

**SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT FOR  
THE PROPOSED DEVELOPMENT OF A 75 MW SOLAR  
PHOTOVOLTAIC FACILITY (KENHARDT PV 3) ON THE  
REMAINING EXTENT OF ONDER RUGZEER FARM 168,  
NORTH-EAST OF KENHARDT, NORTHERN CAPE PROVINCE:  
EIA REPORT - HERITAGE IMPACT ASSESSMENT**

Required under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999).

*Report for:*

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*On behalf of:*

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1<sup>st</sup> draft: 09 November 2015

Final report: 31 January 2016

## EXECUTIVE SUMMARY

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction, operation and decommissioning of the 75 Megawatt (MW) Kenhardt PV 3 solar energy facility on the remainder of farm Onder Rugzeer 168. The site lies 20 km northeast of Kenhardt.

The area is relatively flat, although gently undulating terrain occurs in places. Vegetation is low and sparse with ground visibility being excellent.

Archaeological material in the form of background scatter was located across much of the site but this is of very low heritage significance. Two archaeological sites of medium heritage significance were found and a single possible grave was located. Should the later be found to be a grave, it would be of high heritage significance – if not a grave then it would have no significance. The landscape was identified as a heritage resource but, because of the presence of electrical and other infrastructure in the area, the significance of new impacts in heritage terms is considered to be low.

The potential impacts to archaeological resources and the landscape are of low significance, while the potential impacts to graves are of high significance. With mitigation the potential impacts to archaeology and graves would be reduced to very low significance, but mitigation measures to reduce impacts to the landscape would not have a bearing on the overall impact significance which would remain low. Under a permit issued to the appointed archaeologist, the archaeological mitigation (including graves) would involve excavation and controlled collection of artefacts for analysis and storage in perpetuity.

Because the potential impacts are few and entirely manageable, it is recommended that the proposed project be allowed to continue but subject to the following conditions:

- If they cannot be avoided with a buffer of at least 25 m, the two significant archaeological sites should be excavated;
- The potential grave should be avoided with a buffer of at least 5 m or else tested and, if necessary, exhumed prior to construction;
- The construction team should be made aware of the potential to locate more graves and instructed to report any suspicious stone features prior to disturbance;
- The built elements of the facility should be painted in an earthy colour to minimise visual contrast in the landscape; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

## Glossary

**Background Scatter:** Artefacts whose spatial position is conditioned more by natural forces than by human agency.

**Early Stone Age:** Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

**Hand-axe:** A bifacially flaked, pointed stone tool type typical of the Early Stone Age.

**Holocene:** The geological period spanning the last approximately 10-12 000 years.

**Hominin:** a group consisting of modern humans, extinct species of humans and all their immediate ancestors.

**Later Stone Age:** Period of the Stone Age extending over the last approximately 20 000 years.

**Middle Stone Age:** Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

**Scraper-adze:** a stone tool with 30°-60° retouch on one end and steep retouch and/or damage along the lateral margins.

## Abbreviations

**ASAPA:** Association of Southern African Professional Archaeologists

**CCS:** Crypto-crystalline Silica

**CRM:** Cultural Resources Management

**CSIR:** Council for Scientific and Industrial Research

**EIA:** Environmental Impact Assessment

**EMPr:** Environmental Management Programme

**ESA:** Early Stone Age

**GPS:** Global Positioning System

**HIA:** Heritage Impact Assessment

**LSA:** Later Stone Age

**MSA:** Middle Stone Age

**NEMA:** National Environmental Management Act (No. 107 of 1998)

**NHRA:** National Heritage Resources Act (No. 25) of 1999

**PPP:** Public Participation Process

**SAHRA:** South African Heritage Resources Agency

**SAHRIS:** South African Heritage Resources Information System

## COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R982	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	Section 1.4 and Appendix 1
a) details of- <ul style="list-style-type: none"> <li>i. the specialist who prepared the report; and</li> <li>ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;</li> </ul>	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.5 and Appendix 2
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Sections 3
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 1.1
g) an identification of any areas to be avoided, including buffers;	Sections 7, 11 & 13
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 8
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.5
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Sections 7 & 8
k) any mitigation measures for inclusion in the EMPr;	Sections 7, 8 & 9
l) any conditions for inclusion in the environmental authorisation;	Section 13
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 11
n) a reasoned opinion- <ul style="list-style-type: none"> <li>i. as to whether the proposed activity or portions thereof should be authorised; and</li> <li>ii. if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;</li> </ul>	Sections 12 and 13
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 3.6
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 3.6
q) any other information requested by the competent authority.	n/a

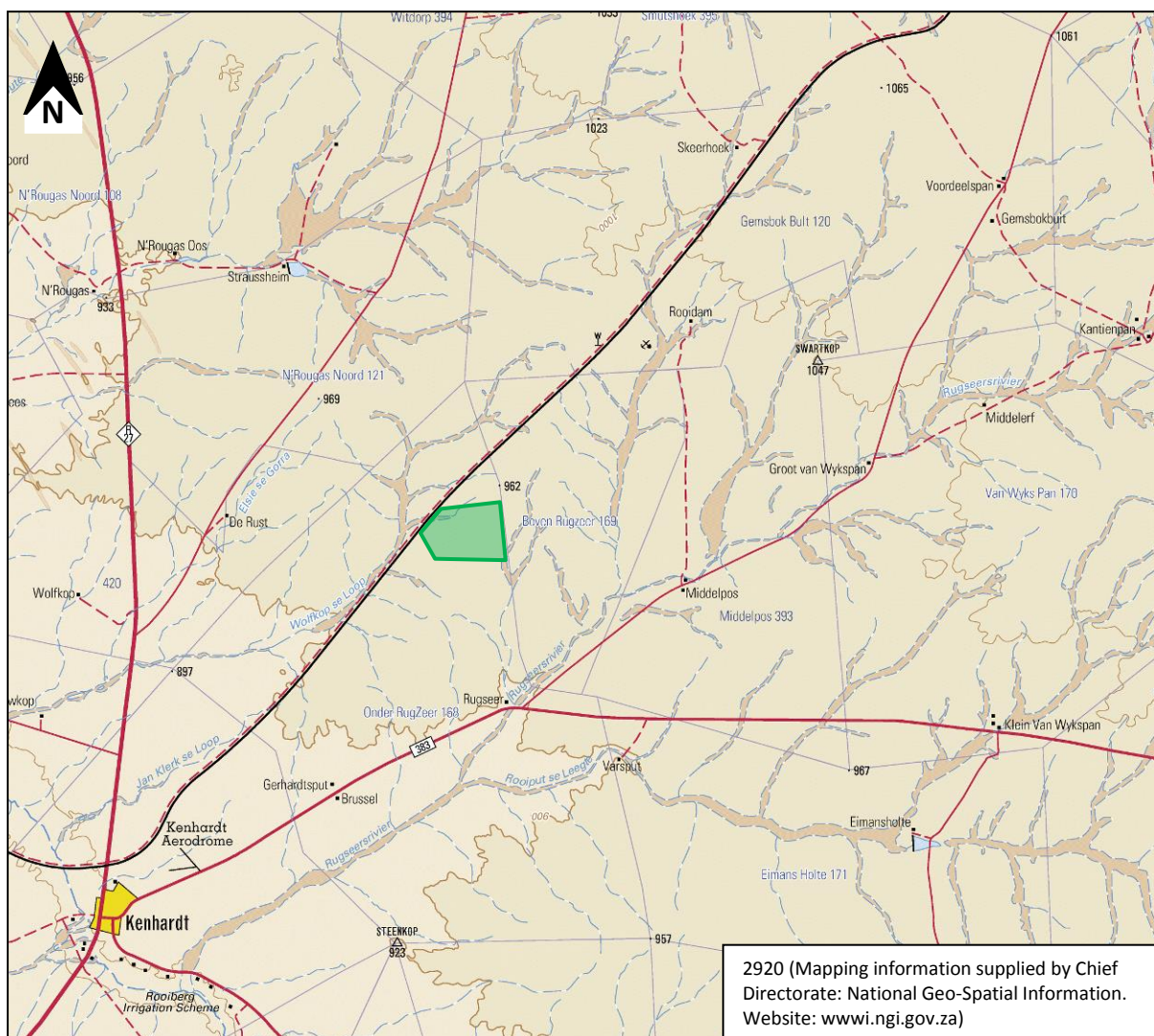
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# 1. INTRODUCTION

ASHA Consulting (Pty) Ltd (ASHA) was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction, operation and decommissioning of the 75 Megawatt (MW) Kenhardt PV 3 solar energy facility on the remainder of farm Onder Rugzeer 168 (Figure 1). A transmission line across the Remainder of Boven Rugzeer 169 and Portion 2 of Boven Rugzeer 169 will link the facility with the Eskom Nieuwehoop Substation presently under construction on Gemsbok Bult 120/3. As noted in Chapter 1 of the EIA Report, this power line will be assessed in a separate Basic Assessment process. This specialist study only assesses the potential impacts of the Kenhardt PV 3 project (in terms of the preferred site).

