

Archaeological Impact Assessment

**For the proposed S Kol Photovoltaic Plant. Keimoes,
Northern Cape**

Prepared For

Savannah Environmental (Pty) Ltd

By



HERITAGE

Contracts and Archaeological Consulting

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EXECUTIVE SUMMARY

Site name and location: The proposed S Kol photovoltaic plant is located approximately 10 km north east of Keimoes in the Northern Cape. The proposed project is located on the farm Geelkop 456 within the Kai Garib Local Municipality and the Siyanda District Municipality.

Purpose of the study: Phase 1 Archaeological Impact Assessment to determine the presence of cultural heritage sites and the impact of the proposed project on these resources within the areas demarcated for the solar development.

1:50 000 Topographic Map: 2821 CA.

EIA Consultant: Savannah Environmental (Pty) Ltd

Developer: S28 Degrees Energy (Pty) Ltd

Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

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Date of Report: 28 October 2011

Findings of the Assessment:

An archival map dating to 1908 indicated the old wagon road that was found during the survey. From the scoping study it is clear that the roads were generally very sandy and bad. Modes of transport included donkey and ox wagons, the former by far more common, usually spanning 18 animals.

Scatters of mainly Middle Stone Age (MSA) artefacts made from quartz and quartzite is wide spread in low densities across the study area. The tools are exposed to a high degree of sheet erosion and are not *in situ*, and therefore, of low significance. The tool scatters in the study area indicate the use of the wider landscape by humans during the MSA period.

Should any possible archaeological finds be made during construction, concentrated tool scatters, horizons with tools scatters or bone and fossil material or any other archaeological finds are made, the operations must be stopped, and a qualified archaeologist contacted for an assessment of the find.

If the developers adhere to the recommendations made under section 7 of this report, there is, from a heritage point of view, no reason why the development cannot commence work.

General

Due to high sand cover, ground visibility was low on portions of the site during survey. The possible occurrence of unmarked or informal graves and subsurface finds can thus not be excluded. If during construction any possible finds are made, operations must be stopped and a qualified archaeologist be contacted for an assessment of the find.

Disclaimer: *Although all possible care is taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. Heritage Contracts and Archaeological Consulting CC and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

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- The technology described in any report;
- Recommendations delivered to the Client.

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ABBREVIATIONS

<i>ASAPA</i> : Association of South African Professional Archaeologists	<i>SAHRA</i> : South African Heritage Resources Agency
<i>CRM</i> : Cultural Resource Management	<i>MIA</i> : Middle Iron Age
<i>EIA Practitioner</i> : Environmental Impact Assessment Practitioner	<i>EIA</i> : Environmental Impact Assessment*
<i>EIA</i> : Early Iron Age*	<i>ESA</i> : Early Stone Age
<i>GPS</i> : Global Positioning System	<i>HIA</i> : Heritage Impact Assessment
<i>LSA</i> : Late Stone Age	<i>LIA</i> : Late Iron Age
<i>MSA</i> : Middle Stone Age	<i>PRHA</i> : Provincial Heritage Resource Agency
<i>BIA</i> : <i>Basic Impact Assessment</i>	

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 25 000 years ago)

Late Stone Age (~ 25 000 to 500 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 BACKGROUND INFORMATION

<i>Kind of study</i>	Archaeological Impact Assessment
<i>Type of development</i>	Solar Facility
<i>Rezoning/subdivision of land</i>	Rezoning
<i>Developer:</i>	S28 Degrees Energy (Pty) Ltd
<i>Consultant:</i>	Savannah Environmental
<i>Farm owner:</i>	J P Snyman

A heritage scoping report was conducted by Heritage Contracts and Archaeological Consulting CC (2011), and the company was also contracted by Savannah Environmental (Pty) Ltd to conduct an Archaeological Impact Assessment for the proposed S Kol Solar Facility, close to Keimoes in the Northern Cape. The report forms part of the EIA for the proposed project.

The aim of the study is to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, a review of the heritage scoping report that includes collection from various sources and consultations; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey two heritage sites were identified. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the report following below.

This report must also be submitted to SAHRA provincial office for peer review.

1.1 Terms of Reference

Conduct a field study to:

Systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; to record GPS points of identified as significant areas; to determine the levels of significance of the various types of heritage resources recorded in the project area.

