
HERITAGE IMPACT ASSESSMENT REPORT

ENVIRONMENTAL IMPACT ASSESSMENT PHASE

Proposed establishment of the Prieska Solar Energy Facility located East of Prieska on the Remaining Extent of (Roosloot) of the Farm Holsloot No 47, Northern Cape Province.

Prepared By:



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Disclaimer; Although all possible care is taken to identify all 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. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

Statement of Independence

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

Signed off by S. Gaigher

A handwritten signature in black ink, appearing to read 'S. Gaigher', with a stylized flourish at the end.

Site name and location: Proposed establishment of the Prieska Solar Energy Facility, on the Remaining Extent of Portion 3 (Rooisloot) of the Farm Holsloot No 47, located east of Prieska in the Northern Cape Province.

Municipal Area: Siya Themba Municipal area.

Developer: Ventusa Energy (PTY) Ltd.

Consultant: G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa. 38A Vorster Str. Louis Trichardt, 0920

Date of Report: 17 July 2013

Executive Summary

The purpose of the executive summary is to distil the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study focuses on the development of the Prieska Solar Energy Facility. This will entail the construction of a 75MW solar generation plant as well as a power line for grid integration.

This study forms part of the Environmental Impact Assessment phase of the environmental management process and is described as a First Phase Heritage Impact Assessment.

The purpose of this phase of the study is to determine the possible occurrence of sites with cultural heritage significance within the study area and the evaluation of the heritage significance of these sites as well as the possible impacts on such sites by the proposed developments.

Findings

The area was investigated during October 2012 and the findings of this survey was reported to SAHRA. The subsequent evaluation of the report indicated areas of uncertainty and a follow up investigation was done during July 2013. Originally the investigator reported that the whole area seemed to contain significant amounts of Stone Age tools. On further inspection though, it was found that much of this could be classified as background scatters of little significance. The one area designated Site 007 was identified as the only intact Stone Age site in the study area. It's provenience was confirmed by the fact that it was located near a drainage vein and that no other tools were found further upstream of this vein, suggesting that it was in its original position and not displaced backscatter.

It was found that the route R357 that runs past the site is not an important scenic route and that it is used mainly by commercial traffic. This combined with the low visual impact of the solar plant resulted in a low visual impact. A compounded effect is however expected should other planned developments in the area proceed as indicated.

Recommendations

It is recommended that if the final footprint of the development comes within 100m of Site 007 that second phase mitigation takes place in the form of surface collections and excavations.

No mitigation is necessary for the visual impact of the site as it pertains to heritage resources.

Fatal Flaws

No fatal flaws were identified.

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List of Abbreviations

Bp	Before Present
EIA	Early Iron Age
ESA	Early Stone Age
GPS	Geographic Positioning System
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Late Stone Age
MYA	Million Years Ago
MSA	Middle Stone Age
NHRA	National Heritage Resources Act no 22 of 1999
SAHRA	South African Heritage Resource Agency
S&EIR	Scoping & Environmental Impact Reporting
WGS 84	World Geodetic System for 1984

Heritage Impact Assessment Report for the Proposed Prieska Solar Energy Project

1. Introduction

1.1 Legislation and methodology

G&A Heritage was appointed by Savannah Environmental cc to undertake a heritage impact assessment for the proposed Prieska Solar Energy Project. Section 38(1) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study is undertaken for:

- (a) construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;*
- (b) construction of a bridge or similar structure exceeding 50 m in length; and*
- (c) any development, or other activity which will change the character of an area of land, or water –*
 - (1) exceeding 10 000 m² in extent;*
 - (2) involving three or more existing erven or subdivisions thereof; or*
 - (3) involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or*
 - (d) the costs of which will exceed a sum set in terms of regulations; or*
 - (e) any other category of development provided for in regulations.*

While the above describes the parameters of developments that fall under this Act., Section 38 (8) of the NHRA is applicable to this development. This section states that;

- (8) The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.*

In regards to a development such as this that falls under Section 38 (8) of the NHRA, the requirements of Section 38 (3) applies to the subsequent reporting, stating that;

- (3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2) (a): Provided that the following must be included:*
 - (a) The identification and mapping of all heritage resources in the area affected;*
 - (b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7;*
 - (c) an assessment of the impact of the development on such heritage resources;*

- (d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*
- (e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (g) plans for mitigation of any adverse effects during and after the completion of the proposed development.*

A heritage impact assessment is not limited to archaeological artefacts, historical buildings and graves. It is far more encompassing and includes intangible and invisible resources such as places, oral traditions and rituals. A heritage resource is defined as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes the following:

- (a) places, buildings, structures and equipment;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and paleontological sites;
- (g) graves and burial grounds, including –
 - (1) ancestral graves,
 - (2) royal graves and graves of traditional leaders,
 - (3) graves of victims of conflict (iv) graves of important individuals,
 - (4) historical graves and cemeteries older than 60 years, and
 - (5) other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);
- (h) movable objects, including ;
 - (1) objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
 - (2) ethnographic art and objects;
 - (3) military objects;
 - (4) objects of decorative art;
 - (5) objects of fine art;
 - (6) objects of scientific or technological interest;
 - (7) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
 - (8) any other prescribed categories, but excluding any object made by a living person;
- (i) battlefields;
- (j) traditional building techniques.

A **'place'** is defined as:

- (a) A site, area or region;
- (b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
- (c) a group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and
- (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'Structures' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'Archaeological' means:

- (a) material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- (b) rock art, being a 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 is older than 100 years including any area within 10 m of such representation; and
- (c) wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;
- (d) features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Paleontological' means 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.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this study are as follows;

- Sites were evaluated by means of description of the cultural landscape and analysis of written sources and available databases.
- It was assumed that the power line and solar facility alignment/placement as provided by Savannah Environmental cc is accurate.
- We assumed that the public participation process performed as part of the Scoping process will be sufficiently encompassing not to be repeated in the Heritage Impact Assessment.

Table 1. Impacts on the NHRA Sections

Act	Section	Description	Possible Impact	Action
National Heritage Resources Act (NHRA)	34	Preservation of buildings older than 60 years	No impact	None
	35	Archaeological, paleontological and meteor sites	Possible Impact	HIA
	36	Graves and burial sites	Possible Impact	HIA

	37	Protection of public monuments	No impact	None
	38	Does activity trigger a HIA?	Yes	HIA

Table 2. NHRA Triggers

Action Trigger	Yes/No	Description
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	Yes	Various distribution power lines and access roads
Construction of a bridge or similar structure exceeding 50m in length.	No	N/A
Development exceeding 5000 m ²	Yes	Prieska Solar Energy Facility
Development involving more than 3 erven or sub divisions	No	N/A
Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years	No	N/A
Re-zoning of site exceeding 10 000 m ²	Yes	Re-zoning from agricultural to industrial
Any other development category, public open space, squares, parks or recreational grounds	No	N/A

2. Background Information Proposed Prieska Solar Energy Facility

2.1 Project Description

An independent power developer of concentrating solar power plants, Jouren Solar (Pty) Ltd., is in the process of investigating the possible establishment of the Prieska Solar Facility, using concentrating solar generation technology, on a site located on the Remaining Extent of Portion 3 (Roosisloot) of the Farm Holsloot No 47 in the Siyathemba Municipality in the Northern Cape.

