McGregor Museum

Department of Archaeology

Proposed development of Phase Two and Phase 3 of the Upington Solar Thermal Plant on Portion 3 of the Farm McTaggarts Camp 453 near Upington, Northern Cape: Scoping phase Heritage Input.

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September 2013

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1. INTRODUCTION

The McGregor Museum Archaeology Department was requested by Savannah Environmental, on behalf of the applicant, Abengoa Solar Power South Africa (Pty) Ltd, to provide a heritage scoping report of two proposed solar energy (CSP) facilities (1 X 100MW Tower Plant and 1 X 100MW Trough Plant) to be known as Upington Solar Thermal Plant Two and Upington Solar Thermal Plant Three, Northern Cape Province.

The proposed development site is located on Portion 3 of the Farm McTaggarts Camp 453 west of Upington, Northern Cape.

1.1 Focus and Content of Scoping Report: Heritage

This heritage scoping report is focused on the development footprint of the proposed CSP solar energy facilities and associated infrastructure.

In the case of the 100 MW Trough Plant, parabolic trough technology with HTF, dry cooling and molten salt storage, is expected to require roughly 300-400 hectares. Associated infrastructure would include: access roads, plant substation, power line, water abstraction point and supply pipe line, water storage tanks, packaged waste treatment plant, lined evaporation ponds, salt storage tanks, auxilliary fossil fuel boilers and work shop & office buildings.

The 100MW Tower Plant would consist of a power tower with central receiver and heliostat technology including direct steam or salt storage with dry cooling, expected to require an area required roughly 400-500 hectares. Associated infrastructure: access roads, plant substation, power line, water abstraction point and supply pipe line, water storage tanks, packaged waste treatment plant, lined evaporation ponds, salt storage tanks, auxilliary fossil fuel boilers and work shop & office buildings.

Relative to the anticipated impact of such a development, the scoping report presents a brief baseline description and sets out a modus operandi for a full heritage impact study.

1.2 Heritage Specialist

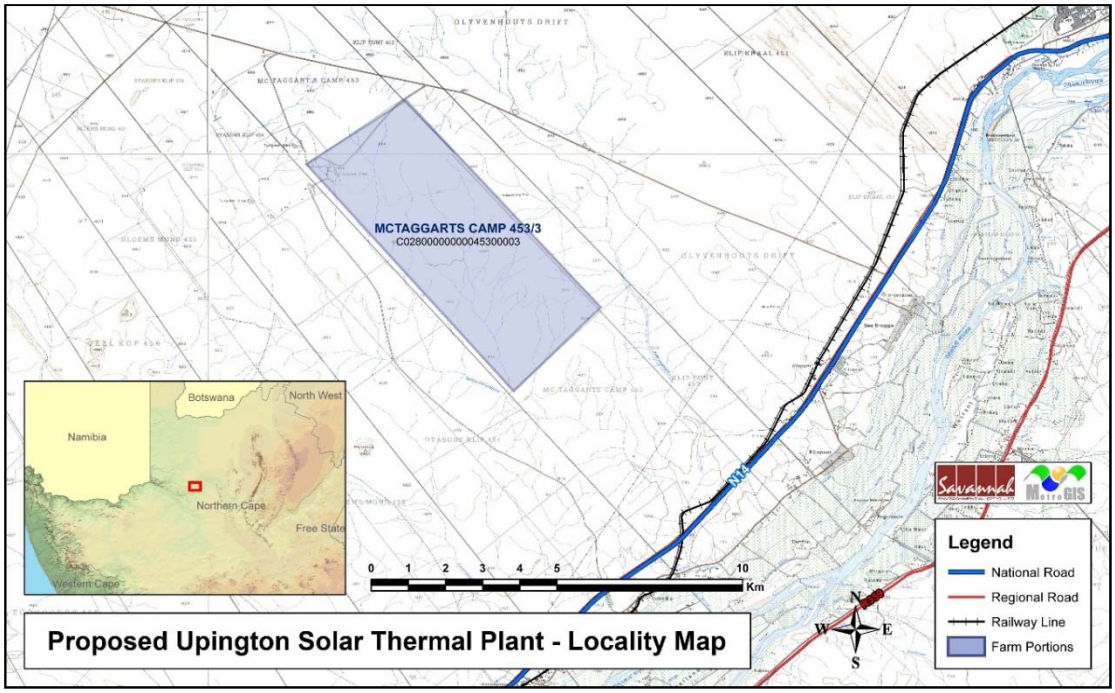
The author of this report is a qualified archaeologist (PhD, University of the Western Cape) accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. The author has worked as a museum archaeologist in the Northern Cape since 1985 and has since the late 1980s carried out surveys in the general area of Upington (e.g. Morris & Beaumont 1991; Morris 2000 – 2012). In addition the author has a comprehensive knowledge of the province's history and built environment, and received UCT-accredited training at a workshop on *Architectural and Urban Conservation: researching and assessing local (built) environments* (S. Townsend, UCT). He is also Chairman of the Historical Society of Kimberley and the Northern Cape.

