Archaeological Impact Assessment

For the proposed Heuningspruit PV 1 And PV 2 Solar Energy Facility Near Koppies, Free State Province

Prepared For

Savannah Environmental (Pty) Ltd

By

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VERSION 1.0

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I, Jaco van der Walt as duly authorised representative of Heritage Contracts and Archaeological Consulting CC, hereby confirm my independence as a specialist and declare that neither I nor the Heritage Contracts and Archaeological Consulting CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the client was appointed as Environmental Assessment practitioner, other than fair remuneration for work performed on this project.

SIGNATURE: _____

EXECUTIVE SUMMARY

Site name and location: Sun Mechanics (Pty) Ltd, an independent Power Producer (IPP) is proposing the establishment of two 5MW photovoltaic (PV) solar energy facilities on sites located approximately 35km south west of Koppies in the Free State Province. The projects are referred to as the Heuningspruit PV 1 Solar Energy Facility and Heuningspruit PV 2 Solar Energy Facility.

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

1:50 000 Topographic Map: 2727AD

EIA Consultant: Savannah Environmental (Pty) Ltd

Developer: Sun Mechanics (Pty) Ltd
Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

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Date of Report: 6 November 2013

Findings of the Assessment:

The impacts to heritage resources by the proposed development are considered to be low as the study area was ploughed in the past and this would have destroyed any surface indicators of heritage resources. An informal cemetery (**Site 1**) was documented to the north west of the proposed alternatives and no direct impact is foreseen on the site. However some recommendations are made to protect the site from accidental damage during the construction phase of the project and are discussed in section 7 of this report.

No buildings exist in the development footprint and no cultural landscape elements were noted. No further mitigation is recommended for this aspect.

From an archaeological point of view both alternatives are suitable (based on approval from SAHRA) if the recommendations made in this report are adhered to.

General

The possible occurrence of unmarked or informal graves and subsurface finds can thus not be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.

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

Archaeological Consulting CC and on condition that the Client pays to Heritage Contracts and Archaeological Consulting CC the full price for the work as agreed, shall be entitled to use for its own benefit and for the specified project only:

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

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FIGURES

ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Plan
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

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

GLOSSARY

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

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

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 BACKGROUND INFORMATION

Kind of study	Archaeological Impact Assessment
Type of development	Photovoltaic solar energy facilities
Rezoning/subdivision of land	Rezoning
Developer:	Sun Mechanics (Pty) Ltd
Consultant:	Savannah Environmental

Heritage Contracts and Archaeological Consulting CC has been contracted by Savannah Environmental (Pty) Ltd to conduct an Archaeological Impact Assessment for the proposed commercial photovoltaic solar energy facility as well as associated infrastructure. Heuningspruit PV 1 Solar Energy Facility is proposed on Voorspoed 1508 and Heuningspruit PV 2 Solar Energy Facility is proposed on Verdun RE/1511.

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

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

During the survey no sites of heritage significance were identified within the development footprint although a informal cemetery was documented located to the north west of the proposed development. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to SAHRA for review.

1.1 Terms of Reference

Field study

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Reporting

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

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

1.2. Archaeological Legislation and Best Practice

Phase 1 of an AIA or a HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

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

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

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

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

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

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

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

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

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

After mitigation of a site, a destruction permit must be applied for from SAHRA by the client before development may proceed.

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

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

Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

1.3 Description of Study Area

1.3.1 Location Data

The preferred project site is located approximately 35km south west of Koppies in the Free State Province Heuningspruit PV 1 Solar Energy Facility is proposed on Voorspoed 1508 and Heuningspruit PV 2 Solar Energy Facility is proposed on Verdun RE/1511. The study area for each project is ~20 hectares in extent, while ~ 13 ha is intended to be utilised for each solar energy facility. The sites are currently used for livestock grazing with sheep and cattle, but was used for crop farming in the past. These properties fall within the Ngwathe Local Municipality of the Free State Province.

The study area falls within a Dry Highveld Grassland Bioregion as described by Mucina *et al* (2006) with the vegetation described as Central Free State Grassland. Land use in the general area is characterized by agriculture, dominated by crops and cattle farming. The study area is characterised by deep sandy to loam soil.

