spread fairly thinly and unevenly over the surrounding landscape but tend to cluster across the northern portion of the property among deposits of ironstone gravels. By far the largest collection of tools (164-166) was recorded in a gravel road that cuts through northern portion of the farm which has exposed gravels below a thin sandy overburden.

Most of the lithics comprise modified (i. e. retouched and utilized) flakes and pieces of stone, but several retouched blade tools, and two pointed flakes (159 & 168) were also found. Four scrapers were recovered, including one end scraper on a long blade (144) and three convex scrapers (157, 160 & 167). A few round cores were found.

Several very low density scatters of a few flake tools were documented on the gravels across the northern portion while a thin scatter of weathered and burnished indurated shale and ironstone flakes (172) were recovered from alongside small dry pan. As indicated the western portion of the site is severely degraded due to extensive grazing, trampling and infrastructure and a few dispersed flakes and chunks were also found near the dam (150) and alongside the road. However, no evidence of any factory or workshop site, or the result of any human settlement was identified in the footprint area.

More than 90% of the tools found are made on banded ironstone with the remainder in indurated shale, chalcedony and quartzite. Some of the tools are also burnished and weathered (indurated shale), while others are abraded (rolled about by natural processes). Extensive gravels of ironstone occur across the vegetated northern portion of the footprint area and banded ironstone is known to have been a desirable raw material for making stone artefacts (refer to Kaplan 2012).

As archaeological sites are concerned, however, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. The collection recovered most likely represents only a very small sample of what is expected to be present on the site, with many more tools hidden under the vegetation cover across the northern portion of the footprint area.

A collection of tools documented during the study and the context in which some of them were found are illustrated in Figures 11-16.

6.1 Significance of the archaeological remains

Despite the fairly small numbers counted, and the disturbed context in which many of the tools were found (such as gravel roads), the archaeological remains on Farm 321 Mount Roper have been provisionally rated as having medium-low (Grade 3B-3C) local significance, subject to further investigation of the site.

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.

There are several structures such as concrete drinking troughs but these modern structures do not constitute heritage resources.