Reporting:

Identify the anticipated impacts, as well as cumulative impacts, of the operational units of the proposed project activity on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation and the code of ethics and guidelines of the ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.2. ARCHAEOLOGICAL LEGISLATION AND BEST PRACTICE

Phase 1 Archaeological Impact Assessments or Heritage Impact Assessments are a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources;
- Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the EIA, is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 38(1), Section 38(8) of the National Environmental Management Act (NEMA) and the Mineral and Petroleum Resources Development Act (MPRDA).

The AIA should be submitted, as part of the EIA, BIA or Environmental Management Plan (EMP), to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is a legal body, based in South Africa, representing professional archaeology in the Southern African Development Community [SADC] region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIA's are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guide lines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation is conducted on a site, a destruction permit must be applied for from SAHRA before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare.

Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to

handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

1.3 Description of Study Area

1.3.1 Location Data

The study area is located 10 km north-east of Keimoes, to the west of the Orange River. A power line and the N14 national road between Keimoes and Upington traverse the site in the south-eastern section.

There are various drainage lines draining the study area, all flowing in an easterly direction towards the Orange River. The topography of the area is relatively gentle, sloping in an easterly direction towards the Orange River.

The climate can be described as arid to semi-arid with rainfall occurring from November to April. Historical imagery on Google Earth indicates that the land has been fallow for a number of years.

1.3.2. Location Map

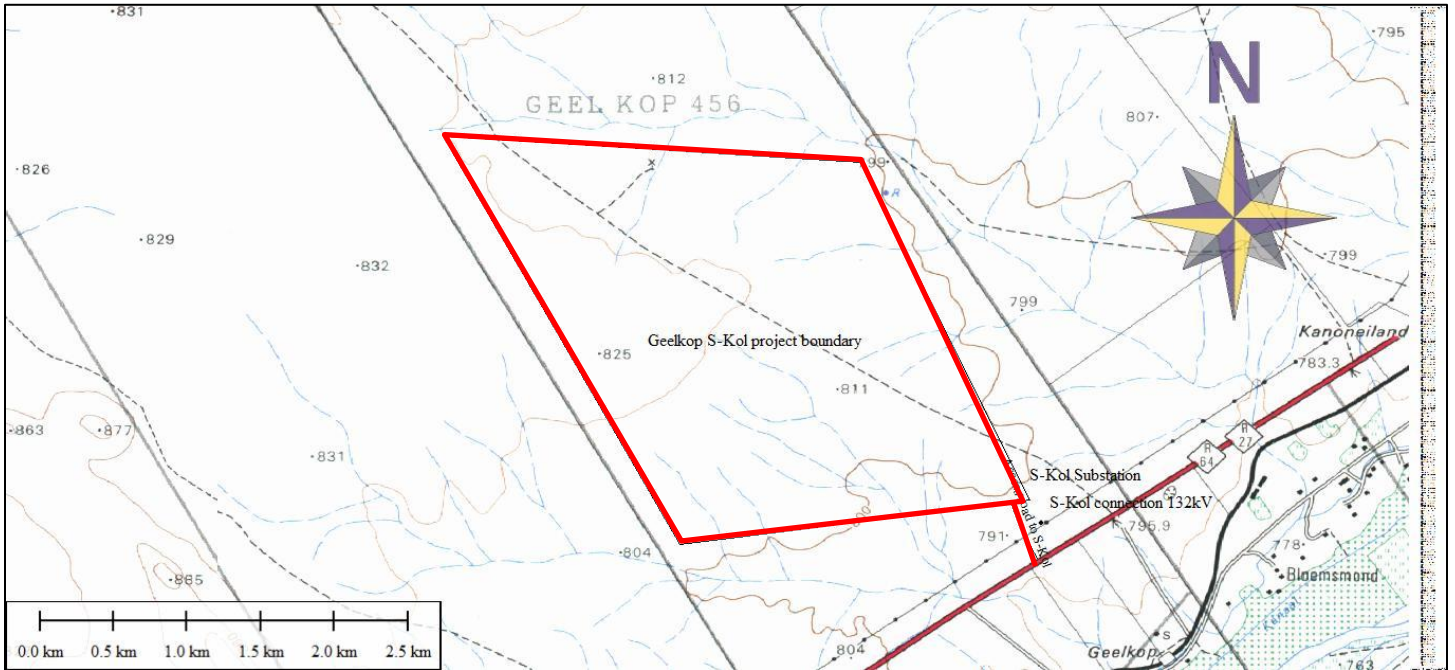


Figure 1: Location map of the proposed project and the areas that was assessed in red.