1.3.2. Location Map

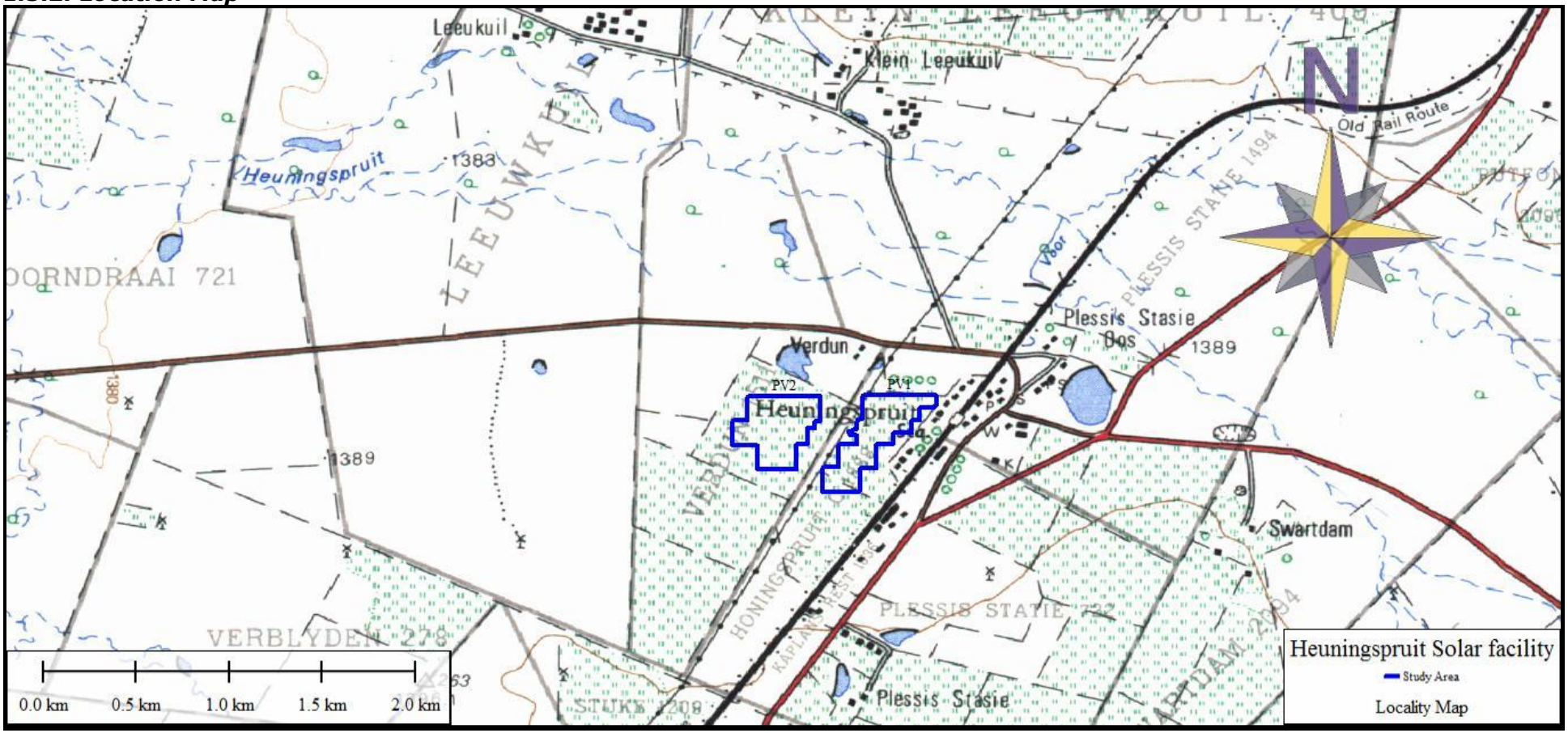

Figure 1: Location map indicating the alternative options that were surveyed.

1.3.3. Google Maps

Figure 2: Google Image showing the two alternatives (blue) and track log (black) of the areas that were covered during the survey.

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases and historical sources to compile a background history of the study area followed by field verification; this was accomplished by means of the following phases (the results are represented in section 4 of this report).

2.1 Phase 1 - Desktop Study

The first phase comprised a desktop study, gathering data to compile a background history of the area in question. It included scanning existing records for archaeological and historical sites in the area.

2.1.1 Literature Search
Utilising data for information gathering stored in the archaeological database at Wits, previous CRM reports done in the area and a search in the National archives. The aim of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves of the area.

2.1.2 Information Collection
The SAHRA report mapping project (Version 1.0) and SAHRIS was consulted to collect data from previously conducted CRM projects in the region to provide a comprehensive account of the history of the study area.