The proposed site is technically preferred by virtue of climatic conditions (primarily as the economic viability of a solar energy facility is directly dependent on the annual direct solar irradiation values for a particular area), orographic conditions, relief and aspect and the availability of a grid connection (i.e. the point of connection to the National grid).

The facility is proposed to include several arrays of photovoltaic (PV) solar panels and/or concentrating photovoltaic solar panels with a generating capacity of approximately 75 Megawatts of electricity and includes the following associated infrastructure:

- Solar panels (single or double axis).
- An on-site inverter to step up the power and a substation to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- Two alternatives are being considered to evacuate the electricity from the facility.
 - a) Alternative 1 a loop-in and loop out power line to connect into the existing Burchell-Mooidraai 1 132kV power line which traverses the site;
 - b) Alternative 2 to connect directly into the existing Eskom Mooidraai Substation located on the site.
- Internal access roads.
- Workshop area for maintenance and storage.

The proposed development inclusive of associated infrastructure can be appropriately located on the identified site, which covers a total area of approximately 7.5 - 8 km². The extent of the broader site is larger than the space required for the facility's development footprint. Therefore, the PV panels and the associated infrastructure can be appropriately placed within the boundaries of the broader site while aiming to avoid any environmental sensitivity identified through the EIA process.

2.2. Site Location

The site is located on the Remainder of the Remaining Extent of Portion 3 (Roosloot) of the Farm Holsloot No 47 in the SiyaThemba Municipality in the Northern Cape. This is approximately 25km east of the town of Prieska in the Northern Cape.

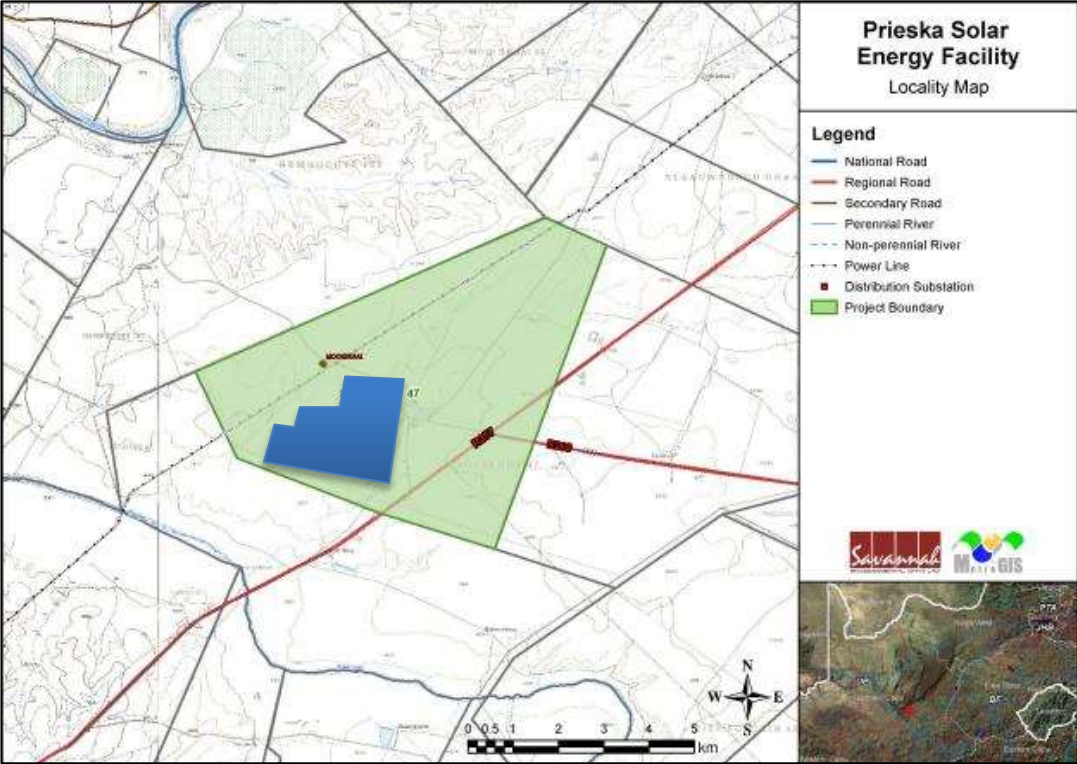


Figure 1. Proposed location with final layout of solar panels within the blue shaded area

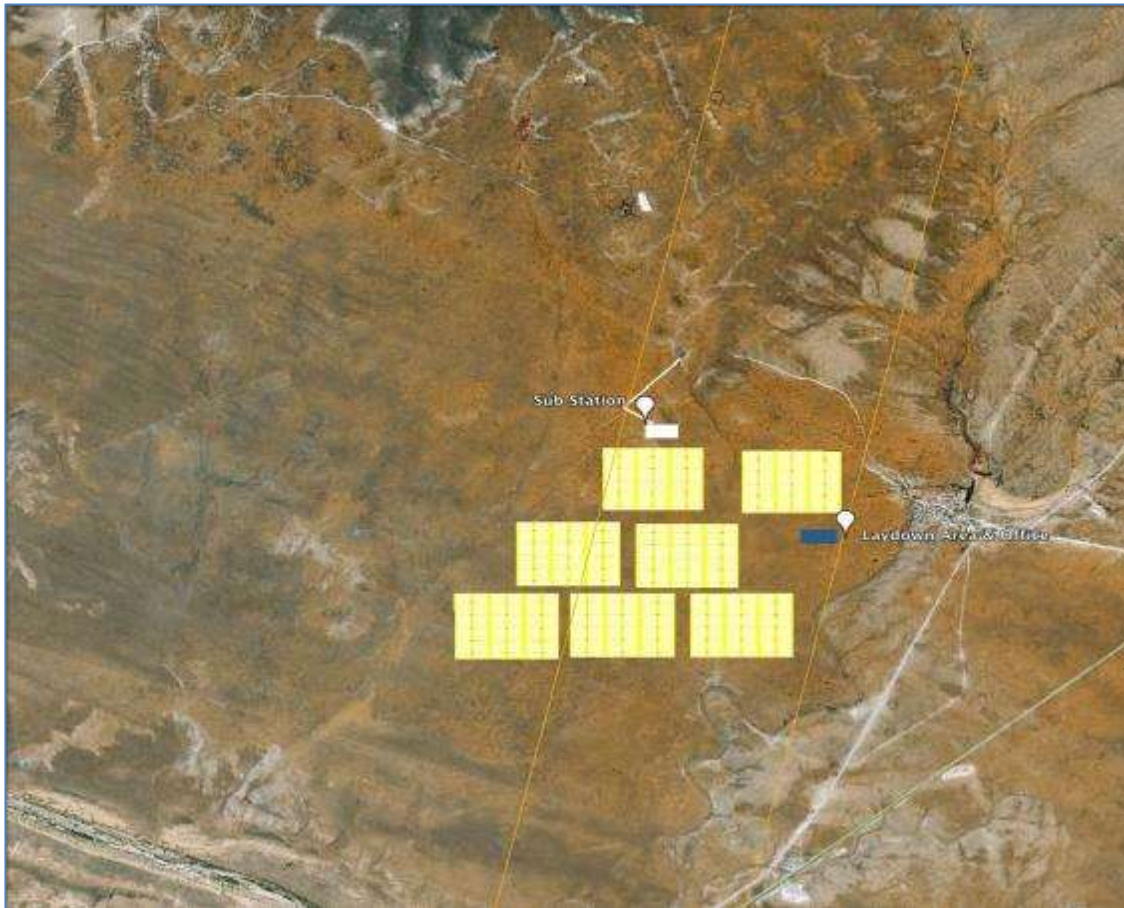


Figure 2. Aerial view of the site at the proposed Prieska Solar Energy Facility



Figure 3. General Landscape and local sub-station

3. Methodology

This study defines the heritage component of the Environmental Impact Assessment process being undertaken for the Proposed Prieska Solar Energy Facility. It is described as a Heritage Impact Assessment (HIA). This report attempts to evaluate the accumulated heritage knowledge of the area as well as the heritage sensitivity of proposed development areas.