The author is independent of the organization commissioning this specialist input, and provides this Specialist Report within the framework of the National Heritage Resources Act (No 25 of 1999).

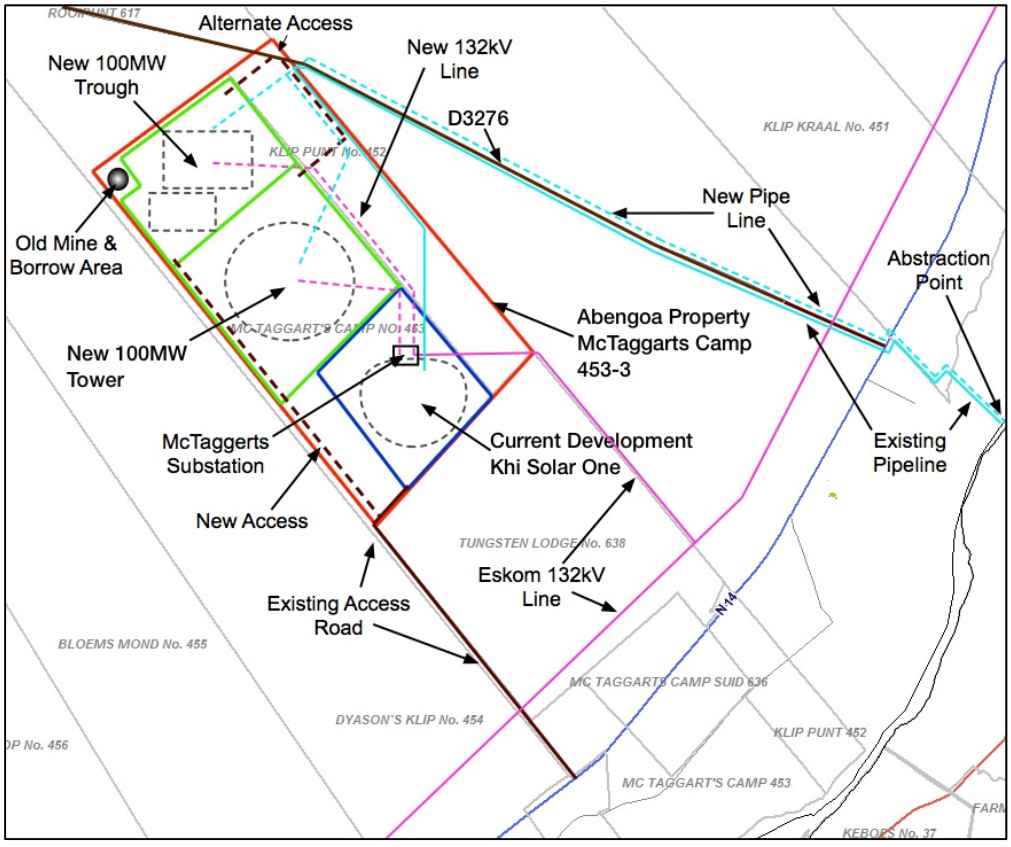
The National Heritage Resources Act no. 25 of 1999 (NHRA) protects heritage resources which include archaeological and palaeontological objects/sites older than 100 years, graves older than 60 years, structures older than 60 years, as well as intangible values attached to places. The Act requires that anyone intending to disturb, destroy or damage such sites, objects and/or structures may not do so without a permit from the relevant heritage resources authority. This means that a Heritage Impact Assessment should be performed, resulting in a specialist report as required by the relevant heritage resources authority/ies to assess whether authorisation may be granted for the disturbance or alteration, or destruction of heritage resources.

2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The environment in question is arid, comprising relatively flat drainage plains stretching up to 15 km north-west of the Orange River. The landscape is sparsely vegetated, with shallow soils, in consequence of which any surface archaeological traces tend to be highly visible.



Location of McTaggarts Camp west of Upington.



Map indicating the proposed Abengoa development and associated infrastructure at McTaggarts Camp.

2.1 Heritage features of the region

The McGregor Museum has been carried out a previous study on the farm McTaggarts Camp in connection with the first phase of the Abengoa project (Morris 2010, 2012). In addition to certain specific observations, the following comments can be made as background information from which heritage predictions may be made for testing in the full HIA study.