1.3.3. Google Maps

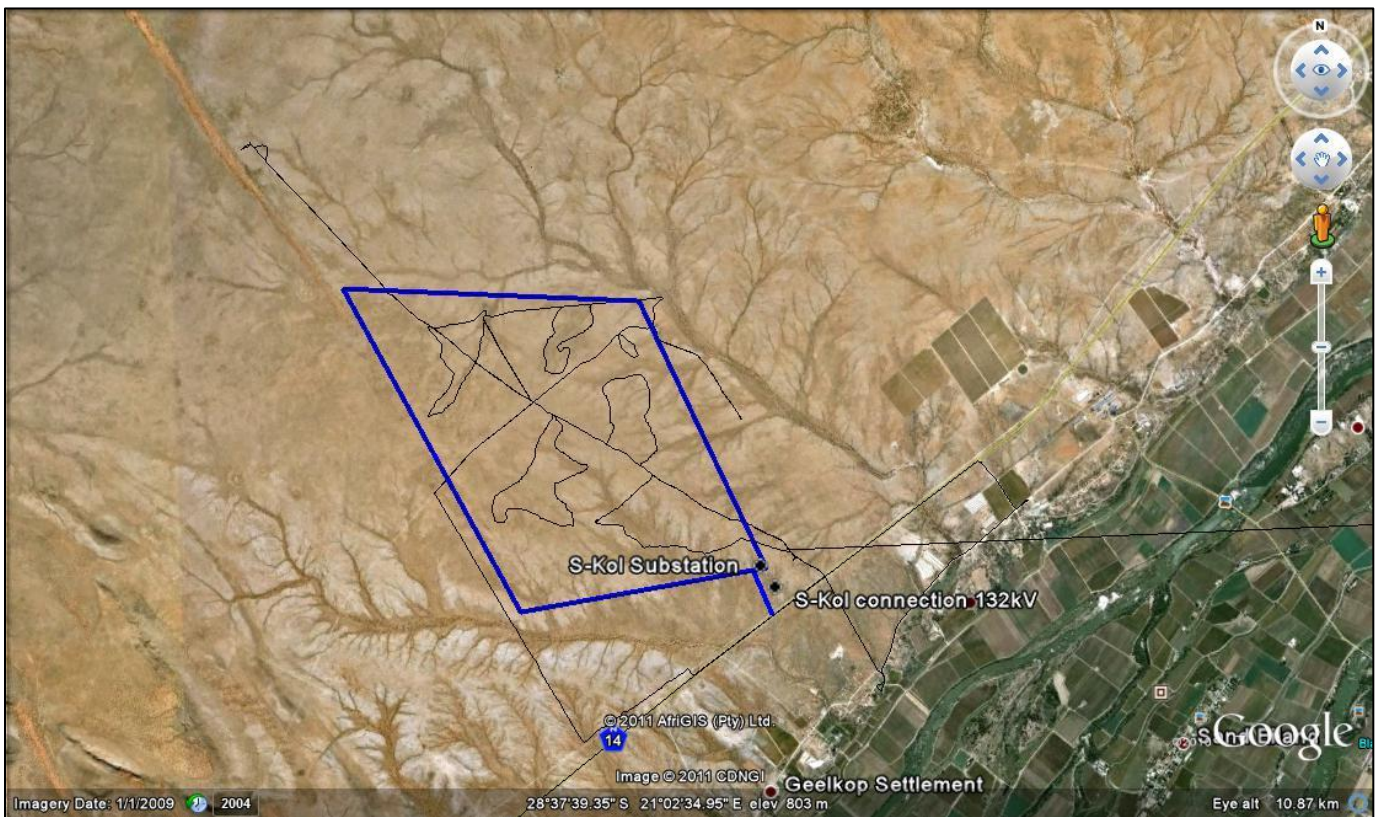


Figure 2: Google Image showing the study area in blue and track log of the areas that was covered.

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases and historical sources to compile a background history of the study area followed by field verification; this was accomplished by means of the following phases.

2.1 Phase 1 - Desktop Study

The first phase comprised of a desktop study, gathering data to compile a background history of the area in question, looking at archaeological sites, historical sites, graves, architecture, oral history and ethnographical information on the inhabitants of the area. This phase comprised a heritage scoping report done by Heritage Contracts and Archaeological Consulting CC 2011.