2.1.3 Consultation
No consultation was conducted by the heritage team but a full public participation process was conducted by the EIA consultant.

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

2.1.5 Genealogical Society of South Africa
The database of the Genealogical Society was consulted to collect data on any known graves in the area.

2.2 Phase 2 - Physical Surveying
A field survey of the study area of the two alternatives measuring approximately 40 ha was conducted; focusing on drainage lines, hills and outcrops, high lying areas and disturbances in the topography. The study area was surveyed by means of vehicle and extensive surveys on foot by a professional archaeologist on 1 November 2013.

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

2.3. Restrictions
Due to the fact that most cultural remains may occur below surface, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey. Only the surface infrastructure footprint areas were surveyed as indicated in the location map, and not the entire farm.. Although Heritage Contracts and Archaeological Consulting CC surveyed the area as thoroughly as possible, it is incumbent upon the developer to stop operations and inform the relevant heritage agency should further cultural remains, such as stone tool scatters, artefacts, bones or fossils, be exposed during the process of development.

3 NATURE OF THE DEVELOPMENT

An area of approximately 20ha is being considered for each facility within the broader farm portions identified. Each facility would comprise of the following infrastructure:

- Photovoltaic (PV) panels up to 5m high (fixed or tracking) with a capacity of up to 5MW.
- Mounting structures to be either rammed steel piles or piles with pre-manufactured concrete footing to support the PV panels.
- Cabling between the project components, to be lain underground.
- Inverters/Transformer enclosures.
- An on-site switching station up to 88kV in capacity.
- An overhead power line of approximately 250m in length to tie into the existing Heuningspruit Rural-Syferfontien Traction 88kV Eskom power line on site. An application to Eskom has been made to connect via this power line into the existing Heuningspruit Rural Substation which is located adjacent (north western boundary) to the development site. Eskom will confirm the voltage of the connection power line and connection point. Eskom may request adjustment or possible expansion or inclusion of additional transformers or bays or switching gear associated with the existing substation and 88kv overhead power line.
- Internal access roads.
- Fencing.
- Workshop area for maintenance, storage, offices and small modular water filtration or di- ionisation unit.
- Parking and water storage tanks.

4. REGIONAL OVERVIEW

4.1 General Information

Through secondary source material, primary sources, maps and online sources the study area is contextualised. No CRM projects are on record for the study area. No studies have been conducted within a 20km radius of the study area (SAHRIS & SAHRA report mapping version. The only historical battle on record for the area is the battle of Vechtkop (1836) 49 km east of the study area.

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. No buildings or structures are located within the proposed two alternatives. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area.

4.2 Archaeological Background

The archaeological background and timeframe of the larger study area can be divided into the Stone Age and Iron Age.

4.2.1. Stone Age

The Stone Age is divided in Early; Middle and Late Stone Age and refers to the earliest people of South Africa who mainly relied on stone for their tools.

Early Stone Age: The period from ± 2.5 million yrs. - ± 250 000 yrs. ago. Acheulean stone tools are dominant. No Acheulean sites are on record near the project area, but isolated finds may be possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site. The lack of any ESA sites was confirmed during the field investigation.

Middle Stone Age: The Middle Stone Age includes various lithic industries in SA dating from ± 250 000 yrs. – 25 000 yrs. before present. This period is first associated with archaic Homo sapiens and later Homo sapiens sapiens. Material culture includes stone tools with prepared platforms and stone tools attached to handles.

Late Stone Age: The period from ± 25 000-yrs before present to the period of contact with either Iron Age farmers or European colonists. This period is associated with Homo sapiens sapiens. Material culture from this period includes: microlithic stone tools; ostrich eggshell beads and rock art. Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters.

Since there are no caves in the study area no LSA sites of significance were recorded and no isolated finds or occurrences were recorded.

4.2.2. Iron Age (general)

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

The Early Iron Age: Most of the first millennium AD.

The Middle Iron Age: 10th to 13th centuries AD

The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living.