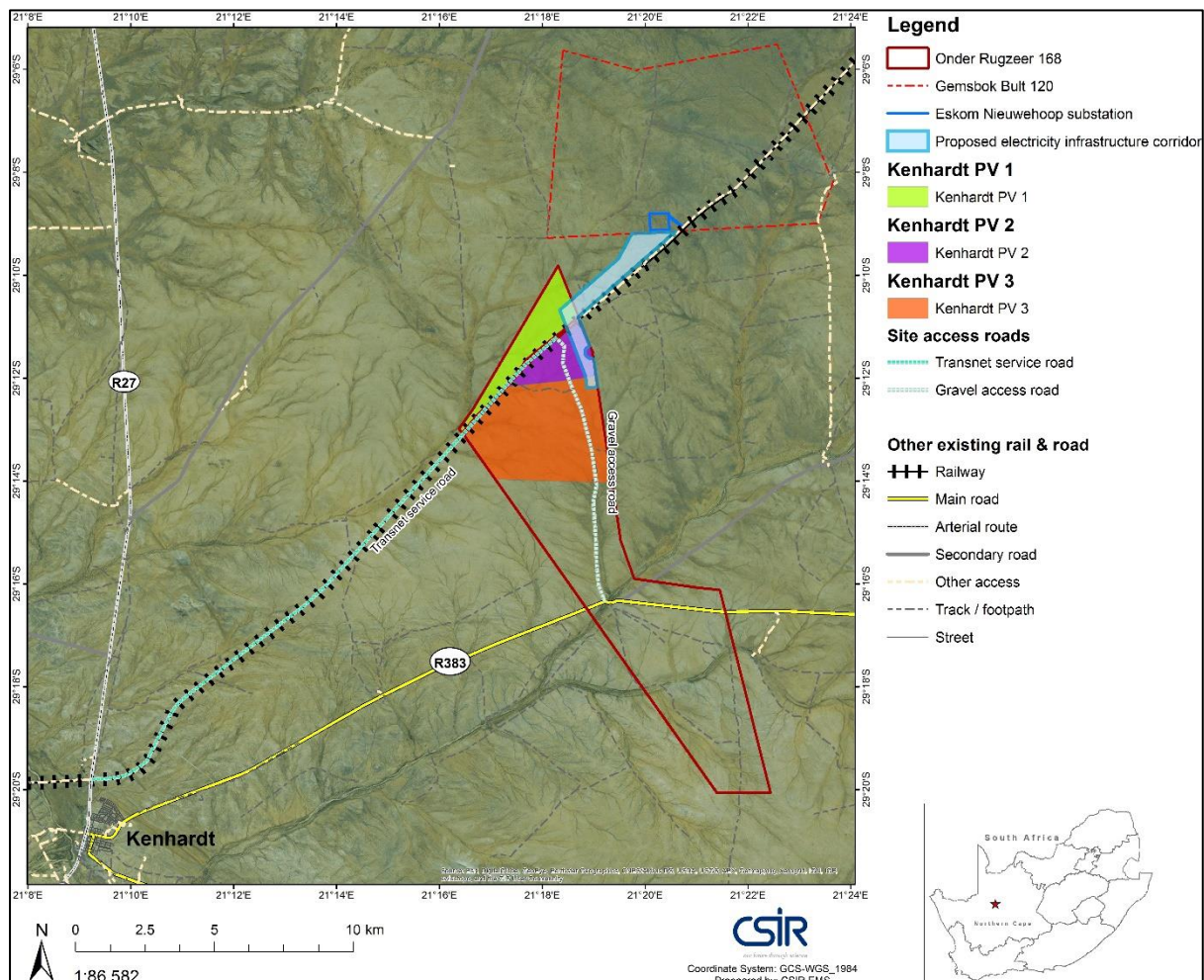


**Figure 1:** Map showing the location of the site (green polygon).

## 1.1. Project Description

This project, referred to as Kenhardt PV 3, is one of three proposed on the same land parcel (Figure 2). It will entail construction of the following main components:

- Solar arrays;
- Buildings (offices, operational and maintenance control centre, warehouse/workshop, ablution facilities and converter station);
- Electrical infrastructure (including a transmission line and substation);
- Access Road;
- Internal gravel roads;
- Fencing;
- Operation and maintenance area;
- Laydown area;
- Storm water channels; and
- Water pipelines, if required.



**Figure 2:** Map showing the location of the three proposed facilities. That assessed in the present report is shaded orange.



Although the study area is some 1340 ha in extent, the final constructed footprint of the facility will be approximately 250 ha. The developer will select the final layout area in such a way as to minimise impacts to the natural and cultural environment. A detailed project description is provided in Chapter 2 of the EIA Report.

A detailed description of the transmission line corridor is provided and assessed separately in the Basic Assessment for the Kenhardt PV 3 – Transmission Line project.

Any aspect of the development as proposed might have a negative impact on heritage resources and thus the entire project is relevant to the heritage assessment. Aspects that disturb the ground (e.g. foundations, roads, trenches) may affect archaeology, palaeontology and graves, while all superstructures (e.g. solar panels, buildings, fences) would introduce impacts to the cultural landscape.

## **1.2. Terms of Reference**

ASHA was requested to conduct a field study and produce a Heritage Impact Assessment (HIA) that would meet the requirements of the heritage authorities.

During the Scoping Phase the South African Heritage Resources Agency (SAHRA) was notified of the proposed development. They responded requesting an impact assessment that examined archaeology, palaeontology and other aspects of heritage as relevant.

The HIA was based on the following broad Terms of Reference:

- Describe the affected environment and determine the status quo in terms of its heritage sites, heritage features and archaeology.
- Undertake a desktop study on the archaeology, cultural landscape and heritage sites within the proposed project area. Highlight any gaps in the baseline data.
- Based on the project description, define the environmental risks to the archaeology and heritage features.
- Undertake a detailed field examination of the archaeological sites and heritage features within or in the region of the development area. Record sites of archaeological relevance (photos, maps, aerial or satellite images, Global Positioning System (GPS) co-ordinates, and stratigraphic columns).
- Provide a sensitivity map indicating the presence of sensitive areas, “no-go” areas, setbacks/buffers, as well as the identification of red flags or risks associated with heritage and archaeological impacts.
- Evaluate the potential for occurrence of archaeological features within the study area.
- Identify relevant protocols, legal and permit requirements relating to heritage and archaeological impacts likely to be generated as a result of the proposed project.
- Identify and rate potential direct, indirect and cumulative impacts of the proposed project on the archaeological heritage during the construction, operational and decommissioning phases of the project.
- Comply with the requirements of the relevant heritage authority in order to obtain a letter of approval, in terms of the National Heritage Resources Act (Act 25 of 1999).