2.1.1 Literature Search

See Annexure A for the full Heritage Scoping Report. In addition to the information from the scoping study the following actions was taken.

2.1.2 Information Collection

The SAHRA report mapping project (Version 1.0) was consulted to further collect data from CRM practitioners who undertook work in the area to provide the most comprehensive account of the history of the area where possible.

2.1.3 Public Consultation

A Brief consultation with the landowner was conducted during this phase.

2.1.4 Google Earth and Mapping Survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located.

2.1.5 Genealogical Society of South Africa

The database of the genealogical society was consulted to collect data on any known graves in the area.

2.2 Phase 2 - Physical Surveying

Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the study area of 400 ha was conducted; focussing on drainage lines, hills and outcrops, high lying areas and disturbances in the topography. The study area was surveyed by means of vehicle and extensive surveys on foot.

All sites discovered inside the proposed development area was plotted on 1:50 000 maps and their GPS co-ordinates noted. Digital photographs were taken at all the sites.

2.3. Restrictions

Due to the fact that most cultural remains may occur below surface, the possibility remains that some features or artefacts may not have been discovered/recorded during the survey. Low ground visibility is present on parts of the study area due to deep sand cover, and the possible the occurrence of unmarked graves and other cultural material cannot be excluded. Only the surface infrastructure footprint area was surveyed as

indicated in the location map, and not the entire farm. Although Heritage Contracts and Archaeological Consulting CC surveyed the area as thorough as possible, it is incumbent upon the developer to inform the relevant heritage agency should further cultural remains be unearthed or laid open during the process of development.

3 NATURE OF THE DEVELOPMENT

The proposed photovoltaic plant will have a maximum generating capacity of 100 MW to be developed in phases on 400 ha of the farm Geelkop 456.

The following associated infrastructure is part of the project proposal:

- » Numerous arrays of photovoltaic panels, which will be linked together to form individual strings.
- » Underground cabling of 33 kV in order to distribute the power to a central on-site substation.
- » A transformer together with the on-site substation to step-up the power from 33 kV to 132 kV, distributed between the photovoltaic plant and the Eskom grid.
- » Connection of each facility to the power distribution grid consisting of a loop-in/loop-out connection.
- » Internal access roads for construction and maintenance purposes.
- » Maintenance, security buildings, and a workshop.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

4.1 Databases Consulted

Wits and McGregor Museum Archaeological Data Bases

On the 1:50 000 map sheet 2821 CA no previously recorded sites exist.

SAHRA Report Mapping Project

Several unpublished CRM projects were conducted in the general study area (Beaumont 2005, 2008; Van Ryneveld 2007a, 2007b; Dreyer 2006). These studies identified Early and Middle Stone Age assemblages as well as historical structures.

Genealogical Society and Google Earth Monuments

Neither the Genealogical Society nor the monuments database at Google Earth (Google Earth also includes some archaeological sites and historical battlefields) have any recorded sites in the study area.

Public Consultation

During consultation with the landowner various heritage sites were mentioned within the study area. These sites include an old ox-wagon road as well as mining activities in the early 1930s.

4.2 Archaeological and Historical Information Available on the Study Area

This scoping study revealed that a range of heritage sites occur in the larger region and similar sites can be expected within the study area. Every site is relevant to the heritage landscape, but it is anticipated that few, if any, sites in the area have conservation value.

There is a high likelihood of Stone Age sites in the area as well as historical sites, based on the human occupation of the area from the 1800s, as well as people moving through the area. The farm Geelkop housed a small post office from 1944 until 1963; however, this is located outside of the study area. The archival study indicated a memorial on the property called Rebellion Tree; this is also located outside the study area. The wagon road between Keimoes and Upington crossed the farm and is marked on maps of the area dating to 1908. Some exploration activities are also recorded for the farm dating from the 1930s. The possibility of graves and cemeteries in the area cannot be excluded.

5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the S Kol Solar Facility the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposit;
- » The wider historic, archaeological and geographic context of the site;
- » The location of the site in relation to other similar sites or features;
- » The depth of the archaeological deposit (when it can be determined/is known);
- » The preservation condition of the site;
- » Potential to answer present research questions.

Furthermore, The National Heritage Resources Act (Act No 25 of 1999, Sec 3) distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- » its importance in/to the community, or pattern of South Africa's history; its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- » its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- » its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- » its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- » its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- » its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- » its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- » sites of significance relating to the history of slavery in South Africa.