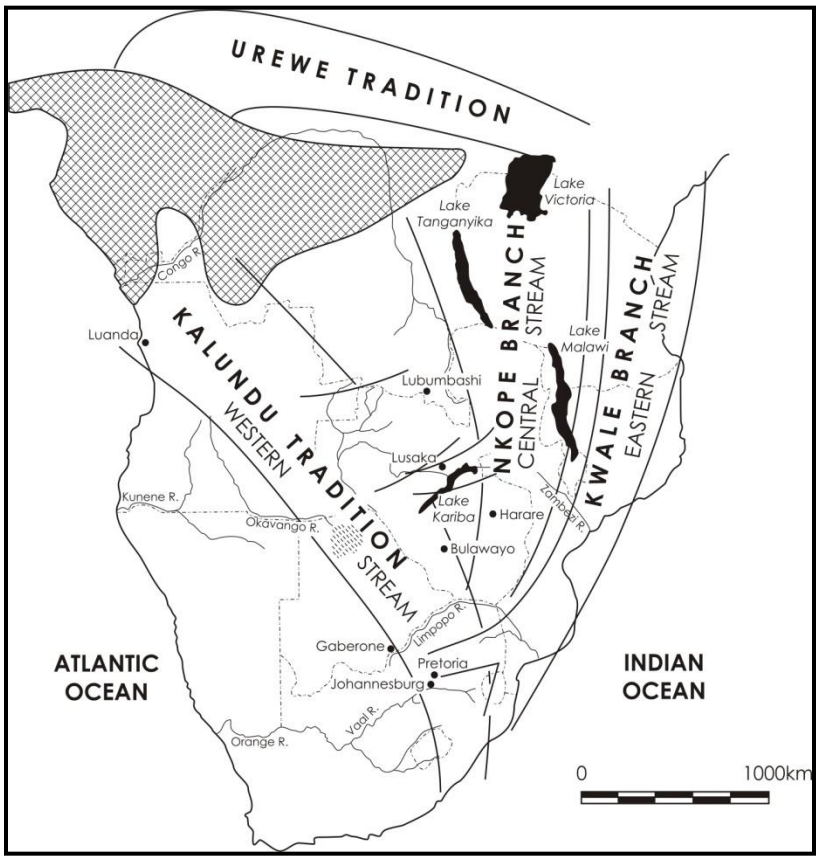

Figure 3: Movement of Bantu speaking farmers (Huffman 2007)

No Sites dating to the Early or Middle Iron Age have been recorded or is expected for the study area. The same goes for the Later Iron Age period where the study area is situated outside the southern periphery of distribution of Late Iron Age settlements

5. HISTORICAL BACKGROUND

The following section will endeavour to give a brief overview of the history of the area and district in which it is located. The report has been divided into several sections that will focus on the following aspects:

- General history of human settlement in the area
- The history of black and white interaction in the area

5.1. Historiography And Methodology

It was necessary to use a range of sources in order to give an accurate account of the history of the area in which the study area is located. Sources include secondary source material, maps, electronic sources and archival documents. This study is by no means all-inclusive, and there are doubtlessly still sources to be found on the history of the property and area researched in this study.