- Compile a report providing a review of heritage resources within the study area based on the desktop study and data from fieldwork and analysis.
- Provide input to the EMP, including mitigation and monitoring requirements to ensure that the impacts on the archaeological features and heritage features are limited. Provide recommendations and suggest appropriate mitigation measures (if required), for the recording, sampling and dating of any archaeological sites that could potentially be destroyed as a result of the proposed project.

### **1.3. Scope and Purpose of the Report**

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued for consideration by the National Department of Environmental Affairs (DEA) who will review the EIA and grant or withhold authorisation. The HIA report will outline any mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

### **1.4. The author**

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting HIAs and archaeological specialist studies in the Western Cape and Northern Cape provinces of South Africa since 2004 (Please refer to the Curriculum Vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is accredited with the Association of Southern African Professional Archaeologists (ASAPA) Cultural Resources Management (CRM) section (Member #233) as follows:


- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

### **1.5. Declaration of independence**

The declaration of independence by the specialist is provided below with a full declaration included in Appendix 2 of this HIA Report.

## DECLARATION OF INDEPENDENCE

I, Dr. Jayson Orton, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed Kenhardt PV 3 Project, application or appeal in respect of which I was appointed, other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



JAYSON ORTON

## 2. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: palaeontological, prehistoric and historical material (including ruins) more than 100 years old;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of

1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;

- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and
- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list “historical settlements and townscapes” and “landscapes and natural features of cultural significance” as part of the National Estate. Furthermore, Section 3(3) describes the reasons a place or object may have cultural heritage value; some of these speak directly to cultural landscapes.

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.

Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to an EIA. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and SAHRA (for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the DEA.

## **3. METHODS**

### **3.1. Literature Survey and Information Sources**

A survey of available literature was carried out to assess the general heritage context into which the development would be set. This literature included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). The 1:250 000 map was sourced from the Chief Directorate: National Geo-Spatial Information.

### **3.2. Field Survey**

The three Kenhardt PV projects and their alternative site locations were assessed together in the field on 28 to 31 October 2015. This was conducted during late Spring, although in this dry area seasonality has no effect on the visibility of heritage resources – visibility was

excellent. The survey did not aim to be comprehensive – that would have taken many weeks – but rather sought to conduct a landscape survey where certain landscape features known to be more sensitive were located and searched. Nevertheless, transects through all areas of the site were carried out to ensure that consistent results were being obtained and that the survey methodology was reliable. 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 setting of the proposed development.

The survey was conducted by the author in the company of Mr Matthew Shaw, an archaeology Masters student.

The Kenhardt PV 3 (preferred) site and Kenhardt PV 3b (alternative) site were surveyed however, as noted above, this specialist study only assesses the potential impacts related to the preferred site. Furthermore, the final layout of the proposed facility will only occupy 250 ha of this preferred site with the development area being chosen to avoid as many sensitive features as possible.

### **3.3. Impact Assessment**

For consistency, the impact assessment was conducted through application of a scale supplied by the CSIR as shown in Chapter 4 of the EIA Report.

### **3.4. Grading**

Section 7 of the NHRA provides for the grading of heritage resources into those of National (Grade 1), Provincial (Grade 2) and Local (Grade 3) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade 1 and 2 resources are intended to be managed by the national and provincial heritage resources authorities, while Grade 3 resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. Heritage Western Cape (2012), however, uses a system in which resources of local significance are divided into Grade 3A, 3B and 3C. These approximately equate to high, medium and medium-low local significance, while sites of low or very low significance (and generally not requiring mitigation or other interventions) are referred to as ungradeable. For convenience, the Heritage Western Cape system is employed here.

### **3.5. Assumptions and Limitations**

The study is carried out at the surface only and hence any completely buried archaeological sites will not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Given the nature of the surface geology, neither of these limitations are likely to have affected the outcome of the report.

With regards to cumulative impacts, various other solar energy facilities and electrical transmission lines have been proposed in the immediate area. A new substation is presently under construction and three solar energy facilities have received positive Environmental Authorisations, although it is unknown when/if they will be built. The full list of developments considered in the cumulative impact assessment is provided in Chapter 4 of the EIA Report.

### **3.6. Consultation Processes Undertaken**

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA.

## **4. PHYSICAL ENVIRONMENTAL CONTEXT**

### **4.1. Site Context**

The PV 3 site is located in a remote area some 20 km northeast of Kenhardt. It is located to the south of the Sishen-Saldanha Railway Line and its gravel service road. Although major power lines are not currently present in the area, a large substation is currently under construction approximately 7 km to the northeast of the site – this is the Eskom Nieuwehoop Substation (Figure 3). Three other PV facilities have already been granted authorisation in close proximity to the substation setting a precedent for electrical development in the area. The land is otherwise generally undeveloped and used for small stock grazing. Farm tracks and fences criss-cross the general area and occasional wind pumps occur.



**Figure 3:** View towards the northeast (from the PV 1 site just north of the railway line) of the Nieuwehoop Substation currently under construction.

### **4.2. Site Description**

The site is generally quite flat with occasional very low rocky outcrops. The vegetation is sparse and largely less than knee-high; trees are rare. The surface is coated mostly with fine gravel which is a product of the weathering bedrock. Very ephemeral stream beds cross the site, but these are generally only evident because of the elevated vegetation density and slightly larger bushes along their alignments. Because all three sites adjoin one another and

were assessed together, the photographs in Figures 4 to 7 show examples of the landscape in the broader study area across the remainder of Onder Rugzeer 168.



**Figure 4:** View of an ephemeral stream bed with its slightly elevated vegetation density.



**Figure 5:** Example of overgrazed land with very sparse vegetation.



**Figure 6:** Example of gravel surface and one of the few trees in the study area.



**Figure 7:** View of a small pan in the PV 2 section of the study area (which is assessed in the separate Kenhardt PV 2 report).

## 5. CULTURAL HERITAGE CONTEXT

This section of the HIA contains the desktop study and establishes what is already known about heritage resources in the vicinity of the study area. What was found during the field survey as presented below may then be compared with what is already known in order to gain an improved understanding of the significance of the newly reported resources.

### 5.1. Archaeological Aspects

Bushmanland is well known for the vast expanses of gravel that occur in places and which frequently contain stone artefacts in varying densities (Beaumont *et. al* 1995). Such material is referred to as 'background scatter' and is invariably of very limited significance. At times, however, the scatter can become very dense and mitigation work is occasionally called for. The artefacts located in these contexts are largely Early Stone Age (ESA) and Middle Stone Age (MSA) and are not associated with any other archaeological materials – these would have long since decomposed and disappeared. Previous experience immediately east of the present site suggests that such dense accumulations of artefacts are unlikely to occur in this area.

Of potentially more significance, however, are Later Stone Age (LSA) sites which are commonly located along the margins of water features in Bushmanland. These features include both pans and ephemeral drainage lines. Such sites were identified to the east of the present study area in association with pans but artefact scatters associated with drainage lines were rare (Orton 2014a, 2014b, 2014c). The drainage lines on the present site, however, are more prominent and perhaps more likely to reveal LSA camp sites. These sites would typically contain mostly stone artefacts, but fragments of ostrich eggshell (used as water containers and also as a food source) and pottery are also found at times, while bone is rare and likely confined to sites that are very recent. Similar LSA sites can also be found in association with rocky outcrops but none appear to occur within the present study area. Because of their positions along water courses and adjacent to rocky areas, such sites are often avoided by development proposals because of the need to avoid the relevant natural features. Despite the increased likelihood of locating archaeology along streams, Morris (2009) noted that a search along the banks of the Hartbees River close to Kenhardt, where he expected elevated frequencies of archaeological material, revealed virtually nothing.

Another kind of archaeological site fairly commonly encountered in Bushmanland is small rock outcrops that have been quarried as a source of stone material for making stone tools. Several such occurrences were noted to the east where quartz outcrops were frequently flaked (Orton 2014a; 2014b; 2014c).

