McGregor Museum
Department of Archaeology

Proposed Blackwood Solar Energy Facility on Portion 1 of Pandamsfontein 1593, south east of Kimberley, in the Tokologo Local Municipality, Free State: Scoping phase Heritage Input

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September 2013

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September 2013

1. INTRODUCTION

Blackwood Solar Energy Facility (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd to undertake an Environmental Impact Assessment Process and compile an Environmental Management Programme (EMP) for the proposed solar energy facility and associated infrastructure 25 km south east of Kimberley in the western Free State.

Savannah Environmental has appointed the McGregor Museum to provide/co-ordinate specialist input with respect to heritage.

This document reports on the project area for the scoping phase.

The project proposes construction of a 75 MW photovoltaic facility and associated infrastructure on the farm Pandamsfontein in the western Free State, east of Kimberley.

1.1 Focus and Content of Scoping Report: Heritage

This heritage scoping report is focused on the proposed development footprint of the solar energy facility. It is proposed that the project would entail construction of:

» Arrays of photovoltaic (PV) panels
» Appropriate mounting structures
» Cabling between the project components, to be lain underground where practical.
» An on-site substation and overhead power line to facilitate the connection between the solar energy facility and the Eskom grid via one of the following options:
- A loop in/loop out of the 132kV power line which traverses the site;
- Construction of an overhead distribution power line of approximately 20km in length to the Boundary Substation.

» Internal access roads and fencing.
» Workshop area for maintenance, storage, and offices.

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

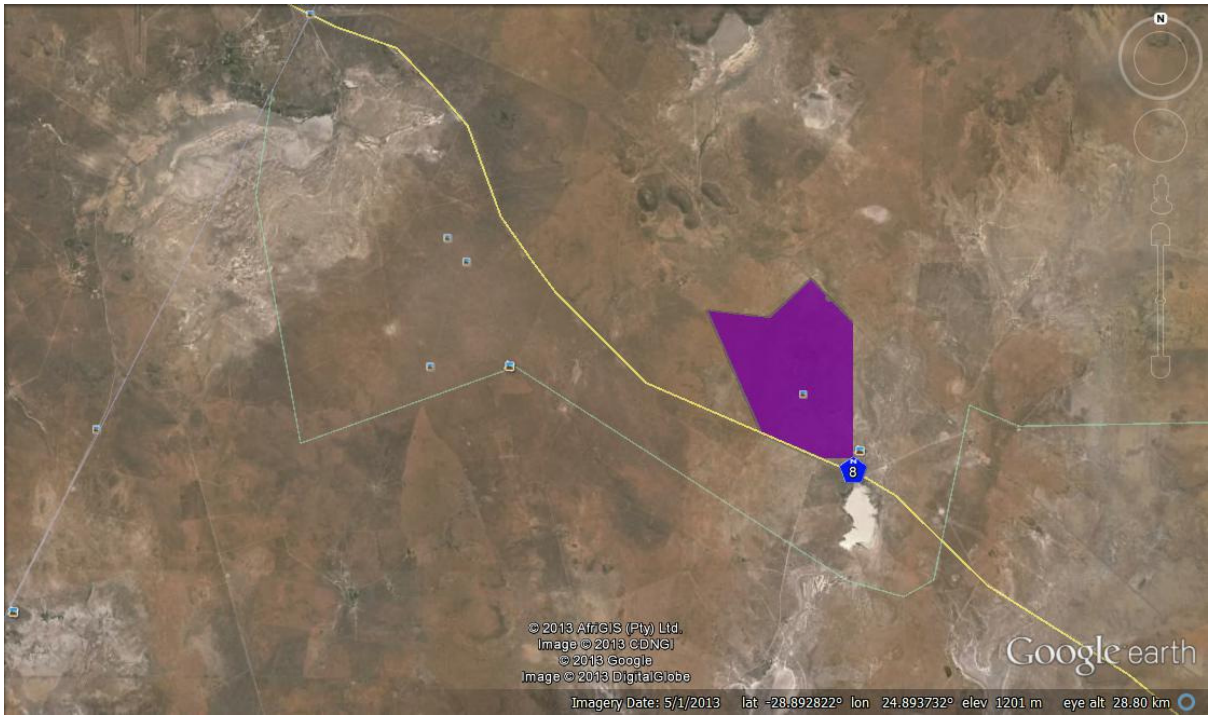
The author of this report is a qualified archaeologist (PhD, UWC) accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. The author has worked as a museum archaeologist in Kimberley in the Northern Cape since 1985. In addition the author has a comprehensive knowledge of the area'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 in a generally flat western Free State grassland/Kimberley Thornveld setting on a Hutton Sands-covered calcrete substrate. Dolerite hills cluster beyond the project area. It is estimated that surface archaeological traces including those in disturbances and erosion features would provide informative indications of the likely archaeological landscape in question.