3.1 Evaluating Heritage Impacts

This Heritage Impact Assessment relies on the analysis of written documents, maps, aerial photographs and other archival sources combined with the results of site investigations and interviews with effected people. Site investigations are not exhaustive and often focus on areas such as river confluence areas, elevated sites or occupational ruins.

The following documents were consulted in this study;

- South African National Archive Documents
- SAHRA Database of Heritage Studies
- McGregor Museum Information
- Internet Search
- Historic Maps
- 1936 and 1952 Surveyor General Topographic Map series
- 1952 1:10 000 aerial photo survey
- Google Earth 2011 & 2003 imagery
- Published articles and books
- JSTOR Article Archive

3.2 Field Methodology

The field investigations for this project were performed during two phases. The first investigation was done during October 2012 and the initial report submitted to SAHRA was based on this information. After comments regarding this report was released another site visit was performed on the 12th and 13th of July 2013. This was done to evaluate the perceived shortcomings of the initial report as outlined in the SAHRA correspondence of Monday, March 04, 2013 CaseId 493.

3.2.1 2012 Investigation

The 2012 field investigations involved foot reconnaissance of the study area informed by aerial photographs of the study area. Due to the terrain and the presence of existing footpaths, the investigation as not done by following parallel transects. The investigator was of the opinion that areas of high potential could easily be identified through this approach, as it was also a relatively small site.

High potential areas such as small pans, dry drainage lines and rocky outcrops were identified as likely sites for the occurrence of habitation remains. These sites were visited on foot and any likely areas that showed up during the actual investigation were deviated to.

Wherever stone tools (as these were the only historic remains to be noted) were encountered they were documented by taking digital photographs, their GPS location was noted as well as their distribution density. If the area indicated the possible location of a manufacturing or occupational site the periphery of this was defined arbitrarily. Type-specific artifacts were photographed using a portable light box designed by G&A Heritage fieldworkers. The box is basically a cardboard cube with two sides cut out (top and front) which is then lighted by a small LED battery light of 10 000k. The background is covered in green felt material to give a good definition to the edges of the tool. The tool is then placed inside the light box (in the field next to its actual location) and the camera (Nikon D7000 with ring-flash) is then positioned above the other opening to take the picture. The box was created for much larger objects and admittedly, as outlined in the SAHRA comments; we

could have cropped the images a lot. This was rectified in this version of the report. It should therefore be obvious that although the tools in this report was picked-up and brushed clean fro the photographs, they were never removed from the original position for any significant length of time. The impact of this kind of documentation is zero and the benefits of proper tool photographs (compared to the in situ, half-buried versions where most of the characteristics are obscured) are such that it is and should be, the prescribed method of photographically documenting such finds.

3.2.2 2013 Investigation

After negative comments regarding the fieldwork performed during 2012 a subsequent follow-up investigation was done during July 2013 to re-evaluate the original findings. The following more structured approach was followed during the follow-up.

The study area was divided into four quadrants that could be more easily surveyed as individual units.



Figure 4. Sections investigated

The selection of the survey areas was based on the potential heritage significance of the sites, which in turn was based mainly on the analysis of the geography and topography of the site. The first section (A) is the second least likely area to contain any heritage sites. It is a homogeneous flat topography with few geographic features that could harbor heritage

sites. The least likely section to hold any heritage sites according to these values is Section C. Both Sections B & D contain dry drainage ditches as well as some poorly defined pans. For this reason the likelihood of finding sites in the Sections were much higher than the others.

3.2.2.1 Section A



Figure 5. Section A with GPS track paths

This site was accessed from the north where a dirt road runs east/west. From here foot accessed the site. The site polygon was plotted on Google Earth and the kml. file was transferred to a GPS enabled Apple iPad. This would then track the investigator during the field survey while at the same time tracking the GPS path. This GPS track path is then saved as a gpx. file to serve as proof to SAHRA evaluators that the area was sufficiently covered during the survey.

An old disused livestock enclosure is located to the west of Section A (northwest corner). Just before you reach this site a large area of approximately 200m x 300m is found just in

front of it. This area is characterized by dark, leached soil with underlying calcrete deposits. Such areas traditionally do not contain any occupational sites as previous investigations showed. In the top (northern) center and south-east there are poorly defined pans that were also investigated for Stone Age deposits. A drainage vein connects the southern pans with the northern leached area. This was also investigated. Surveying of this area took around 6 hours

3.2.2.2 Section B



Figure 6. Section B with track paths

This section was deemed the most likely to contain evidence of heritage sites. The reason for this is the occurrence of a well-defined drainage ditch running from north to south with some tributaries. Most of the built structures on the property are also located within this section. Most of the southwestern part of the property is homogenous with few geographically suitable occupational sites. The same gravel road bypassing the homestead also accessed this section. The built structures were first investigated and from there the

drainage ditch was investigated and parallel transects walked from there. Some vegetation lines were also investigated. Surveying took 8 hours 40min.

3.2.2.3 Section C



Figure 7. Section C with GPS track paths

The second most likely area to find heritage sites. The drainage ditch described in Section B extends through this section running in loose turns from north to south. There are some poorly defined pans located to the northeast. These are not really visible on the aerial photographs, however they are more distinct on the ground. The drainage ditch forms a small raised area to the east with some loose rock concentrations.

This site was initially accessed from the east and surveyed completely on foot. As with Section B the drainage ditch was surveyed first and thereafter roughly parallel transects were walked over most of the remaining area of the site. The drainage vein seems to define a watershed as there is a distinct increase in vegetation along the perimeter of the drainage ditch. This could be verified through comparing the findings of the geo-hydrological report with these assumptions. This survey took 4 hours 30 minutes.

3.2.2.4 Section D



Figure 8. Section D showing GPS track paths

This is the most homogenous geographic area with the least likelihood of containing any sites of heritage significance. There were very few guiding characteristics within this area and as a result roughly parallel transects were followed during the survey of the site. A larger concentration of rocks seemed located in the north of the area rather than the south. 3 hours 40 minutes was spent surveying this area.