2.1.1 Colonial frontier

The eighteenth- and nineteenth-century records for this region (Penn 2005) pertain mainly to the areas south of and along the Orange River. The travellers Wikar and Gordon followed the river as far as and beyond this region in the 1770s, describing communities living along the river (see Morris & Beaumont 1991 for a summary). Dunn and others describe the situation a century later (Robinson 1978). Frontiersmen such as the colourful Stephanos can be linked with particular places in the landscape (Morris 2002). None of these accounts refer to the specific area of the proposed development.

McTaggarts Camp derives its name from events during the Korana War of 1879-1880, when Captain McTaggart set up his military camp here (Van Vreeden 1961:431). It is not known exactly where this encampment was, though it seems most likely that it was close to the river, hence well away from the proposed solar facilities. The ephemeral nature of such an event is unlikely to have left much of a discernible archaeological trace.

There was further military activity in the area in the early twentieth century in relation to Jacob Marengo, shot dead on 20 September 1907 near Eensaamheid Pan where, in an incident of “severe overkill”, 5000 rounds were fired to exterminate the resistance leader, five other armed Nama and two accompanying women (Masson 1995). Eensaamheid is about 100 km north west of Upington.

Tungsten mining took place at the north western-most part of McTaggarts Camp in the 1930s (Morris 2012).

2.1.2 Later Stone Age

Late Holocene Later Stone Age (LSA) sites are frequently noted in surveys south of and south west of the region of proposed development and along the Orange River (e.g. Morris & Beaumont 1991; Beaumont *et al*. 1995). These are generally short-duration occupations by small groups of hunter-gatherers. In contrast, there are substantial herder encampments along the Orange River floodplain itself (Morris & Beaumont 1991) and in the hills north of Kakamas (Parsons 2003). In a range of hills north east of Keimoes, on Zovoorby, a rock shelter and specularite working (a sparkling mineral with known cosmetic and ritual use in the precolonial past) has been excavated (Smith 1995).

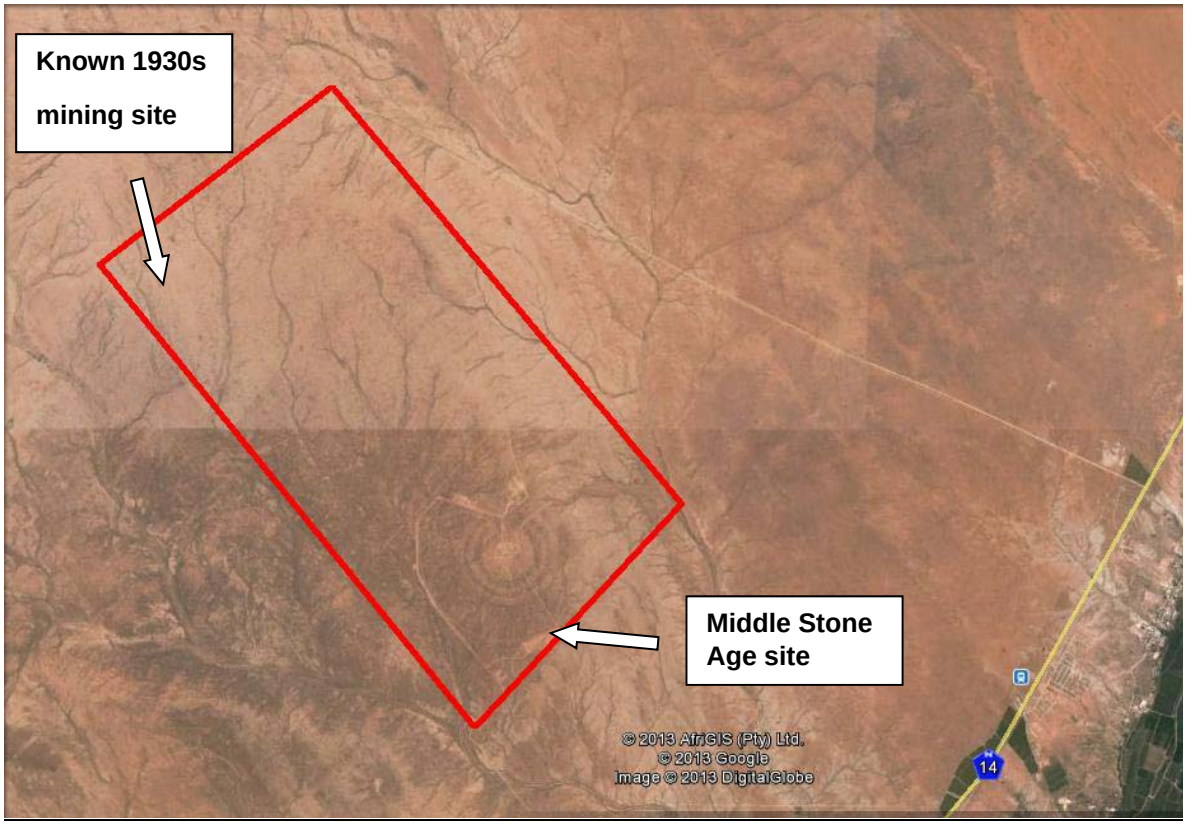
LSA sites are usually focused on a particular feature in the landscape such as a hill or rocky outcrop and in relation to resources like water and associated habitats richer in animals and plant foods (Morris 2011).