5.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and approved by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 9 of this report.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.C)	-	Low Significance	Destruction

5.2 Impact Rating of Assessment

The following criteria are used to establish the impact rating of a site as provided by the client:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - * medium-term (5-15 years), assigned a score of 3;
 - * long term (> 15 years), assigned a score of 4; or
 - * permanent, assigned a score of 5;
- » The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be *mitigated*.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

6. BASELINE STUDY -DESCRIPTION OF SITES

6.1 Site Layout Map

It is important to note that the entire farm was not surveyed but only the footprint of the proposed PV Layout area and power line for connection to the grid as indicated in figure 1.

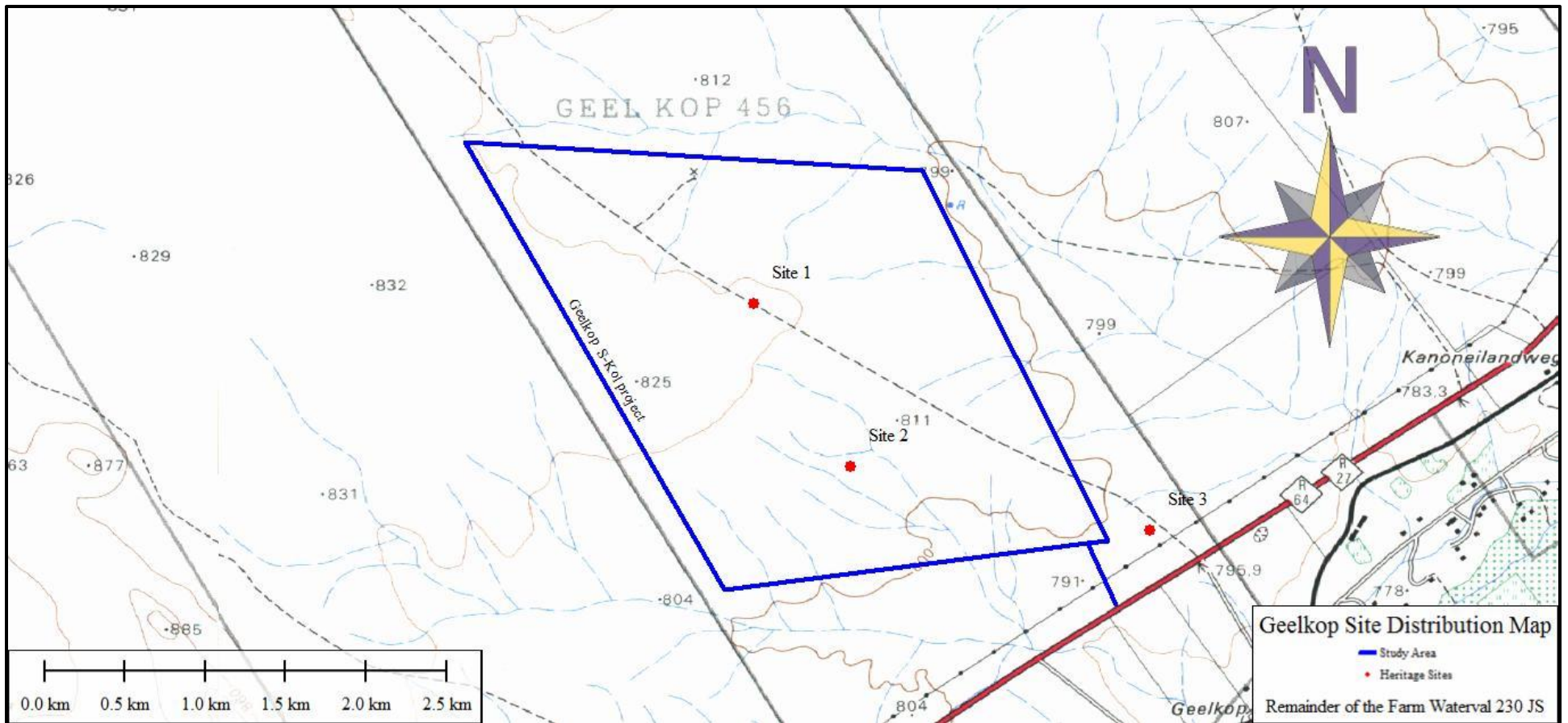


Figure 3: Showing the distribution of heritage sites and the area that was surveyed.