4. Measuring Impacts

In 2003 the SAHRA compiled the following guidelines to evaluate the cultural significance of individual heritage resources:

4.1 TYPE OF RESOURCE

- Place
- Archaeological Site
- Structure
- Grave
- Paleontological Feature
- Geological Feature

4.2 TYPE OF SIGNIFICANCE

4.2.1 HISTORIC VALUE

It is important in the community, or pattern of history

- o Important in the evolution of cultural landscapes and settlement patterns
- o Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
- o Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
- o Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.

It has strong or special association with the life or work of a person, group or organisation of importance in history

- o Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

It has significance relating to the history of slavery

- o Importance for a direct link to the history of slavery in South Africa.

4.2.2 AESTHETIC VALUE

It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

- o Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
- o Importance for its creative, design or artistic excellence, innovation or achievement.
- o Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
- o In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

4.2.3 SCIENTIFIC VALUE

It has potential to yield information that will contribute to an understanding of natural or cultural heritage

- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

4.2.4 SOCIAL VALUE

- It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

4.3 DEGREES OF SIGNIFICANCE

4.3.1 RARITY

It possesses uncommon, rare or endangered aspects of natural or cultural heritage.

- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

4.3.2 REPRESENTIVITY

- It is important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects.
- Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class.
- Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

The table below illustrates how a site's heritage significance is determined

Spheres of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			

Local			
Specific Community			

What other similar sites may be compared to this site?

4.4. Impact Statement

4.4.1 Assessment of Impacts

Direct, indirect and cumulative impacts of the issues identified through the EIA phase are assessed in terms of the following criteria:

- 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).

4.5 Assumptions and Restrictions

- It is assumed that the SAHRA database locations are correct
- It is assumed that the social impact assessment and public participation process of the Basic Assessment phase will result in the identification of any intangible sites of heritage potential.
- It is assumed that the visual impact assessment performed as part of the EIA phase will be encompassing enough not to be repeated in the HIA.
- As much of the site as possible was investigated; however a 100% coverage was not possible due to heavy plant growth.

Heritage Indicators within the Receiving Environment

5. Regional Cultural Context

5.1 Stone Age

This area is home to all three of the known phases of the Stone Age, namely: the Early- (2.5 million – 250 000 years ago), Middle- (250 000 – 22 000 years ago) and Late Stone Age (22 000 – 200 years ago). The Late Stone Age in this area also contains sites with rock art from the Khoekhoen cultural groups. Early to Middle Stone Age sites are less common in this area, however rock-art sites and Late Stone Age sites are much better known.

The Early Stone Age (also referred to as the Acheulean or ESA) in the Prieska area, as in most other areas, is little known and largely under researched. The reason for this is the lack of stratigraphically preserved sites (such as found in caves). According to Richard Klein, less than 20 sealed ESA sites have been found in southern Africa (Klein, 2000). For this reason, most of what we know about the ESA in southern Africa is based on the study of similar, stratified sites from East Africa. The one area according to Deacon, where stratified ESA sites could be found is in the fluvial deposits of the Vaal-Orange drainage (Deacon 1975). There is therefore a possibility of such sites being found sub-surface in the study area and although small, it is a possibility that should be investigated.

The term MSA has also been contentious since its first use as many academics campaign for its inclusion in either the ESA or LSA, especially the transition from the MSA to the LSA (Wadley, Delagnes, Villa, 2004). The identification and research on MSA sites are therefore of paramount importance, and areas where these might occur should be probably investigated.

During the Middle Stone Age, 200 000 years ago, modern man or Homo sapiens emerged, manufacturing a wider range of tools, with technologies more advanced than those from earlier periods. This enabled skilled hunter-gatherer bands to adapt to different environments. From this time onwards, rock shelters and caves were used for occupation and reoccupation over very long periods of time. In areas where such structures were not readily available (such as the study area) it seems *A priori* that temporary shelters should have been used, however these were probably too flimsy to have survived for any significant length of time. Stone circles are often found in the Northern Cape and some associations have been made that interprets them as the foundations of such degradable structures as illustrated by excavated sites along the Orange River (Sampson, 1968), Bloubos north of Upington (Parsons 2004) and some sites in the Seacow Valley (Sampson, 1968). Stone circles have also been documented at De Aar (Orton 2011).

It is suggested by Klein that both Acheulean and MSA people were closely tied to standing water sources, possibly because they lacked impermeable water containers (Klein 2000). For this reason, possible sources of standing water (pans and creeks) were investigated for possible MSA or ESA deposits. Excavation work at Bundu Pan northwest of Copperton by Kiberd (2001, 2005, 2006) showed that some of these sites could have stratified deposits that could be associated with all three components of the Stone Age. This puts such sites in importance next to Wonderwerk Cave at Kururman for diversity of deposits, illustrating that pans should be seen as an important guiding

element during the survey. The pans in the study area was not well defined, however still distinct enough to be investigated individually.

The Late Stone Age (LSA), considered to have started some 20 000 years ago, is associated with the predecessors of the Khoekhoen. Stone Age hunter-gatherers lived well into the 19th century in some places in SA. Stone Age sites may occur all over the area where an unknown number may have been obliterated by mining activities, urbanisation, industrialisation, agriculture and other development activities during the past decades especially associated with the town of Prieska.

It is suggested that the LSA could be widely ascribed to one of two possible origins nl, hunters and herders. Beaumont identifies two broad categories described as the *Swartkop Industry*, associated with hunters and the *Doornfontein Industry*, associated with herders (Beaumont 1995). This distinction seems clearer in the Bushmanland and Northern Cape than in the Western Cape. Both of these types of sites are associated with ceramic industries. According to Beaumont The "Swartkop" assemblages were dominated by hornfels with some quartz containing many examples of blades and backed blades (Morris 1990; Orton 2002/3). The "Doornfontein" or herder sites were said to be dominated by irregular flakes and a proliferation of ceramics that might include lugs and spouts although sites older than AD 700 seem to lack any spouts (Beaumont *et al.* 1995). It is suggested by Smith (1995) that Swartkop sites are found further away from rivers and water sources while Doornfontein sites are usually located closer to these. Sites older than 2000 years are referred to by Beaumont (1995) as Springbokoog sites. Organic materials are nearly unknown from any of the above sites with the exception of ostrich eggshells (Morris 1994; Morris & Von Bezing 1996). It should be noted that Parsons (2007) recently called the above distinctions into question suggesting a more varied approach, she further suggests that too little focus has been lent to open-air sites and these might prove to contain much more information than previously suggested (Parsons 2003).

A limited number of Rock-Art sites are located in this area, mostly due to the lack of suitable shelter sites. Sites are found abundantly in the larger Bushmanland area in general though (Beaumont *et al.* 1995; Rusch & Parkington 2010 and Beaumont & Vogel 1989). The largest component of this category seems to be incised, pecked, scraped or chipped engravings (Beaumont & Vogel, 1989).

5.2 The Historic Era

The name Prieska is most probably derived from the Korana words "*beris*" and "*ga*", combined meaning: "*...where the she-goat was lost*". The reason for this name is however unclear. While Prieska only became a municipality in 1878, it was used as a fording place for the Orange River for many years before (Northern Cape Tourism Authority).

Prieska is also associated with the minor Cape Afrikaner revolt of 1900, which was finally suppressed by Lord Kitchener, where after the people involved, moved to the Transvaal. Current reminders of this action are the British built fort on the hill outside of Prieska as well as the British Military Memorial Gardens in town (Southerncape.co.za, 2012).