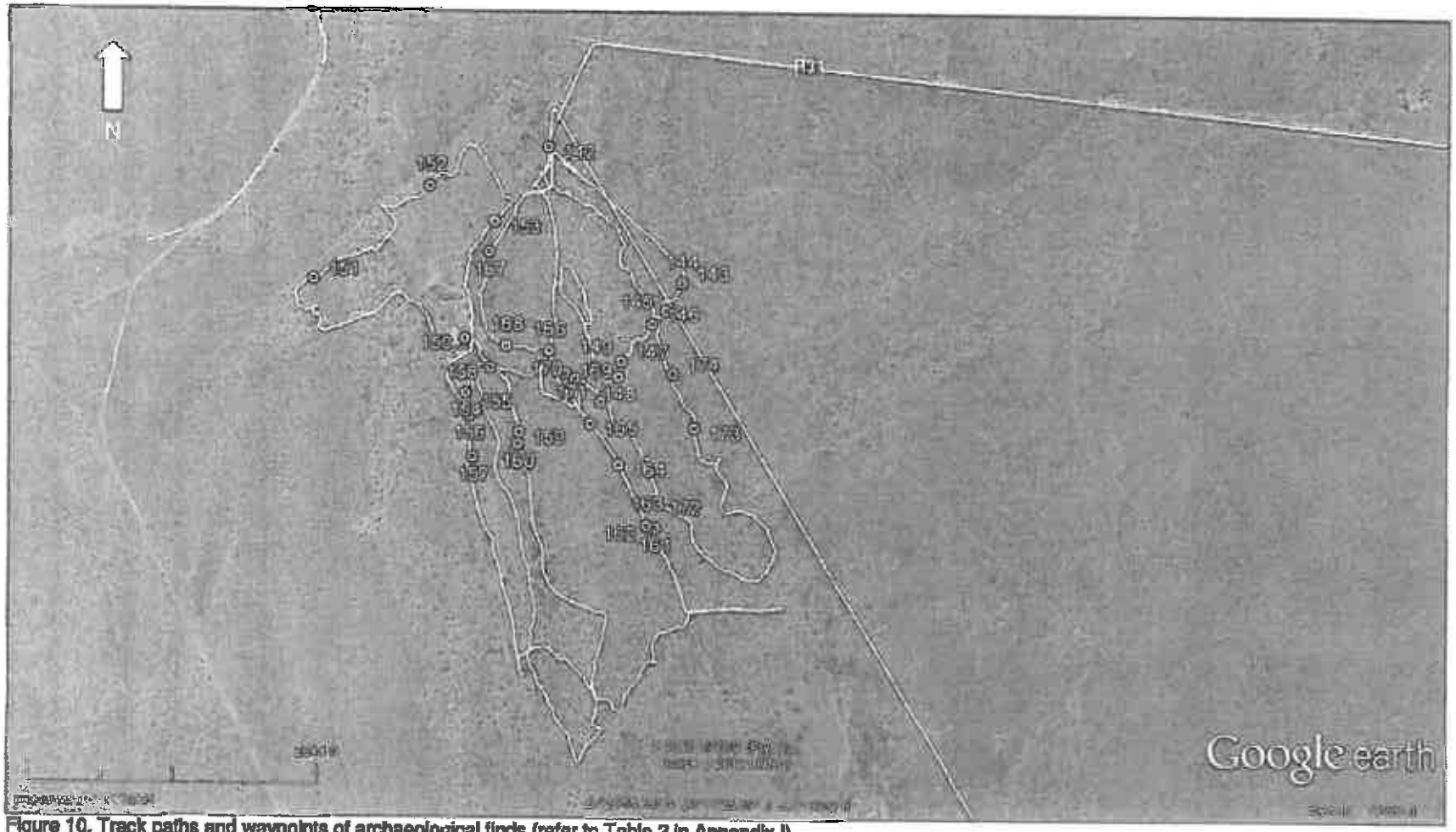

Figure 10. Track paths and waypoints of archaeological finds (refer to Table 2 in Appendix I)

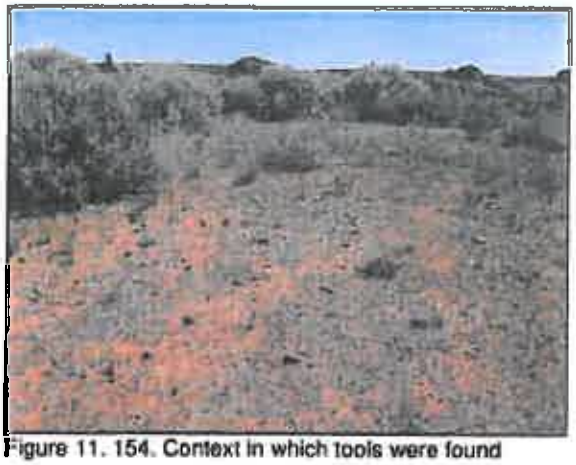

Figure 11. 154. Context in which tools were found

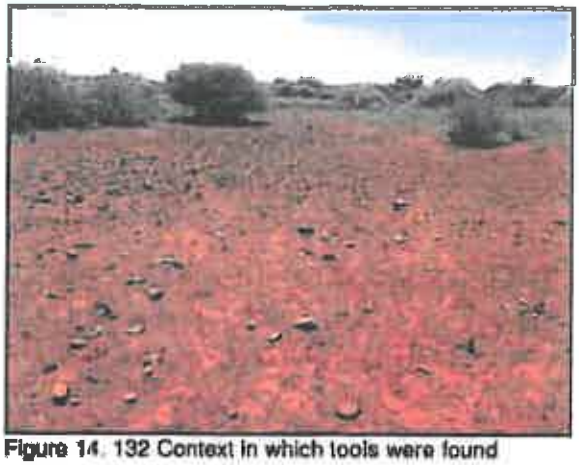

Figure 14. 132 Context in which tools were found

Figure 12. 155. ESA biface & MSA flakes. Scale is in cm

Figure 15. 144. Collection of tools. Scale is in cm

Figure 13. 172. MSA burnished flakes. Scale is in c m

Figure 16. Collection of tools. Scale is in cm

7. ASSESSMENT OF IMPACTS

The proposed Roma Energy Mount Roper Solar Energy Plant may potentially impact on important archaeological remains across the northern portion of the footprint area, which is overlain by deposits of ironstone gravels (Table 1). It is known that banded ironstone was a desirable raw material for making stone artefacts, by Stone Age people. Quarry/workshop sites and activity areas may possibly be identified as well.