2.1.3 Pleistocene: Middle and Earlier Stone Age

Beaumont *et al*. (1995:240-1) note a widespread low density stone artefact scatter of Pleistocene age across areas of Bushmanland to the south where raw materials, mainly quartzite cobbles, were derived from the Dwyka glacial till. Similar occurrences have been noted north of Upington in situations where raw materials are abundant. Systematic collections of this material at Olyvenkolk south west of Kenhardt and Maans Pannen east of Gamoep could be separated out by abrasion state into a fresh component of Middle Stone Age (MSA) with prepared cores, blades and points, and a large aggregate of moderately to heavily weathered Earlier Stone Age (ESA) (Beaumont *et al*. 1995).

The ESA included Victoria West cores on dolerite and quartzite (a fine example has been found at Hondeblaf north of Upington), long blades, and a very low incidence of handaxes and cleavers. The Middle (and perhaps in some instances Lower) Pleistocene occupation of the region that these artefacts reflect must have occurred at times when the environment was more hospitable than today. This is suggested by the known greater reliance of people in Acheulean times on quite restricted ecological ranges, with proximity to water being a recurrent factor in the distribution of sites.

A low density surface scatter of Middle Stone Age material was found on McTaggarts Camp (logged at the McGregor Museum as 2821CA003 McTaggarts Camp 1) in 2010, and this was sampled in Phase 2 mitigation (Morris 2012). It was focused around a bedrock exposure where water would be held for a time after good rain.



The sparsely vegetated drainage plain, otherwise largely featureless, is apparent in this Google Earth image indicating the property (Portion 3 McTaggarts Camp) and known heritage sites. The partial development of Upington Solar Thermal Plant One is visible in the south eastern third of the property.

2.2 Description and evaluation of environmental issues and potential impacts

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments such as those envisaged can have a permanent destructive impact on these resources. The objective of an EIA would be to assess the sensitivity of such resources where present, to evaluate the significance of potential impacts on these resources and, if and where appropriate, to recommend no-go areas and measures to mitigate or manage said impacts.

Area impacts are possible in the case of the Solar Development and the proposed substation; the power lines and access roads would represent linear impacts.

2.2.1 Direct, indirect and cumulative impacts (in terms of nature, magnitude and extent)

The destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. In the long term,

the proximity of operations in a given area could result in secondary indirect impacts resulting from the movement of people or vehicles in the immediate or surrounding vicinity. The Environmental Management Plan should seek to minimize the latter impacts as far as possible.

With respect to the magnitude and extent of potential impacts, it has been noted that the erection of power lines would have a relatively small impact on Stone Age sites, in light of Sampson's (1985) observations during surveys beneath power lines in the Karoo (actual modification of the landscape tends to be limited to the footprint of each pylon), whereas a road or a water supply pipeline would tend to be far more destructive (modification of the landscape surface would be within a continuous strip), albeit relatively limited in spatial extent, i.e. width (Sampson compares such destruction to the pulling out of a thread from an ancient tapestry).

2.2.2 Issues potentially influencing choice of preferred development locales

Areas along natural drainage lines – water resources and ecology: Various considerations including possible concentration of past human activity (and hence archaeological traces) along water courses may suggest that the development footprint not be directly on or near the main drainage channels.