The area is also known for zinc, copper and asbestos mining. Most of the mines have become unprofitable and have closed down, the last closing in 1990. The study area is used mainly for livestock farming at the moment. It has been suggested by Smith (1995) that the decimation of the massive Springbok herds to make way for agro-pastoralism lead to the decline of nomadic hunter/gatherer groups.

6. Previous Studies in the Area

Several heritage related studies have recently been performed in this area, among these are;

- John E. Almond, 2012. Proposed photovoltaic energy plant on Farm Klipgats Pan (Portion 4 of Farm 117) near Copperton, Northern Cape Province
- J, van Schalkwyk, 2011. Heritage Impact Assessment Report For The Proposed Establishment Of PV Solar Facilities By Mainstream Renewable Power In The Prieska Region, Northern Cape Province
- M, Murimbika, 2012. Proposed 75MWp Photovoltaic Power Plant and its associated infrastructure on a portion of the remaining extent of ERF 1 Prieska, Northern Cape
- John E. Almond, 2012. PALAEOLOGICAL SPECIALIST ASSESSMENT: DESKTOP STUDY Proposed photovoltaic energy plant on Farm Hoekplaas (Remainder of Farm 146) near Copperton, Northern Cape Province
- P. Beaumont, 2008. Phase 1 Archaeological Impact Assessment Report on Portions of the Farm Green Valley Nuts near Prieska, Karoo District Municipality, Northern Cape Province
- M, Murimbika, 2012. ARCHAEOLOGICAL AND HERITAGE IMPACT ASSESSMENT REPORT FOR: PROPOSED 75MWP PHOTOVOLTAIC POWER PLANT AND ITS ASSOCIATED INFRASTRUCTURE ON A PORTION OF THE REMAINING EXTENT OF ERF 1 PRIESKA, NORTHERN CAPE
- J, van Schalkwyk, 2011. Heritage impact assessment for the PROPOSED ESTABLISHMENT OF A WIND FARMS BY MAINSTREAM RENEWABLE POWER IN THE PRIESKA REGION, NORTHERN CAPE PROVINCE
- J, Orton, 2012. Heritage Impact Assessment for a Proposed Photovoltaic Energy Plant on the Farm Hoekplaas, Near Copperton, Northern Cape
- C, Dreyer, 2006. First Phase Archaeological and Cultural Heritage Assessment of the Proposed New Oxidation Ponds at Prieska, Northern Cape
- P, Beaumont, 2007. Phase 1 Heritage Impact Assessment Report on the Farm Riets Drift 18, on the South Bank of the Orange River Between Douglas and Prieska, Karoo District Municipality, Northern Cape Province
- C, Dreyer, 2006. Phase 1 Archaeological Impact Assessment: Vogelstruis Bult 104, Prieska District, Northern Cape, South Africa
- P, Beaumont, 2009. Heritage Impact Assessment Report on a 50 ha portion of the farm Middelwater 18 near Prieska, Karoo District Municipality, Northern Cape Region
- J, van Schalkwyk, 2012. Heritage Impact Assessment for the proposed diamond mining development on the Farm Remhoogte 152, Prieska magisterial district, Northern Cape Province
- K, van Ryneveld, 2005. Cultural Heritage Site Inspection Report for the Purpose of a Prospecting Right EMP - (Portion of) Uitdraai 33, Prieska District, Northern Cape, South Africa
- M, Atwell, 2011. HERITAGE ASSESSMENT PROPOSED WIND ENERGY FACILITY AND RELATED INFRASTRUCTURE, STRUISBULT: (FARM 103, PORTIONS 4 AND 7), COPPERTON, PRIESKA.
- M, Atwell, 2011. Heritage Assessment - proposed wind energy facility and related infrastructure, Struisbult: (Farm 103, portions 4 and 7), Copperton, Prieska
- J, Kaplan, 2012. ARCHAEOLOGICAL IMPACT ASSESSMENT THE PROPOSED CONSTRUCTION OF THE ESKOM MOOIDRAAI-SMITSKLOOF 132/22 KV POWERLINE AND SUBSTATION NEAR PRIESKA NORTHERN CAPE PROVINCE
- J, van Schalkwyk, 2011. HERITAGE IMPACT ASSESSMENT REPORT FOR THE PROPOSED ESTABLISHMENT OF A PV SOLAR FACILITY BY MAINSTREAM RENEWABLE POWER IN THE PRIESKA REGION, NORTHERN CAPE PROVINCE
- J, Kaplan, 2011. Archaeological Impact Assessment - the proposed Kweza Power Photovoltaic Energy Generation Facility near Prieska, Northern Cape Province
- J, Orton, 2012. HERITAGE IMPACT ASSESSMENT FOR A PROPOSED PHOTOVOLTAIC ENERGY PLANT ON THE FARM KLIPGATS PAN NEAR COPPERTON, NORTHERN CAPE

While the palaeontological sensitivity of the study area will be discussed in a separate specialist report, the findings of the HIA by van Schalkwyk shows significant parallels with the current study. Open-air sites were identified and classed as either Middle or Late Stone Age. Unfortunately only one photograph was made available to compare sites and the description of these sites was very limited, also inhibiting comparison. The one photo of hornfels stone tools looked similar to some of the finds from the study area, although there seems to be a higher percentage of blades, which could place the sites more comfortably within the LSA. The author also gives a generalized description of all the identified sites together rather than individually making specific comparisons difficult. Overall the findings (although this study does not commit to specific sites) do compare favorably with each other.

Many of the reports referenced above suffered from the same shortcomings of the original 2012 report on this site and was therefor not as such of much use.

The study by Orton (2012) on the Farm Hoekplaas also investigates a similar area to the study area and more especially looks at the occurrence of stone tools along ephemeral pans. There seems to be significant similarities between the findings of Ortons study and the present study. The studies by Orton seemed to be of a much higher standard than most studies in this area and it proved very valuable in this study.

It should be noted that due to the large amount of renewable energy projects currently underway in the Northern Cape, it is very likely that more studies will be available by the submission date of this report.

6 Cultural Landscape

The following landscape types could possibly be present in the study areas.