5.2. Maps Of The Area Under Investigation

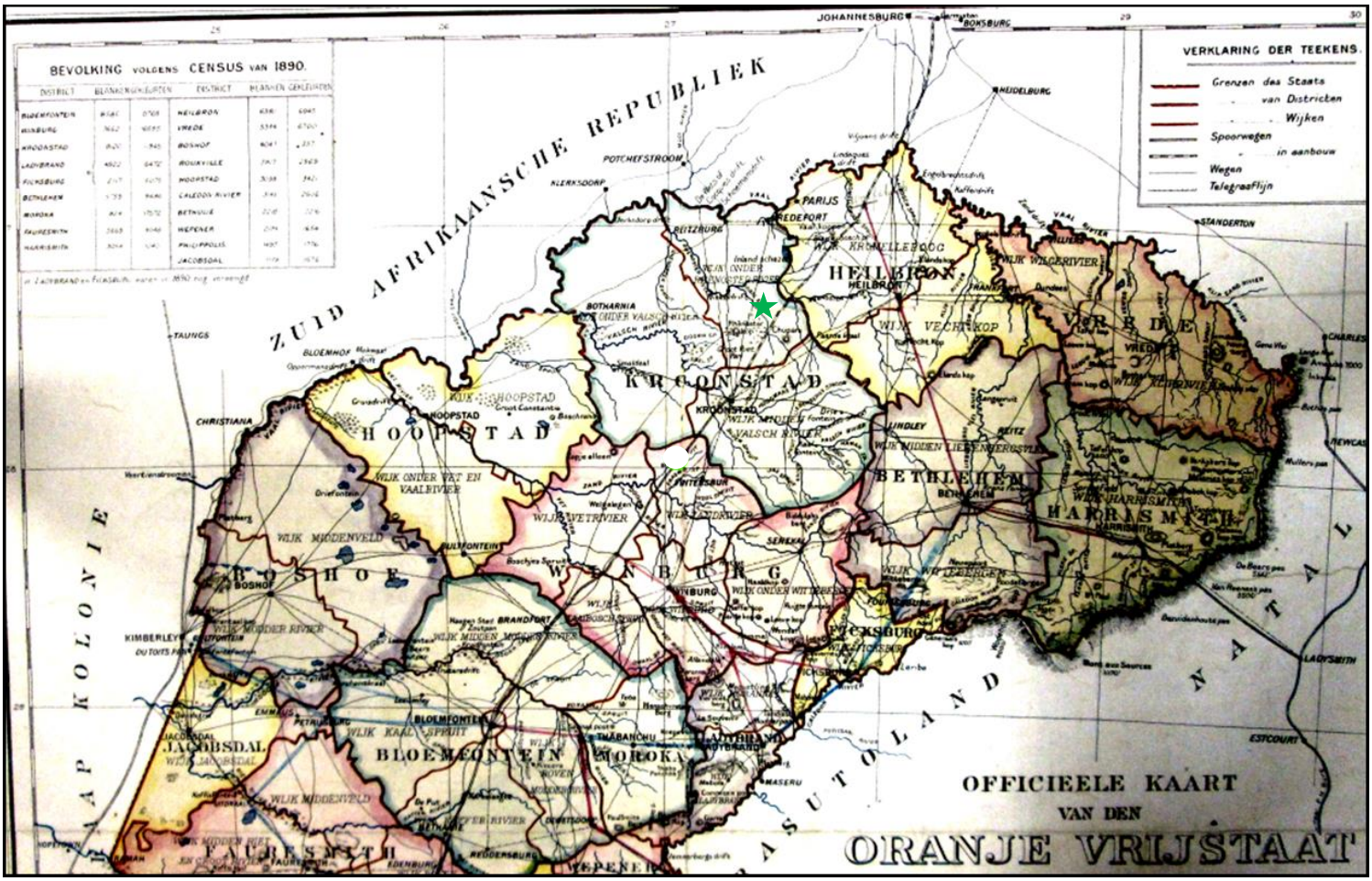

Figure 4: 1891 Map of the Orange Free State, showing the location of Koppies close to the proposed development.