Potential impacts on archaeological heritage	
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 Roma Energy Mount Roper Solar Energy Plant will possibly impact on potentially significant pre-colonial archaeological heritage. Stone implements will likely be exposed during vegetation clearing operations in the northern portion of the site. Such tools are likely to occur in-situ as very little disturbance has taken place in this area. Evidence for workshop sites, activity areas, or human settlement may also be identified.

Indications are, however, that in terms of the archaeological heritage the proposed activity is viable, subject to further archaeological investigation.

9. RECOMMENDATIONS

With regard to the proposed development of the Roma Energy Mount Roper Solar Energy Plant on Farm 321, near Kuruman, the following recommendations are made:

1. The footprint area across the northern portion of the site 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 on the ironstone gravels which overlie this portion of the farm. These should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological remains.

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

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Appendix I

Name of Site	Name of Farm	Lat/Long	Finds
	Remainder Farm 321 Mount Roper		
142		S27 20.613 E23 11.185	MSA flake
144		S27 20.771 E23 11.366	Low density scatter of a few flakes, including retouched and utilized pieces and end scraper on long blade, on patch of ironstone gravels
145		S27 20.805 E23 11.346	2-3 flakes on patch of ironstone gravels
146		S27 20.821 E23 11.328	Retouched flake
147		S27 20.866 E23 11.287	Flaked chunk, retouched triangular shaped flake
148		S27 20.884 E23 11.284	1-2 flakes, retouched MSA blade, on patch of ironstone gravels
149		S27 20.874 E23 11.253	Chunk and flake on patch of ironstone gravel
150		S27 20.849 E23 11.078	A few flakes and chunks on gravels alongside dam. 1 weathered MSA flake in indurated shale
151		S27 20.775 E23 10.878	Flake and chunk on slopes covered in banded ironstone
152		S27 20.662 E23 11.028	Indurated shale MSA flake in road
153		S27 20.703 E23 11.115	Utilized and retouched flake
154		S27 20.907 E23 11.081	ESA handaxe/biface, 2 MSA flakes in ironstone and indurated shale on thin patch of ironstone and red sands
155		S27 20.920 E23 11.082	Retouched and utilized MSA flake
156		S27 20.934 E23 11.086	MSA flake blade in indurated shale
157		S27 20.983 E23 11.092	Flake and convex and utilized scraper
158		S27 20.877 E23 11.113	Blade flake retouched on both ends/scraper retouch
159		S27 20.952 E23 11.152	Snapped MRP flake, broken point, quartzite flake
160		S27 20.966 E23 11.152	Convex scraper
161		S27 21.062 E23 11.337	Chunk and flake next to Aardvark hole
162		S27 21.063 E23 11.329	Broken utilized flake in gravel roads
163		S27 21.059 E23 11.325	Thick chunky blade and flake in gravel road
164-165		S27 20.988 E23 11.287 S27 20.941 E23 11.248	Gravel road – broken utilized flake, chunk, MRP, thick weathered end retouched blade, large side retouched flake, flake, blade, large cobble side retouched flake, retouched flake
166		S27 20.855 E23 11.191	Large, thick double sided blade with adze-like step retouch in indurated shale in road, 1 x small round core, utilized flake, weathered retouched flake
167		S27 20.739 E23 11.108	Convex scraper
168		S27 20.850 E23 11.134	Retouched and utilized pointed flake
169		S27 20.881 E23 11.213	Large chunk/minimal core
170		S27 20.887 E23 11.226	Gravel patch – 1 large chunky step retouched blade, 1 utilized flake, 1 retouched flake
171		S27 20.914 E23 11.281	Weathered indurated shale core
172		S27 21.032 E23 11.336	MSA burnished flakes (x 2), chunk, blade misc retouched flake, large chunk, retouched blade – in dry pan
173		S27 20.943 E23 11.387	Small chunk
174		S27 20.880 E23 11.357	Patch of ironstone gravel – chunk, x 2 flakes,

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