Landscape Type	Description	Occurrence still possible?	Likely
1 Paleontological	Mostly fossil remains. Remains include microbial fossils such as found in Baberton Greenstones	Yes, sub-surface	To be determined by the PIA
2 Archaeological	Evidence of human occupation associated with the following phases – Early-, Middle-, Late Stone Age, Early-, Late Iron Age, Pre-Contact Sites, Post-Contact Sites	Yes	Site 007
3 Historic Built Environment	<ul style="list-style-type: none"> - Historical townscapes/streetscapes - Historical structures; i.e. older than 60 years - Formal public spaces - Formally declared urban conservation areas - Places associated with social identity/displacement 	No	No
4 Historic Farmland	These possess distinctive patterns of settlement and historical features such as: <ul style="list-style-type: none"> - Historical farm yards - Historical farm workers villages/settlements - Irrigation furrows - Tree alignments and groupings - Historical routes and pathways - Distinctive types of planting - Distinctive architecture of cultivation 	No	No

Landscape Type	Description	Occurrence still possible?	Likely
	e.g. planting blocks, trellising, terracing, ornamental planting.		
5 Historic rural town	<ul style="list-style-type: none"> - Historic mission settlements - Historic townscapes 	No	No
6 Pristine natural landscape	<ul style="list-style-type: none"> - Historical patterns of access to a natural amenity - Formally proclaimed nature reserves - Evidence of pre-colonial occupation - Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages - Historical structures/settlements older than 60 years - Pre-colonial or historical burial sites - Geological sites of cultural significance. 	No	No
7 Relic Landscape	<ul style="list-style-type: none"> - Past farming settlements - Past industrial sites - Places of isolation related to attitudes to medical treatment - Battle sites - Sites of displacement, 	No	No
8 Burial grounds and grave sites	<ul style="list-style-type: none"> - Pre-colonial burials (marked or unmarked, known or unknown) - Historical graves (marked or unmarked, known or unknown) - Graves of victims of conflict - Human remains (older than 100 years) - Associated burial goods (older than 100 years) - Burial architecture (older than 60 years) 	Yes,	Unlikely
9 Associated Landscapes	<ul style="list-style-type: none"> - Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes - Sites associated with displacement & contestation - Sites of political conflict/struggle - Sites associated with an historic event/person - Sites associated with public memory 	No	No
10 Historical Farmyard	<ul style="list-style-type: none"> - Setting of the yard and its context - Composition of structures - Historical/architectural value of individual structures - Tree alignments - Views to and from - Axial relationships - System of enclosure, e.g. defining walls - Systems of water reticulation and irrigation, e.g. furrows - Sites associated with slavery and farm labour - Colonial period archaeology 	No	No

Landscape Type	Description	Occurrence still possible?	Likely
11 Historic institutions	<ul style="list-style-type: none"> - Historical prisons - Hospital sites - Historical school/reformatory sites - Military bases 	No	No
12 Scenic visual	<ul style="list-style-type: none"> - Scenic routes 	No	No
13 Amenity landscape	<ul style="list-style-type: none"> - View sheds - View points - Views to and from - Gateway conditions - Distinctive representative landscape conditions - Scenic corridors 	No	No

Findings

Although the original survey conducted in 2012 did not identify individual sites due to a lack of concentrations of tools, the 2013 survey managed to better class possible sites. The following areas with stone tool finds were documented during the survey. Stone tools were only documented in Survey Area 1 & 2. Any area that produced identifiable tools in quantities of one or more was plotted using a GPS utilizing the WGS 84 base reference. A concentration of tools were located around the leached area in the northwest of the study site as well as around the pan close to the drainage ditch in the southeast of the study area. Single tools identified during the walking survey mostly represent background scatters of the MSA and LSA. No tools consistent with the ESA were identified. Described tools were mostly quartzite, hornfels and cryptocrystalline silica (CCS) although hornfels were distinctly limited compared to the other materials.

7. Stone Age Sites and Scatters

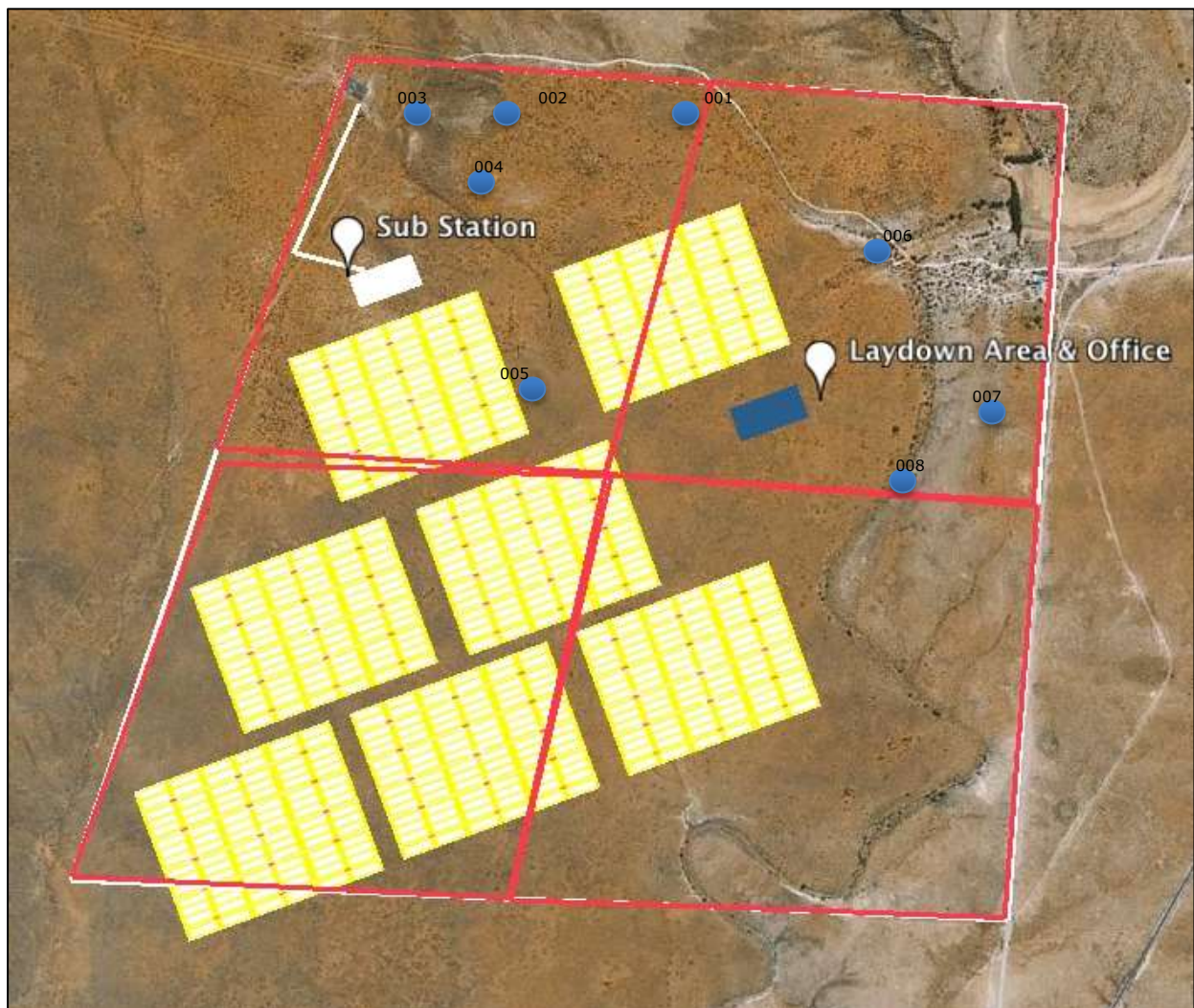


Figure 9. Collection points in relation to development footprint

7.1 Survey Area A



Figure 10. Sites 001 – 005 (blue circles indicate finding point)

Five collection points were identified in this area. Points 001 – 003 & 005 were single tool collection points with little or no further deposits (see Fig 12). Point 004 did however produce several stone tools as well as flakes (see Fig 13). These were of substantial number and intricacy. These tools are however not unique. The tool documented at Point 003 was a small quartzite scraper.