Rock engravings are known from the broader area (Louw Roux Bushmanland 2013). From the limited information available, these appear to be naturalistic images produced by the Bushmen. Geometric images, produced by the Khoekhoen, are not well known from the area (Orton 2013), although David Morris (pers. comm. 2015) has seen examples in the region. Painted art is also very rare but again, examples are known, particularly on large granite boulders.



## **5.2. Historical aspects**

The Anglo-Boer War was fought across the Northern Cape, but information on the role of Kenhardt appears difficult to locate. The town was occupied by the Boers in late February 1900 after they convinced the magistrate that they had a large gun and would fire on the town if it did not surrender. They later surrendered to the British who occupied the town on 31<sup>st</sup> March 1900. By mid-1900 there were perhaps 100 Cape Rebels detained in a camp outside of Kenhardt (Grobler 2004). The British raised a local force known as the Border Scouts in Upington in May 1900. Many were mixed-race individuals, some local farmers, others Kalahari hunters, but all disliked the Boers. The scouts were responsible for a large area of the north-western Cape Colony centred on Upington and Kenhardt. They eventually numbered 786 by January 1901 and were under the command of Major John Birbeck (AngloBoerWar.com 2015; Rodgers 2011). At the beginning of 1902 there were 150 Border Scouts stationed at Kenhardt. Two boers, H.L. Jacobs and A.C. Jooste, were accused of treason and executed in the town on 24 July 1901 (Grobler 2004). A memorial stands there to their honour (Green Kalahari n.d.).

No major action appears to have taken place around Kenhardt, although the Boers are known to have attacked a patrol on 17<sup>th</sup> May 1901, while the British attacked a Boer position on 25<sup>th</sup> June 1901 (AngloBoerWar.com 2015).

## **5.3. Built Environment**

The built environment is sparsely represented in Bushmanland because the farms tend to be so large. The vast majority of structures appear to be quite recent in age (20<sup>th</sup> century) and are of very limited heritage significance. In any case, the development will not affect any buildings.

## **5.4. Graves**

Graves are also very rare. Some older farms may have small graveyards located close to their farm buildings but, again, these are highly unlikely to be included within the areas proposed for development. Unmarked pre-colonial graves can, in theory, be located anywhere, although they are generally more common in sandy areas where excavation of graves was easier and in more productive areas where population densities would have been higher. It is highly unlikely that pre-colonial graves would be encountered in the study area.

## **5.5. Other aspects**

The cultural and natural landscape is also of concern. However, the cultural landscape is very poorly developed in this area with fences, water troughs and wind pumps being the primary features. The natural landscape lacks visually interesting and sensitive features. In addition, the proposed site is a long distance from any important roads (it is 11 km from the R27) and is highly unlikely to be visible to anyone other than local residents making use of the gravel road along the railway line. Solar PV facilities are not very tall and, if an earthy

coloured paint is used for the buildings, they can be almost invisible from as little as 1 km away.

## 6. IDENTIFICATION OF KEY ISSUES

### 6.1. Key Issues Identified During the Scoping Phase

Only one potentially significant heritage issue was identified during the Scoping Phase of this EIA Process. This was:

- The potential damage to or destruction of Stone Age archaeological sites occurring in proximity to water courses and pans.

The following comment was also received from the SAHRA on 22 September 2015 (via SAHRIS) based on their review of the Background Information Document. It is important to note that only the points relating to Archaeology and Heritage aspects have been extracted from the SAHRA comments and reproduced below:

*In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.*

*The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists [www.asapa.org.za](http://www.asapa.org.za)) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place.*

*The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.*

*Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed.*

The present HIA meets the requirements of SAHRA in that it aims to satisfy Section 38(3) of the NHRA, the author is an appropriately accredited CRM Section member of ASAPA and recommendations for further studies as may be required are presented.

## **6.2. Sensitivity of the site in relation to proposed activity**

The site is sensitive for the many archaeological artefacts and sites on its surface that would be damaged or destroyed through construction related activities. These include site preparation and all works related to installation of the project components.

## **6.3. Identification of Potential Impacts**

The potential impacts identified during the EIA Phase are:

### 6.3.1. Construction Phase

- Damage to or destruction of archaeological resources;
- Damage to or destruction of graves; and
- Impacts to the cultural and natural landscape.

### 6.3.2. Operational Phase

- Impacts to the cultural and natural landscape.

### 6.3.3. Decommissioning Phase

- Impacts to the cultural and natural landscape.

### 6.3.4. Cumulative impacts

- Damage to or destruction of archaeological resources;
- Damage to or destruction of graves; and
- Impacts to the cultural and natural landscape.

## 7. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project. Besides the landscape itself, all are archaeological in nature and comprise largely of Stone Age remains. These are listed in Table 1 and mapped in Figure 8.

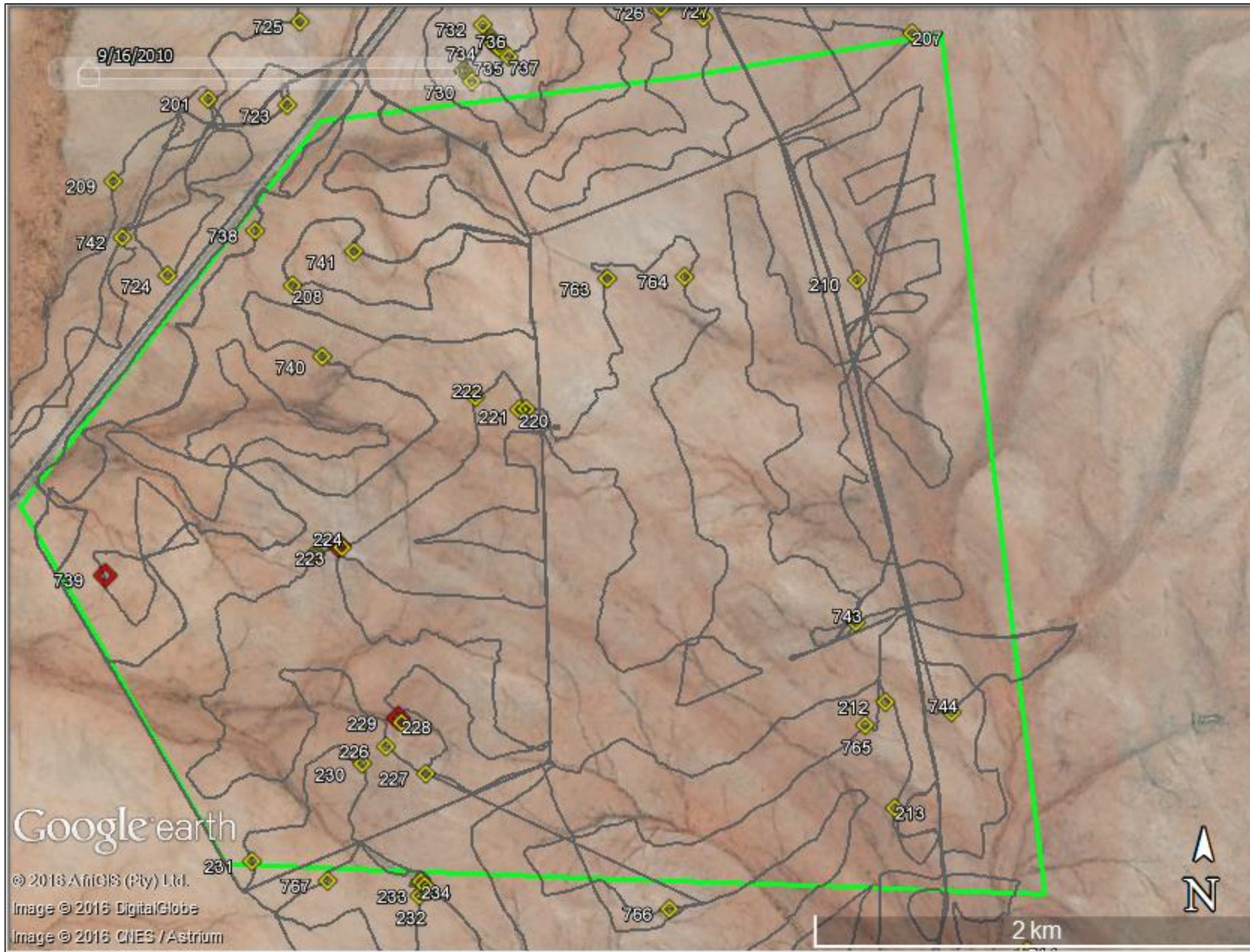
**Table 1:** List of archaeological resources found during the survey. Note that, even though the alternative site is not formally assessed here, the resources found are still listed for the record. Where the PV number appears in brackets this indicates that the resource is close to but not actually within the footprint area. A number of hours under mitigation is the suggested time required to carry out mitigation excavations.