2.2.3 Observations derived from previous experience of the area

- Based on previous experience, the terrain on which the proposed Upington Solar Thermal Plants would be located is likely not to be rich in archaeological traces of major significance.
- Should there be local sources of Dwyka tillite, these may have served as raw materials often drawn upon in Pleistocene times. If not, it might be expected that any archaeological traces would be sparse. Adjacent terrain surveyed by the McGregor Museum has minimal Stone Age traces comprising widely scattered/isolated stone artefacts mainly based on jaspilite (banded ironstone) sourced from the banks and terraces of the Orange/Gariep River.
- There appear to be none of the features such as hills or rocky features (such as Spitskop north of Upington) which in other parts of this landscape provide shelters with traces of precolonial Stone Age occupation/activity.
- Nineteenth- and twentieth-century cultural history and intangible heritage values attached to places may be difficult to recover owing to the sparse population. It is not thought likely that any significant intangible heritage values would be attached to the particular terrain in question.
- Apart from the remains of a tungsten mine, noted above, there appear not to be colonial era built environment features in the areas of proposed Solar Development.
- The likelihood of palaeontological features of significance occurring would be subject to a desktop enquiry and fieldwork if deemed necessary.

3. PROPOSED METHODOLOGY FOR FULL HERITAGE STUDY

A site visit will be necessary to inspect various parts of the terrain on foot, focusing on areas of expected impact (construction of facility, sub-station, and secondary infrastructure such as roads, pipelines and power lines). Heritage traces would be evaluated in terms of their archaeological significance (see tables below). The predictions set out in sections 2.2.2 and 2.2.3 above would need to be tested by way of observations made on the ground.

3.1 Assumptions and constraints

It would be assumed that, by and large in this landscape, with its sparse vegetation and shallow soil profiles, some sense of the archaeological traces to be found in the area would be readily apparent from surface observations (including assessment of places of erosion or past excavations that expose erstwhile below-surface features). Given a prevailing erosion regime noticed in nearby segments of this landscape, it would not be considered necessary to conduct excavations as part of the full HIA to establish the potential of sub-surface archaeology.

A proviso would routinely given, however, that should sites or features of significance be encountered during construction (this could include an unmarked burial, an ostrich eggshell water flask cache, or a high density of stone tools, for instance), specified steps are necessary (cease work, report to heritage authority).

With regard to fossils, a report and/or field assessment of the likelihood of their occurring here would be obtained from a palaeontologist.

3.2 Potentially significant impacts to be assessed in the HIA process

Any area or linear, primary and secondary, disturbance of surfaces in the development locales could have a destructive impact on heritage resources, where present. In the event that such resources are found, they are likely to be of a nature that potential impacts could be mitigated by documentation and/or salvage following approval and permitting by the South African Heritage Resources Agency and, in the case of any built environment features, by Ngwao Boŝwa jwa Kapa Bokone (the Northern Cape Heritage Authority). Although unlikely, there may be some that could require preservation *in situ* and hence modification of intended placement of development features.

Disturbance of surfaces includes any construction: of a road, a pipeline, erection of a pylon, or preparation of a site for a sub-station, or plant, or building, or any other *clearance* of, or *excavation* into, a land surface. In the event of archaeological materials being present such activity would alter or destroy their context (even if the artefacts themselves are not destroyed, which is also obviously possible). Without context,

archaeological traces are of much reduced significance. It is the contexts as much as the individual items that are protected by the heritage legislation.

Some of the activities indicated here have a generally lower impact than others. For example, Sampson (1985) has shown that powerlines tend to be less destructive on Stone Age sites than roads since access along the route of the line during construction and maintenance tends to be by way of a 'twee-spoor' temporary roadway (not scraped, the surface not significantly modified). Individual tower positions might be of high archaeological significance (e.g. a grave, or an engraving). Note: the impact of a 'twee-spoor' could be far greater on Iron Age landscapes in other parts of South Africa, where stone walling might need to be breached.

3.4 Determining archaeological significance

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (nd) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2000a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator).

Estimating site potential

Table 1 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon nd, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential, but there are notable exceptions to this rule, for example the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes *any* trace, even of only Type 1 quality, can be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Assessing site value by attribute

Table 2 is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, National Monuments Council).

Class	Landform	Type 1	Type 2	Type 3
L1	Rocky surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near feature such as hill	On old river terrace
L4	Sandy ground, Coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Sloping floor or small area	Flat floor, high ceiling
Class	**Archaeo-logical traces**	**Type 1**	**Type 2**	**Type 3**
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell or bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997)

Class	Attribute	Type 1	Type 2	Type 3
1	Length of sequence/context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte/ecofacts
2	Presence of exceptional items (incl regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High

6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

3.5 Conclusion

The manner in which archaeological and other heritage traces might be affected by the proposed Upington Solar Thermal Plants Two and Three has been indicated above. In summary, it would be any act or activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, of any heritage material, object or value (as indicated in the National Heritage Resources Act (No 25 of 1999). The most obvious impact in this case would be land surface disturbance associated with infrastructure construction.

The predictions made in this scoping report relative to previous work in the area will guide the eventual full Heritage Impact Assessment which would include a field visit inter alia to test the predictions on the ground.

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