Figure 11. Tools documented at Points 001, 002 & 003



Figure 12. Tools documented at Point 004

The tools and tool fragments that were recorded here were mostly blades and fragments of blades suggesting a late MSA or early LSA origin. The leached area (see survey description) seems to have been a possible source of base material. The same rock type is found in unmodified version within this leached area suggesting that the find at 004 could possibly have been a manufacturing site. Complete tools, cores and flakes were present in densities varying from 1 – 4 per square meter. The lack of significant amounts of flakes and cores could be ascribed to the fact that they could be buried underneath the alluvial sediment. The surrounding surface gravel at the site location was also distinctly different to the types of stone used in the tool manufacturing. The occurrence of both hornfels and blade fragments would suggest that this site could be associated with the *Swartkops* industry and

therefore with hunter groups. It is therefore possible that the leached area could have been a more permanent source of water in the past.



Figure 13. Surface of "leached area" with background scatter at site 004



Figure 14. Surface find at site 002. Notice difference in substrate color between Point 002 and 004.

7.2 Survey Area B



Figure 15. Survey Area 2 indicating sites identified

Three collection areas were described in this section of the study area. Two of the points (006 & 008) were once again surface scatters of LSA tools. The site at 007 was much similar to the point identified at 004 with a higher concentration of stone tools than the other occurrences. The reason why the finds at 007 is more significant than that at 004 is merely the mass of artifacts located here. The general density of tools, cores and flakes in this area were around 5-8 per square meter.



Figure 16. Tools described from Site 007



Figure 17. Tools documented at Site 007 (scale inadvertently omitted)



Figure 18. End scrapers identified at Site 007

This site also produced several blade fragments although no complete blades were identified. These were mostly produced from quartz as well as CCS. Smaller scrapers were also noticed suggesting that the site is associated with the LSA. Two of the artifacts were retouched. The amount of artifacts noticed on the surface of an area measuring 30m x 30m was of such density that this could be described as a discrete Stone Age site. One of the blade fragments seemed to be from a backed blade (second from right in Fig. 18).



Figure 19. Surface scatter of Stone Tools at Site 006



Figure 20. Tools notices at points 006 & 008



Figure 21. Stone tools at point 006



Figure 22. Blade fragments at Site 007



Figure 23. LSA tools located at Site 007



Figure 24. General landscape

Built Environment

The study area consists mainly of agricultural grazing land with few manmade structures visible on site. There are some recently built labour houses near the access road off the provincial asphalt road. This was labeled Point 009.



Figure 25. Labour housing on site 009

The building style as well as building materials used in the labour houses suggests that these are of recent construction. These structures will not be affected by the proposed development.

Furthermore there are some homesteads and agricultural buildings on the portion of the property that will be un-affected by the proposed development. These are however not indicated in the 1859 survey diagram and are also not of such historic significance that the development will have a visually negative impact on them.

It is possible that these structures impacted on some Stone Age deposits when they were originally constructed, however no impact assessment was performed before these construction activities.

Neither the 1936 or 1952 Surveyor General Topographic Map series or the 1952 1:10 000 aerial photo survey indicated the presence of these structures.

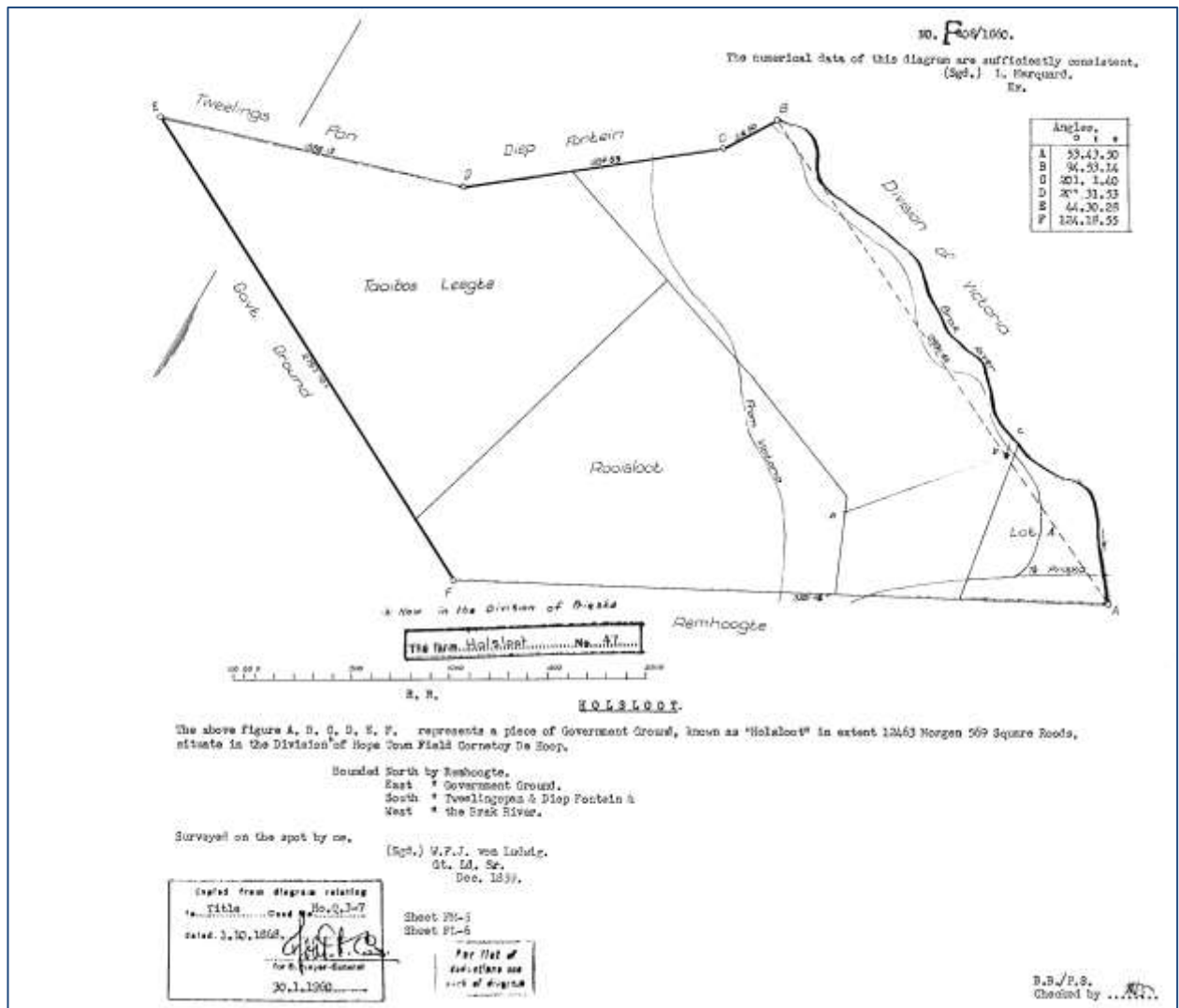


Figure 26. 1859 Survey Diagram as found in the Property Act for Holsloot 47

Scenic Routes and Visual Impacts

The R357 provincial road, although scenic in itself, is not classed as a provincially important scenic route. The road runs within 500m of the proposed development. The area has been subject to previous development with agricultural structures as well as the electrical sub-station already detracting from the overall sense of place. The energy facility will also have a low profile and combined with the lack of traffic on the R357 the effect on the landscape is

anticipated to be low. The PV technology used also has a very low reflective surface thus sun reflection impacting on areas further away is not anticipated.