PV	Waypoint	Co-ordinates	Description	Heritage Significance	Suggested Mitigation
3	208	S29 12 33.8 E21 17 15.8	Flaked quartz outcrop with a few artefacts around it.	Low	
3	210	S29 12 33.0 E21 18 49.6	Flaked quartz outcrop with a few artefacts around it.	Low	
3	212	S29 13 34.3 E21 18 54.4	Flaked quartz outcrop with a few artefacts around it.	Low	
3	213	S29 13 49.7 E21 18 56.0	Single quartzite hand-axe.	Low	
3	220	S29 12 51.8 E21 17 53.5	Half a bored stone. It was square in plan view and the hole is very skew through the stone. The intact side has been used as a hammer stone.	Low	
3	221	S29 12 51.7 E21 17 54.7	A single quartzite hand-axe with retouch on the butt end.	Low	
3	222	S29 12 50.0 E21 17 46.3	A single quartz hand-axe (very short, about 9 cm long).	Low	
3	223	S29 13 11.8 E21 17 24.1	Flaked quartz outcrop with a few artefacts around it. This is part of a larger quartz hill/ridge.	Low	
3	224	S29 13 11.5 E21 17 23.5	On the crest of the above quartz ridge there is a natural hollow of about 2.5 m by 1.5 m. Within this space is a pile of quartz blocks. In the sand and hyrax dung in the hollow there are a number of pieces of bottle glass, a shotgun cartridge, several ostrich eggshell fragments, two retouched cryptocrystalline silica (CCS) artefacts (a scraper and a miscellaneous retouched piece) and many quartz flakes. To the northeast, just below the quartz outcrop, there is a semi-circular 'clearing' amongst the quartz rocks and gravel but there did	Medium	Avoid with a buffer of at least 25 m or conduct archaeological excavations in the hollow to rescue artefacts and data. Test excavate and expand if necessary in 'clearing' and map whole site (schematic scale drawing) (4 hours)

PV	Waypoint	Co-ordinates	Description	Heritage Significance	Suggested Mitigation
			not appear to be artefacts in it.		
3	225	S29 13 12.6 E21 17 19.7	LSA scatter of quartz, quartzite and ostrich eggshell in a sandy area between quartz gravel patches.	Low	
3	226	S29 13 40.6 E21 17 31.4	Flaked quartz outcrop with a few artefacts around it.	Low	
3	227	S29 13 44.6 E21 17 38.0	Massive quartz outcrop/hill standing at least 3 m above the surrounding land with a small shelter facing east-northeast. The floor has a number of glass fragments and a few quartz artefacts. There is also an area where the outcrop has been flaked.	Low	
3	228	S29 13 37.1 E21 17 34.0	Quartz artefacts scatter in sandy area alongside a river. One quartzite flake also seen.	Low	
3	229	S29 13 36.5 E21 17 33.5	A large scatter of quartz artefacts in a sandy area along a river. Nothing diagnostic seen but presumably it is LSA.	Medium	Avoid with a buffer of at least 25 m or conduct archaeological excavations to rescue artefacts and data (8 hours).
3	230	S29 13 43.1 E21 17 27.5	Quartz gravel patch with quartz artefacts in between.	Low	
3	231	S29 13 57.3 E21 17 09.1	Flaked quartz outcrop with a few artefacts around it.	Low	
3	738	S29 12 25.8 E21 17 09.6	Flaked quartz outcrop with a few artefacts around it.	Low	
3	739	S29 13 15.9 E21 16 44.5	Two loose 'mounds' of quartz in a sandy area but close to a quartz gravel patch. These may be graves.	High	Avoid with a buffer of at least 5 m or test excavate to check for human remains and then make a decision to avoid or exhume in line with required process.
3	740	S29 12 44.1 E21 17 20.8	Flaked quartz outcrop with a few artefacts around it.	Low	
3	741	S29 12 28.8 E21 17 26.0	Flaked quartz outcrop with a few artefacts around it.	Low	
3	743	S29 13 22.7 E21 18 49.4	Flaked quartz outcrop with a few artefacts around it.	Low	
3	744	S29 13 35.8 E21 19 05.5	Flaked quartz outcrop with a few artefacts around it.	Low	
3	747	S29 15 15.4 E21 19 18.1	A single quartzite hand-axe. Tip is broken but remaining length is 17 cm.	Low	
3	763	S29 12 32.8 E21 18 08.1	A mixed age scatter of MSA, LSA and historical material along	Low	

PV	Waypoint	Co-ordinates	Description	Heritage Significance	Suggested Mitigation
			the south side of a pan. It is too mixed to be of much value.		
3	764	S29 12 32.6 E21 18 21.0	Adiagnostic scatter of quartz artefacts. Essentially a high density area of background scatter.	Low	
3	765	S29 13 37.6 E21 18 51.0	Flaked quartz outcrop with a few artefacts around it.	Low	
3B	745	S29 15 19.9 E21 19 08.8	Low density, widespread LSA scatter of quartz and ostrich eggshell fragments spread along the river bank.	Low	
3B	746	S29 15 16.4 E21 19 16.9	A set of about 8 to 11 small mounds of quartz at the edge of an area with much quartz gravel. It seems unlikely to be a graveyard, but yet is certainly not natural.	Unknown	Avoid with a buffer of at least 5 m or test excavation to check if any human remains are present then make a decision to avoid or exhume in line with required process.
3B	748	S29 14 50.3 E21 19 17.9	Cluster of quartz cobbles with a few artefacts in between.	Low	
3B	751	S29 15 15.4 E21 19 09.6	Small, but very dense scatter of ostrich eggshell fragments. One piece is definitely flaked and is quite likely a flask mouth fragment. Probably more than 100 pieces altogether.	Low	
3B	752	S29 15 16.5 E21 19 05.4	Fragment of glass that looks like it is from a case bottle. Although the glass does not look all that old, there are bubbles in the glass.	Low	
3B	753	S29 15 30.5 E21 19 04.6	Light LSA scatter of quartz and ostrich eggshell.	Low	
3B	754	S29 15 29.9 E21 19 08.2	LSA ostrich eggshell scatter with rare quartz artefacts present.	Low	
3B	755	S29 15 33.8 E21 19 11.5	Small cluster of about fifteen quartz rocks with a few pieces of ostrich eggshell.	Low	
3B	756	S29 15 38.8 E21 19 12.1	Scatter of adiagnostic quartz artefacts.	Low	
3B	757	S29 15 14.9 E21 18 53.5	Flaked quartz outcrop with four fragments of bottle glass present. Bottle base has a small nipple on it. Base has been flaked.	Low	
3B	758	S29 14 55.1 E21 18 46.1	Bedrock exposure in stream with a slightly elevated density scatter of quartz around it. A careful search revealed no grinding grooves.	Low	

<b>PV</b>	<b>Waypoint</b>	<b>Co-ordinates</b>	<b>Description</b>	<b>Heritage Significance</b>	<b>Suggested Mitigation</b>
(3)	234	S29 14 00.2 E21 17 37.2	Light LSA scatter of quartz, quartzite, CCS and silcrete located in the sandy outflow area of a pan (northwest side between the pan and the study area). Another site lies on the opposite side of the pan but is further from the study area.	Low-medium	Avoid with a buffer of at least 40 m from the centre of the pan or conduct archaeological excavations to rescue artefacts and data (4 hours).