Google Earth image indicating the project area north of the N8 south east of Kimberley and relative to the major Alexandersfontein pan (lighter-coloured East North East of the project).

2.1 Heritage features of the region

Previous archaeological surveys carried out in the region include impact assessments east of the project site in the vicinity of Bosvark (proposed gypsum mining) and, particularly, at Alexandersfontein/Benfontein, a large Pleistocene lake on the margins of which numerous Stone Age occurrences have been recorded in lake-shore and spring eye settings. A detailed engagement with existing survey reports on record at the McGregor Museum and submitted to SAHRA has yet to be undertaken and would be an aspect of the work needed for the full HIA. For the broader region the following comments can be made as background or baseline information from which certain heritage predictions may be made for testing in the full HIA study.

2.1.1 Colonial frontier

Nineteenth century farming infrastructure representing the influx of frontier (Trekboer, in some cases Griqua) settlers occurs in the area in the form of stone kraals and dwellings (or ruins thereof), as well as graves (e.g. Morris 2011). Some such features may be found on the property in question, together with more recent features (built environment older than 60 years being subject to provisions of the National Heritage Resources Act). The property is also close to the Diamond Fields (Kimberley) and hence may include material traces pertaining to the diamond rush, as also to the period of the Anglo-Boer War (although no action was fought at this particular spot).

2.1.2 Later Stone Age

Later Stone Age sites have been noted in the region, particularly on the farm Benfontein (Alexandersfontein). A notable feature, apart from surface scatters of stone tools, are rock engraving sites on dolerite hills (Morris 1988) such as at Tafelkop and near Bosvark (Morris 2011), as well as on a series of hills on the farms Olifantsfontein and Suzanna just west of the property (Fock & Fock 1989).

2.1.3 Pleistocene: Middle and Earlier Stone Age

Assemblages ascribed to the Pleistocene age Earlier and Middle Stone Age and 'Fauresmith' industry (Beaumont & Morris 1990; Underhill 2011) are known to occur in the area, typically within and at the base of the red Hutton Sands overlying calcrete or dolerite. Mostly very low density occurrences have been noted in surveys nearby, while in certain localities sites of higher density and significance have been documented, notably on the fringes of the Alexandersfontein Pan (e.g. Butzer *et al*. 1973; Butzer 1976; Morris 2002).

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 HIA 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 Blackwood Solar Energy Facility development and infrastructure; 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 Observations derived from previous experience of the area

- Based on previous experience, the terrain on which the proposed Blackwood Solar Energy Facility would be located is likely to include traces of Stone Age utilization of the landscape with palimpsests of material spanning Pleistocene and Holocene times. Some occurrences may turn out to be significant, depending on findings in the EIA phase.
- Where there are dolerite outcrops or hills, rock engravings may occur.
- Nineteenth- and twentieth-century cultural history may occur in the form of stone kraals, ruins of dwellings, extant dwellings and infrastructure (those over 60 years old are explicitly protected by the Act), and graves. Intangible heritage values attached to places may be recoverable from current or former inhabitants (farmers, farm-workers).
- 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/alternative powerline routes). Heritage traces would be evaluated in terms of their archaeological significance (see tables below). The predictions set out in sections 2.2.2 above would need to be tested by way of observations made on the ground. Preparatory to fieldwork, all relevant reports for surveys in the area would be reviewed.

3.1 Assumptions and constraints

It would be assumed that, by and large in this landscape, with its sparse vegetation and generally 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 of any kind exposing erstwhile below-surface features). In parts of this landscape a prevailing erosion regime would mean that archaeological traces would be mostly on the surface; however, sub-surface occurrences can be expected where the landscape is mantled by Hutton Sands or other forms of sedimentation, or where material has been deliberately buried (most obviously, graves).

A proviso is routinely given 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 the Free State Provincial Heritage Resources 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	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Class	Landform	Type 1	Type 2	Type 3
	or other feature visible			

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 Blackwood Solar Energy Facility development 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 primary and secondary infrastructure construction, including access roads, powerlines, etc.

The predictions made in this scoping report relative to previous work in the wider region, together with further review of surveys in the region, 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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