Assessment of Impacts

8. Archaeological Sites - Pre-Contact Heritage (Stone Age Sites)

The predominant finds in the study area seems consist mainly of background scatters of MSA and LSA artefacts. These are all of low importance and do not require mitigation. The one site located next to the drainage vein is however considered to be of more significance as it may well represent a LSA manufacturing site. Once the final layout is done it should be determined if the groundwork will be affecting this site. It is interesting to note that no artefacts were identified higher up the drainage line. This suggests that the artifacts documented at Site 007 was within the matrix and not washed down from a site higher up the gully.

If any earthmoving activities are planned within 100m of this site it is recommended that it undergo mitigation in terms of excavations. Test excavations are also recommended for the area surrounding the leached depression in the northwest of the study are. This will only be necessary if the final footprint comes within 50m of this site.

Nature of Impacts: Placement of the solar power plant could negatively affect sites associated with the Middle to Late Stone Age.

Extent of Impacts: Localised damage to the sites

Nature of Impact: Possible pre-contact Stone Age site could be damaged locally by excavation activities and associated activities		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long term (5)	Long term (5)
Magnitude	High (8)	Low (1)
Probability	Probable (3)	Improbable (1)
Significance	Medium (45)	Low (8)
Status	Negative	Positive
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resource	Yes	No
Can impacts be mitigated	No	Yes
Mitigation	Surface collection as well as excavation of Stone Age materials at Site 007 before construction commences. Test excavations at Site 004 should it fall within the footprint of the final layout.	
Cumulative impacts	Combined with the impact of several other proposed low energy projects in this region it is conceivable that significant impacts could be expected on LSA sites.	
Residual impacts	Loss of heritage related information, especially LSA sites.	

9. Scenic routes and Visual Impacts

Due to the low traffic flow on the R357 road and taking into consideration that most of this is commercial traffic it is anticipated that the possible visual impact will be low. The solar

facility will have a low profile that should not impact radically on the horizon profile or surrounding landscape. There is no viable mitigation for this visual impact, however this is not seen as a fatal flaw. Cumulative effects could be experienced due to the large amounts of proposed low energy projects that are planned for the surrounding areas.

Nature of Impacts: Placement of the solar facility could have a negative effect on the visual fabric of the surrounding area.

Extent of Impacts: Localised

Nature of Impact: The solar facility could have a detrimental impact on the visual quality of the areas around the R357		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long term (5)	Long term (5)
Magnitude	Low (1)	Low (1)
Probability	Probable (3)	Improbable (3)
Significance	Low (8)	Low (8)
Status	Negative	Positive
Reversibility	Reversible	Reversible
Irreplaceable loss of resource	No	No
Can impacts be mitigated	No	
Mitigation	No mitigation that would not exacerbate the problem is possible.	
Cumulative impacts	Combined with the impact of the local sub-station as well as other possible future low energy projects in the area, the cumulative effect could be dramatic.	
Residual impacts	Loss of the quality of the sense of place (<i>genius loci</i>)	

Heritage Management Planning

10. Minimising the Impact on Archaeological Sites (as per the NHRA)

Objective 1: Minimising the impact on archaeological sites
The development of solar generation facility and associated infrastructure could impact on unidentified sites of archaeological importance.

Project Component	Solar Array, roads, power lines and construction camps
Potential Impact	Destruction of archaeological sites
Activity/Risk source	Solar array foundations, power lines and roads
Mitigation Target	Conserve archaeological sites

Mitigation: Action	Responsibility	Time Frame
It is recommended that a Stone Age specialist be contracted to perform a surface collection as well as excavations at Site 007 should it be found to fall within 100m of the final layout.	Contracted Heritage Practitioner	Before construction commences, during construction phase.

Performance Indicator	No destruction of archaeological sites
Monitoring	During construction phase

11. Minimising the impact on Burial and Grave Sites (as per the NHRA)

Objective 1: Minimising the impact on burial and grave sites
The placement of solar sites could impact on unidentified burial or grave sites

Project Component	Solar array, power lines, roads and construction camps
Potential Impact	Destruction of grave and burial sites
Activity/Risk source	Solar array and associated infrastructure
Mitigation Target	Mitigate impacts on burial or grave sites

Mitigation: Action	Responsibility	Time Frame
On uncovering a possible grave or burial site it is imperative that construction be ceased immediately. The area should be marked and a heritage practitioner should be informed immediately.	Environmental control officer	Immediately

Performance Indicator	Mitigation of burial and grave sites
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12. Conclusion and Recommendations

Several artefact of Stone Age origin was identified on the study area. These proved all to be of MSA and LSA origin. Only one area showed a large enough concentration of stone artefacts to be classified as a Stone Age site (Site 007). This was the only site that showed significant enough heritage potential to require possible mitigation. The general lack of information and research on LSA sites in the Northern Cape as well as the recent research into stratified deposits of sites located around pans makes this a significant enough site to deserve mitigation if not protection. The actual need for mitigation will be determined by the final placement of the development footprint. If this is within 100meters of the site point, as documented here, mitigation in the form of surface collections as well as excavations will be necessary.

Originally the area was thought to have been mostly homogeneous in regards to its heritage significance, however subsequent surveying (which covered the ground in a much more structured way) indicated that there were in fact concentrations of artifacts that could be distinguished from the background scatter of materials. Of these Site 007 was found to be significance.

The visual impact on the cultural landscape by the proposed development was deemed to be limited due to a combination of low profiles, low reflectivity and already compromised landscapes.

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APPENDIX A – LIST OF ARCHAEOLOGICAL OCCURRENCES

No	Description	GPS	Significance
001	One MSA cleaver. Background scatter.	29° 34' 46,7" S 23° 02' 26,1" E	Low, no mitigation
002	One quartz scraper and blade fragments from the LSA. Background scatter	29° 34' 40,2" S 23° 02' 06,8" E	Low, no mitigation
003	Some blades and scrapers of LSA origin, no further deposits were noted. Background scatter.	29° 34' 38,4" S 23° 01' 57,1" E	Low, no mitigation
004	A thumbnail scraper, two blade fragments and one quartz tool. Some possible cores and flakes were also observed.	29° 34' 45,8" S 23° 02' 06,1" E	Medium, no mitigation
005	One LSA blade.	29° 34' 46,7" S 23° 02' 26,1" E	Low, no mitigation
006	One quartz scraper and one blade fragment of LSA origin. Background scatter.	29° 35' 04,8" S 23° 02' 41,9" E	Low, no mitigation
007	Several LSA tools were noted in this area made from hornfels, CCS and quartz.	29° 35' 17,3" S 23° 02' 52,5" E	Medium, mitigation recommended
008	Low background scatter of LSA tools.	29° 35' 28,9" S 23° 02' 35,9" E	Low, no mitigation
009	Modern housing structures	29° 35' 16,2" S 23° 02' 51,6" E	None, no mitigation