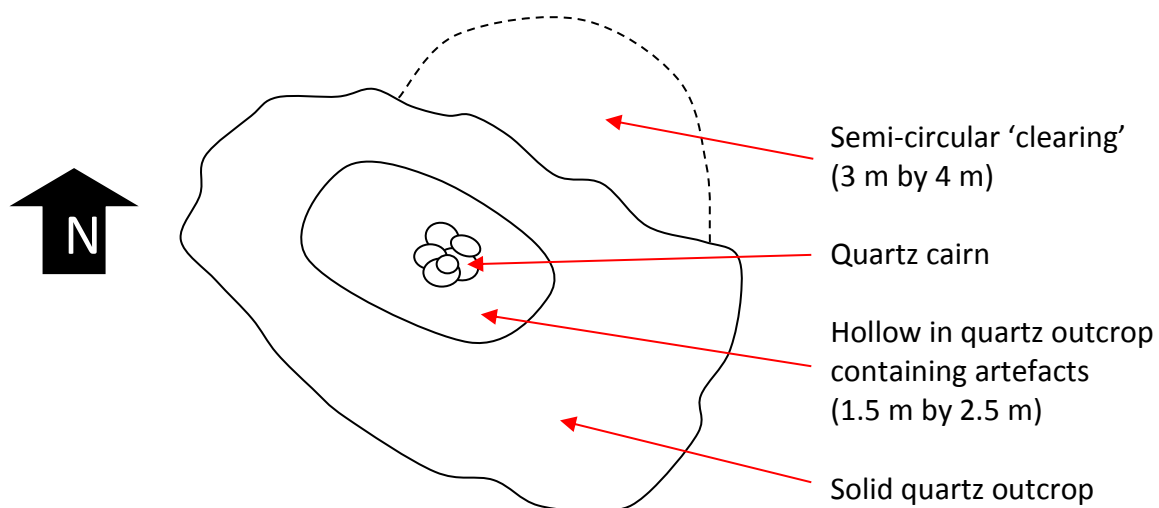


**Figure 8:** Aerial view of the study area (green) with waypoints (numbered symbols) and tracks (grey lines) indicated. The three significant heritage sites in PV 3 are highlighted in red. Waypoints and tracks to the north and south are within the PV 1, PV 2 and alternative site study area.



## 7.1. Archaeological Resources

Many archaeological resources were found in the study area. The most common type of archaeological site encountered was quartz quarries (Figures 9 and 10). These are natural outcrops of quartz that have been struck in order to remove flakes from them for use elsewhere. They generally have some artefacts scattered around them as well. They have little scientific value. Of more interest, however, are two other archaeological sites found in the study area. One was a large scatter of quartz artefacts located along the margin of an ephemeral water course (waypoint 229). Although the age was uncertain, the site is most likely LSA. The other site was located atop a quartz outcrop. Although a part of the outcrop had been used as a quarry site in the past (waypoint 223), this was not the important part. Further along the ridge there was a section of quartz that had a hollow of about 1.5 m by 2.5 m in it (waypoint 224; Figure 9). Within this hollow a cairn of quartz blocks had been built, but this cairn is assumed to be recent (Figure 10). Also within the hollow were noted a number of artefacts of quartz and CCS as well as several ostrich eggshell fragments, some glass and a shotgun cartridge. On the north-eastern side of the outcrop there was a small area that appeared to have been cleared of rocks (Figure 11) but no artefacts were found within this area.



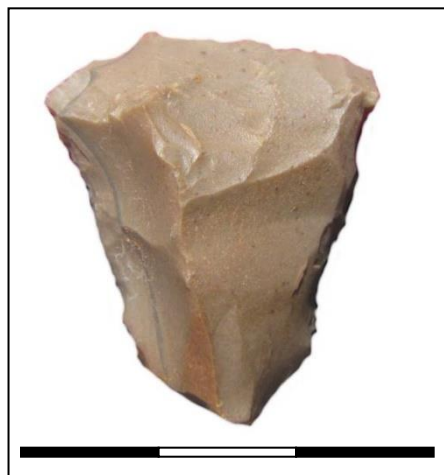
**Figure 9:** Schematic plan of the quartz outcrop at waypoint 224 showing the hollow, the cairn and the small clearing to the northeast.



**Figure 10:** View towards the east showing the hollow and stone cairn inside it.

**Figure 11:** View towards the east of the cleared area alongside the quartz outcrop.

Many isolated artefacts, part of the general background scatter, were noted during the survey. These included an ESA hand-axe, an LSA scraper-adze with scraper retouch on the end and adze working along both lateral margins, and an MSA blade (Figure 12). The most unusual find was a fragment of a bored stone (waypoint 220; Figure 13). It had also been used as a hammer stone, probably prior to its breakage since there were no other associated artefacts in the vicinity.



**Figure 12:** Background scatter artefacts. Left: a quartzite hand-axe (waypoint 213); centre: a CCS scraper-adze; and right: an MSA quartzite blade. All scales in 1 cm intervals.



**Figure 13:** Cross-section and plan view of a bored stone fragment. Scale in 1 cm intervals. The inset shows the hammering damage on the outer surface.

## 7.2. Graves

Two or three loose mounds of quartz cobbles that might represent potential graves were found (Figure 14). They were located side-by-side at waypoint 739. Although located very close to an area of quartz gravel, the mounds were in a sandy area suggesting that the cobbles were deliberately carried there.



**Figure 14:** The two or three mounds of quartz cobbles at waypoint 739.

### **7.3. Cultural and Natural Landscape**

The cultural landscape is rather weakly developed and relates to the keeping of small stock in the region. The landscape is characterised by wide open space with occasional fence lines, farm tracks and wind pumps. In the vicinity of the study area it is compromised by the presence of the railway line and substation.

### **7.4. Statement of Significance**

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

The archaeological resources are deemed to have medium cultural significance for their scientific value, graves are deemed to have high cultural significance for their social value, while the landscape has low cultural significance for its aesthetic and historical value.

### **7.5. Summary of Heritage Indicators and Provisional Grading**

Although the potential for human remains means that possible grave sites should be regarded as significant, the nature of the site in the PV 3 study area suggests that a 3C grading is appropriate (i.e. medium-low local significance). The archaeological remains are worthy of no more than a 3C rating, while the cultural landscape has low significance and is not considered gradeable.

## **8. ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS**

### **8.1. Damage to and Destruction of Archaeological Resources (Construction Phase)**

The potential impact of damage to and destruction of archaeological resources is predicted to be a negative, direct impact. The impact is rated with a site specific spatial extent and a permanent duration. The consequence and probability of the impact are respectively rated as moderate and likely. The reversibility of the impact and irreplaceability of the resource are respectively rated as non-reversible and high. It is anticipated that any archaeological sites located within the final development footprint would be physically damaged or, more likely, destroyed when the surface is levelled in preparation for construction. Because the consequence of the impact on the two archaeological sites (at waypoints 224 and 229) found within the proposed development area is moderate, the significance of any potential impacts is likely to be low before mitigation. Mitigation would involve an archaeologist conducting excavations to rescue archaeological material from the relevant sites and, once this is complete, the significance of impacts would be reduced to very low. Alternatively, the archaeological sites could be avoided. If this route is chosen then it is suggested that a buffer of 25 m from the centre of the sites be employed. It should also be ensured that all

works take place within the authorised footprint so as to avoid impacts to any nearby archaeological sites.