6.2. Sites with Coordinates

Site Number	Landscape	Type Site	Cultural Markers	Co ordinate
Site 1	Archaeological and Cultural Heritage	Historical	Old wagon road	S28 37 34.7 E21 01 45.9
Site 2	Archaeological and Cultural Heritage	Middle Stone Age	Stone tools with facets on the striking platform	S28 38 07.4 E21 02 05.3
Site 3	Archaeological and Cultural Heritage	Mining	Exploration trench	S28 38 20.3 E21 03 05.6

6.3. Site Descriptions

6.3.1 Site 1

Site Number	Site 1	1:50 000 map nr	2820 DB and 2821 CA
Site Data	Description:		
Type of site	Open Scatter		
Site categories	Historical		
Context	The site consists of a sandy road marking the location of the old wagon road between Keimoes and Upington that traverses the study area in an east-west direction.		
Cultural affinities, approximate age and significant features of the site	Based on the results of the archival study the road was in use at least by 1908 and usually used by wagons.		
Description of artefacts	No artefacts were noted.		
Estimation or measurement of the extent	The road traverses the farm for a total length of 2.5 km, and is approximately 2 meters wide.		
Depth and stratification of the site	Not applicable.		

Photographs



Figure 4: Remains of old wagon road.



Figure 5: General site conditions.

<p>Field Rating (Recommended grading or field significance) of the site</p>	<p>Generally Protected B.</p>
<p>Statement of Significance (heritage value)</p>	<p>Medium significance.</p>

Impact Evaluation

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove the last remains of the historical marker.

	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (3)
Probability	Probable (3)	Probable (3)
Significance	45 (Medium)	30 (Medium)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

The site should be memorialised in terms of a plaque indicating the location of the old wagon road and short history thereof.

Cumulative impacts:

Archaeological and historical sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.

Residual Impacts: Depletion of historical record of the area.

6.3.2 Site 2

Site Number	Site 2	1:50 000 map nr	2820 DB and 2821CA
Site Data	Description:		
Type of site	Open stone tool scatter.		
Site categories	MSA tool scatter.		
Context	The site consists of MSA artefacts, gravitating down from a small ridge next to an old drainage line. The site is characterised by sheet erosion and represents a low density of MSA artefacts.		
Cultural affinities, approximate age and significant features of the site;	Approximate age for MSA in southern Africa dates to ~ 30-300 thousand years ago.		
Description of artefacts	Almost all of the artefacts are made from quartz, quartzite and banded iron stone. Features on the flake tools include facets on the striking platform, a feature considered characteristic of MSA stone tool production. Formal tools produced on banded iron stone include convergent flakes with some lateral retouch, and small (< 5 cm long) retouched blades. Based on size and morphology, these could indicate the presence of people on the landscape between ~ 66 000 and 45 000 ago, during archaeological phases known as the Howieson's Poort, post-Howieson's Poort and late-Middle Stone Age (Lombard 2011). Some cores are also present. Artefact ratio is approximately 4 artefacts per m ² , thus relatively low.		
Estimation or measurement of the extent	Artefacts are found scattered around an area of approximate 100x50 meters on a ridge next to a drainage line.		
Depth and stratification of the site	Not known.		

Photographs



Figure 6: Stone tools found at Site 2.



Figure 7: General Site conditions.

Field Rating

(Recommended grading or field significance) of the site:

Generally Protected B.

Statement of Significance (heritage value)

Low to Medium significance.

Impact Evaluation

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position Stone Age Material or objects.

	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	39 (Medium)	27 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
If impact on the site is definite, surface sampling should be conducted and the site should be monitored during construction. Alternatively, the general location should be demarcated to avoid impact on the site.		
Cumulative impacts:		
Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: Depletion of Archaeological record of the area.		

6.3.3 Site 3

Site Number	Site 3	1:50 000 map nr	2820 DB and 2821CA
Site Data	Description:		
Type of site	Open Air site		
Site categories	Historical/recent mining activities		
Context	The site consists of an exploration trench, approximately 10 meters long and 1.5 meters wide, running south-west to north-east. The site falls outside of the development footprint and no impact is foreseen, therefore no impact evaluation is necessary.		
Cultural affinities, approximate age and significant features of the site;	According to the archival study, exploration on the farm occurred around 1929, however the extent of the exploration is unknown as the Secretary of Mines indicated that the claims of finding super phosphate on the farm was ungrounded. The presence of mining activities was also confirmed by the owner.		
Description of artefacts	No artefacts were noted.		
Estimation or measurement of the extent	The site measures 10 x 1.5 meters.		
Depth and stratification of the site	Not known.		