## **8.2. Damage to and Destruction of Graves (Construction Phase)**

It is anticipated that any graves located within the final development footprint would be physically damaged or possibly even destroyed when the surface is levelled in preparation for construction. Graves have high cultural significance and it is best to avoid them. Because of the uncertainty that the feature is actually a grave (shown in Figure 14 (waypoint 739)) the impact significance before mitigation is rated as high. This potential impact is predicted to be a negative, direct impact, with a site specific spatial extent and a permanent duration. The consequence and probability of the impact are respectively rated as extreme and likely. The reversibility and irreplaceability of the impact are respectively rated as non-reversible and high.

In terms of mitigation, in the event that any graves or potential graves cannot be avoided with a buffer of at least 5 m then an archaeologist should be contracted to conduct a test excavation to determine the status of the feature. If it is determined to be a grave after the test excavation, then exhumation would need to occur with the permission of SAHRA. With mitigation the impact significance would be reduced to very low.

## **8.3. Impacts to the Natural and Cultural Landscape (Construction and Operational Phases)**

The impact of the proposed project on the natural and cultural landscape is expected to occur during the construction, operational and decommissioning phases. These potential impacts are predicted to be negative and direct, with a local spatial extent, and a long-term duration for the construction and operational phases and a short-term duration for the decommissioning phase. The consequence and probability of the impact are respectively rated as moderate and very likely. The reversibility and irreplaceability of the impact are respectively rated as high and moderate.

During the operational phase, the addition of solar panels to the landscape will result in a marked change in its character from a rural landscape to one characterized by electrical infrastructure. Given that the precedent has already been set for electrical development, the significance of these potential impacts is considered to be low. Solar panels are not as visible from a distance as the built aspects of the proposed development would be, but with the use of earthy-coloured paint on the buildings the degree of visual intrusion would be slightly reduced but the impact significance is still rated as being low. No mitigation measures are recommended for the operational and decommissioning phases.

## **8.4. Cumulative Impacts to Archaeological Resources**

The development of multiple solar energy facilities will result in many archaeological artefacts and sites being disturbed and /or destroyed over a wide area. Few of the sites recorded in the region have high cultural significance and it is likely that the vast majority of those that do would be protected from harm because of their proximity to water courses and pans. Cumulative impacts would be negative and direct in nature. They would occur at

the local level and would be permanent. Because some significant sites were found in the present study area, the cumulative impact consequence is rated as being moderate, while the probability is likely. These ratings result in an overall cumulative impact significance rating of low. With mitigation of those sites that are to be destroyed the cumulative impacts would be reduced to very low significance because scientific data would have been rescued. The impacts are irreversible and the irreplaceability of archaeological resources is high.

### **8.5. Cumulative Impacts to Graves**

The development of multiple solar energy facilities may result in a number of graves being disturbed and /or destroyed over a wide area. However, because graves can be very difficult to identify and many may well continue to exist beneath any developments, it is difficult to evaluate any cumulative impacts. The nature of graves as individual and generally isolated heritage resources is such that, although each is significant, the disturbance of multiple examples will not result in a significant cumulative impact. Cumulative impacts would be negative and direct and occur at the local level. They would be permanent in duration. The moderate consequence and likely probability combine to give an impact significance rating before mitigation of low. After mitigation it is expected to be very low. The mitigation measures include avoiding graves with a buffer or at least testing via excavations to check for human remains. If any are located then exhumation would be required (in line with regulatory requirements).

### **8.6. Cumulative Impacts to the Natural and Cultural Landscape**

The development of multiple solar energy facilities will result in significant visual degradation of the local environment. However, it is also worth noting that it is far better, from the cumulative impact point of view, to cluster the facilities rather than to have them spread out over the landscape. The present application is one of a number of applications for solar energy facilities in close proximity to the Nieuwehoop Substation and, because of this clustering, the cumulative impacts are seen as acceptable. They would be direct negative impacts occurring at the local level and with long term duration. The consequence is rated as moderate and, although the impact is very likely to occur, the significance is rated as being low. Although mitigation is suggested (i.e. use earthy-coloured paint on built elements), this will not have much effect overall, therefore the post-mitigation significance is still rated as being low.

## **9. IMPACT ASSESSMENT SUMMARY**

The assessment of potential impacts and recommendation of mitigation measures as discussed above are collated in Tables 2 to 5 below. Note that indirect impacts are not assessed because the nature of the identified heritage resources is such that significant indirect impacts are highly unlikely to occur.

**Table 2: Impact assessment summary table for the Construction Phase.**

Construction Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplace ability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Clearing of site	Destruction of archaeological resources	Negative	Site	Permanent	Moderate	Likely	Non-reversible	High	Archaeological excavation to be undertaken by a professional archaeologist or avoid sites with a buffer of 25 m from their mid-points.  Ensure that all works occur inside the approved 250 ha development footprint.	Low	Very low	5	High
Clearing of site	Destruction of graves	Negative	Site	Permanent	Extreme	Likely	Non-reversible	High	Avoid grave with a buffer of at least 5 m or test and exhume as required	High	Very low	5	Low
Clearing of site and construction of the proposed facility	Impacts to the natural and cultural landscape	Negative	Local	Long term	Moderate	Very likely	High	Moderate	Use earthy-coloured paint on built elements	Low	Low	4	High

**Table 3: Impact assessment summary table for the Operational Phase.**

Operational Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
The presence of the proposed PV facility	Impacts to the natural and cultural landscape	Negative	Local	Long term	Moderate	Very likely	High	Moderate	None required	Low	Low	4	High

**Table 4: Impact assessment summary table for the Decommissioning Phase.**

Decommissioning Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
The presence of construction vehicles	Impacts to the natural and cultural landscape	Negative	Local	Short term	Moderate	Very likely	High	Moderate	None required	Low	Low	4	High



**Table 5: Cumulative impact assessment summary table.**

Cumulative Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplace ability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Clearing of site	Destruction of archaeological resources	Negative	Local	Permanent	Moderate	Likely	Non-reversible	High	Archaeological excavation to be undertaken by a professional archaeologist or avoid sites with a buffer of 25 m from their mid-points.  Ensure that all works occur inside the approved 250 ha development footprint.	Low	Very low	5	High
Clearing of site	Destruction of graves	Negative	Local	Permanent	Moderate	Likely	Non-reversible	High	Avoid grave with a buffer of at least 5 m or test and exhumate as required	Low	Very low	5	Low
Clearing of site and construction of the proposed facility	Impacts to the natural and cultural landscape	Negative	Local	Long term	Moderate	Very likely	High	Moderate	Use earthy-coloured paint on built elements	Low	Low	4	High

## **10. PERMIT REQUIREMENTS**

The NHRA does not require the developer to obtain permits prior to construction. However, any archaeological mitigation work (i.e. test excavations, sampling, etc.) that may be required (whether as a condition of authorisation or in the event of new archaeological resources or graves of significance being found within the development footprint during construction) would need to be conducted under a permit issued to, and in the name of, the appointed archaeologist. The permit application process allows the heritage authorities to ensure that a suitably qualified and experienced archaeologist undertakes the work and that the proposed excavation/sampling methodology is acceptable.

## **11. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME**

### **11.1. For inclusion in the EMPr**

Provision should be made for archaeological mitigation to be carried out, if the sites are not avoided, well in advance of the start of construction, preferably at least 6 months. This will allow the archaeologist time to obtain a permit, conduct the work, analyse the material and obtain a positive comment from SAHRA.

The Environmental Control Officer (ECO) (or Environmental Officer) should meet with workers on site at the start of the construction phase to explain the possibility that graves might be present. During clearing of the surface, all personnel should be vigilant for any unusual stone features and these should be reported to the ECO, who should then report the find(s) to an archaeologist. An alternative to this is to commission an archaeologist to conduct a more detailed examination of the surface of the final development footprint in order to identify any potential issues prior to construction. The feature(s) may need to be tested by an archaeologist to confirm whether they are graves or not. If they are graves then exhumation would be required prior to further work in the area.

Note that there are no specific heritage monitoring requirements for this project but that environmental monitoring by the ECO to ensure compliance with the recommendations has been included in the EMPr.

### **11.2. For inclusion in the Environmental Authorisation**

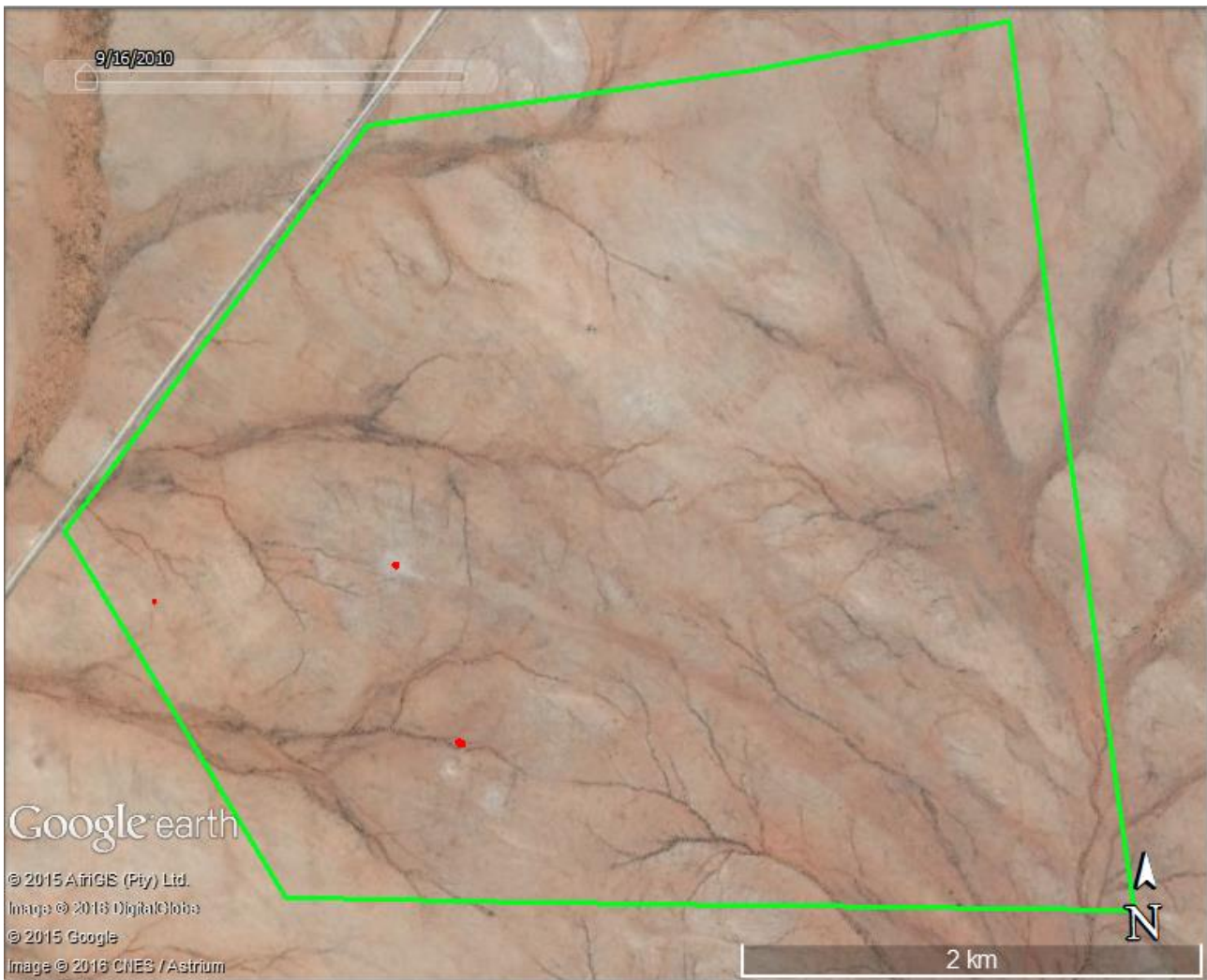
The following points should be included as conditions of authorisation:

- If they cannot be avoided with a buffer of at least 25 m, the two significant archaeological sites should be excavated;
- The potential grave should be avoided with a buffer of at least 5 m or else tested and, if necessary, exhumed prior to construction;
- The construction team should be made aware of the potential to locate more graves and instructed to report any suspicious stone features prior to disturbance;

- The built elements of the facility should be painted in an earthy colour to minimise visual contrast in the landscape; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

## **12. CONCLUSIONS**

Only three significant heritage resources were identified – two archaeological sites and a possible grave site (Figure 15). It should be easy to avoid the potential grave site since it lies close to the western edge of the study area. One of the archaeological sites is on a quartz hill that is unlikely to be considered a developable area. The other archaeological site lies in the southern part of the study area but because the area is so big it is likely to be avoidable by the final development footprint. Either way, the archaeological sites should be avoided or mitigated and the grave either avoided or tested and exhumed if necessary. Care should be taken to identify any further possible graves prior to the commencement of construction. Should these measures be complied with then no further significant impacts are expected and there is no heritage-related reason why the proposed development should not be allowed to proceed within the identified study area.



**Figure 15:** Aerial view of the PV 3 study area showing the three significant heritage sites (red) in the western part.

### 13. RECOMMENDATIONS

Because the impacts are few and entirely manageable, it is recommended that the proposed project be allowed to continue but subject to the following conditions:

- If they cannot be avoided with a buffer of at least 25 m, the two significant archaeological sites should be excavated;
- The potential grave should be avoided with a buffer of at least 5 m or else tested and, if necessary, exhumed prior to construction;
- The construction team should be made aware of the potential to locate more graves and instructed to report any suspicious stone features prior to disturbance;
- The built elements of the facility should be painted in an earthy colour to minimise visual contrast in the landscape; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist.

Such heritage is the property of the state and may require excavation and curation in an approved institution.

## 14. REFERENCES

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## APPENDIX 1 – Curriculum Vitae



*Curriculum Vitae*

**Jayson David John Orton**

ARCHAEOLOGIST AND HERITAGE CONSULTANT

### Contact Details and personal information:

**Address:** 6A Scarborough Road, Muizenberg, 7945  
**Telephone:** (021) 788 8425  
**Cell Phone:** 083 272 3225  
**Email:** jayson@asha-consulting.co.za

**Birth date and place:** 22 June 1976, Cape Town, South Africa  
**Citizenship:** South African  
**ID no:** 760622 522 4085  
**Driver's License:** Code 08  
**Marital Status:** Married to Carol Orton  
**Languages spoken:** English and Afrikaans

### Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

\*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

### Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

### Memberships and affiliations:

South African Archaeological Society Council member	2004 –
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
ASAPA Cultural Resources Management Section member	2007 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –

## **Professional Accreditation:**

**ASAPA membership number: 233, CRM Section member**

Principal Investigator: Coastal shell middens (awarded 2007)  
Stone Age archaeology (awarded 2007)  
Grave relocation (awarded 2014)

Field Director: Rock art (awarded 2007)  
Colonial period archaeology (awarded 2007)

## **Fieldwork and project experience:**

Extensive fieldwork as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

### Phase 1 surveys and impact assessments:

- Project types
  - Notification of Intent to Develop applications (for Heritage Western Cape)
  - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
  - Archaeological specialist studies
  - Phase 1 test excavations in historical and prehistoric sites
  - Archaeological research projects
- Development types
  - Mining and borrow pits
  - Roads (new and upgrades)
  - Residential, commercial and industrial development
  - Dams and pipe lines
  - Power lines and substations
  - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

### Phase 2 mitigation and research excavations:

- ESA open sites
  - Duinefontein, Gouda
- MSA rock shelters
  - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
  - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
  - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
  - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
  - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
  - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
  - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
  - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

## APPENDIX 2 - Specialist Declaration

I, Jayson Orton, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: \_\_\_\_\_

Name of Specialist: JAYSON ORTON

Date: 30 DECEMBER 2015