Photographs



Figure 8: Exploration trench.

Field Rating

(Recommended grading or field significance) of the site:

Generally Protected C.

Statement of Significance (Heritage Value)

Low significance.

Impact Evaluation

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position Stone Age material or objects.

	Without mitigation	With mitigation
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (2)
Probability	Not Probable (2)	Not Probable (2)
Significance	30 (Medium)	16 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

If impact on the site is definite the site must be mapped. Alternatively the general location should be demarcated to avoid impact on the site.

Cumulative impacts:

Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.

Residual Impacts: Depletion of Archaeological record of the area.

7. RECOMMENDATIONS

Three sites were identified during the survey. One site, Site 3, is located outside of the study area and no further action is necessary here..

I recommend that Site 1 is memorialised with a commemorative plaque, indicating the location of the old wagon road and a short history of the site.

Site 2 is heavily eroded and represents a low density scatter of MSA material. This material is not *in situ* and is of low significance. MSA artefacts are scattered in low densities over the entire study area and site 2 represents a slightly higher concentration. No further action is necessary for this site.

From a heritage point of view, there is no reason why the development cannot commence if these recommendations are adhered to.

8. CONCLUSIONS

An archival map, dating to 1908, indicated the old wagon road that was found during the survey. From the scoping study it is clear that the roads were generally very sandy and bad. Modes of transport included donkey and ox wagons, the former by far more common, usually spanning 18 animals.

Scatters of mainly MSA artefacts, made from quartz and quartzite, is wide spread in low densities across the study area. The tools are exposed to a high degree of sheet erosion and are not *in situ*, and therefore, of low significance. The tool scatters in the study area indicate the use of the wider landscape by humans during the MSA period.

If the developers adhere to the recommendations made under section 7 of this report, there is, from a heritage point of view, no reason why the development cannot commence work.

General

Due to high sand cover, ground visibility was low on portions of the site during survey. The possible occurrence of unmarked or informal graves and subsurface finds can thus not be excluded. If during construction any possible finds are made, operations must be stopped and a qualified archaeologist be contacted for an assessment of the find.

9. PROJECT TEAM

Jaco van der Walt, Project Manager

Dr. Marlize Lombard, Principle Investigator

10. STATEMENT OF COMPETENCY

I (Jaco van der Walt) am a member of ASAPA (no 159), and accredited in the following fields of the CRM Section of the association: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. This accreditation is also valid for/acknowledged by SAHRA and AMAFA.

Currently, I serve as Council Member for the CRM Section of ASAPA, and have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique and Tanzania; having conducted more than 300 AIAs since 2000.

Dr Marelize Lombard lectures in the Anthropology Department of the University of Johannesburg, where she also conducts research and publishes on the Stone Age of Southern Africa. She is an accredited Stone Age Principal Investigator with ASAPA, SAHRA and AMAFA.

11. REFERENCES

Acocks, J.P.H. 1975. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa, No. 40. Pretoria: Botanical Research Institute.

Beaumont, P.B. 2005. Archaeological Impact Assessment at and in the vicinity of a quartzite quarry on Portion 4 of the Farm Droogehout 442 near Upington.

Beaumont, P.B. 2008. Phase 1 Heritage Impact Assessment Report on a portion of the farm Keboes 37, near Kanoneiland, Siyanda District Municipality, Northern Cape.

Dreyer, C. 2006. First phase Archaeological and cultural Heritage Impact Assessment of the Proposed Concentrated Solar Thermal Plant (Csp), at the farms Olyfenhoutsdrift, Upington, Bokpoort 390 and Tampansrus 294/295, Groblershoop, Northern Cape.

Lombard, M. 2011. Howieson's Poort. McGraw Hill Year Book of Science & Technology. Article ID: YB120253; Sequence Number 14.

South African Heritage Resources Agency, Report Mapping Project. Version 1.0, 2009

Van Ryneveld, K. 2007. Phase 1 Archaeological Impact Assessment – Portion of the farm Cnydas East 439, Upington District, Northern Cape, South Africa.

Van Ryneveld, K. 2007. Phase 1 Archaeological Impact Assessment – Portion of the farm Bokspuits 118, Groblershoop, Northern Cape, South Africa.