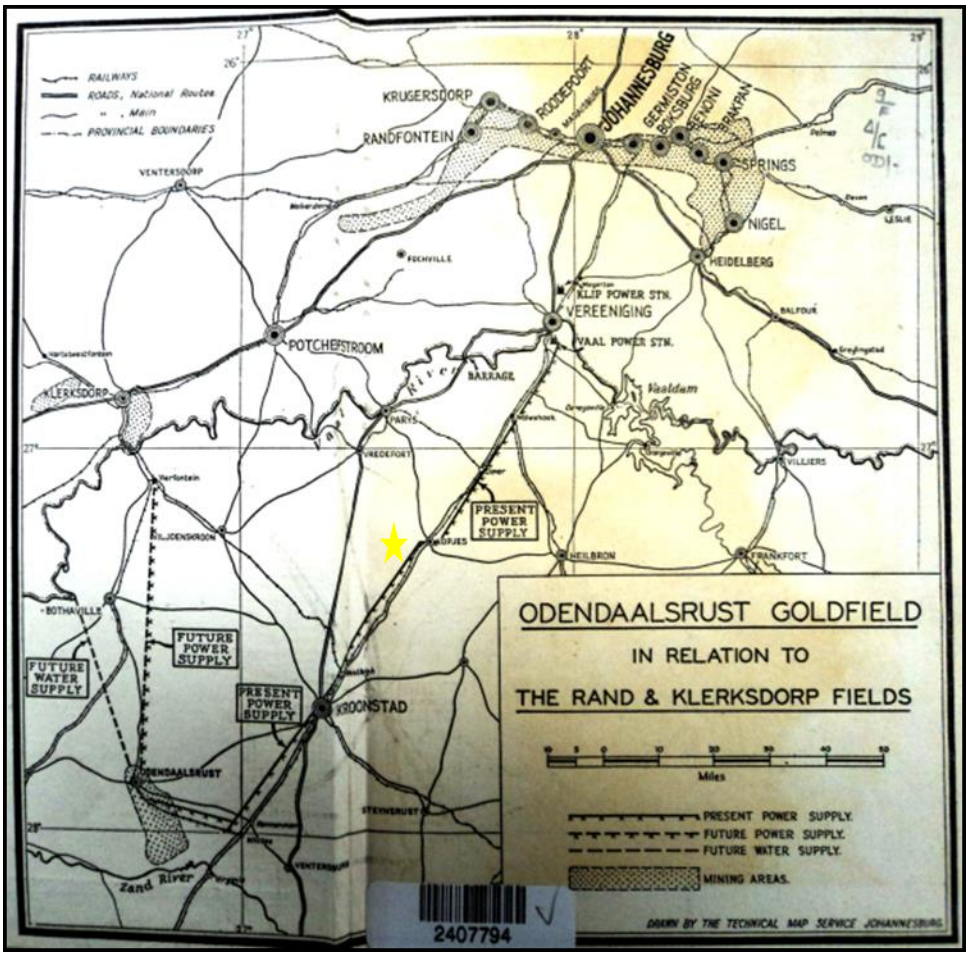

Figure 5: Indication of the development area in relation to the Odedaalsrust Gold Fields as well as the Rand and Klerksdorp goldfields.

5.3. A Brief History of Human Settlement And Black And White Interaction In The Farm Area

The first Europeans arrived in the Cape in 1652, and expansion to the north only started in the late 1820s.

In 1836 on 16 October the Battle of Vechtkop (Vegkop), near present day Heilbron, FS, between the Voortrekkers and the Ndebele takes place. Kalipi attacks the laager with 6 000 warriors. 430 Ndebele and two Voortrekkers are killed. There is difference of opinion about the exact date of the attack, but it is certain that news of the campaign reached the Ndebele king at Kapain, Marico district, on 25 October.

The Great Trek of 1837, as this northern movement of white people from the Cape Colony was called, resulted in a mass migration of white people into the northern areas of South Africa. (Ross 2002:39) The discovery of diamonds and gold in the northern provinces between 1867 and 1886 had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intensions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902, and which was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and as a consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims. (Du Preez 1977).

The northern Free State is located within the area where some of the main operations of the Boer General, Christiaan De Wet, took place between 1899 and May 1900 when the war ended. De Wet, among the other Boer generals, realized that they could not win the war by conventional means, and spread out into small hit-and-run groups that inflicted serious casualties on the British armies. This is known as Guerrilla warfare. The British Commander-In-Chief, Lord Kitchener, consequently turned to the destruction of Boer crops and built concentration camps where the wives and children of the Boer soldiers were interned. This "scorched earth" policy of the British finally resulted in the demoralisation of the Boers. (Readers Digest 1984: 33)

Some skirmishes took place on towns in the vicinity of Koppies. Kroonstad was one of these towns. On 12 March 1900, on the eve of the occupation of Bloemfontein by Lord Roberts, President M. T. Steyn declared Kroonstad the new capital of the Free State government. It simultaneously became the organizing center for retreating Boer commandos and a depot for stores of all kinds. It was also at Kroonstad that it was decided in March 1900 to abolish wagon laagers and to employ mounted commandos instead. This heralded a new method of warfare with increased mobility, which later became known as guerrilla warfare. Kroonstad remained the Free State capital until 11 May 1900, when the British were victorious at Zand River. Kroonstad remained in British hands for the rest of the war, and housed concentration camps for both Boer civilians and black people. (Pretorius 2010: 225-226)

Lindley is another town located close to where some of the very few successful Boer sieges during the war took place here. Spagge's Battalion of 500 men reached Lindley from Kroonstad on 27 May 1900. The battalion had covered 90 miles in three days and only had rations for two days. As they approached Lindley, the battalion came under heavy rifle fire from a group of Boers. During five days of fighting the British casualties came to 468. The British finally gave in when they realized they were completely surrounded, and became the prisoners of war of General Piet de Wet. (Pretorius 2010: 244-245).

A central figure in the establishment of the town Koppies was Emily Hobhouse. Concerned about the economic and personal losses of the Boer people, throughout the Anglo Boer war, she promoted the idea of home-industry among the inhabitants of the town. Her vision and courage was manifested in the Lace school at Phillipolis.

Peace talks between the Boers and the British had started around April 1902, and culminated in the Peace of Vereeniging treaty on 31 May 1902. This event signalled the end of the Anglo-Boer War, as well as the temporary end of the Boer Republics' independence. (Geskiedenisatlas van Suid-Afrika 1999: 251)

In 1904, General C.R. de Wet established a settlement on the banks of the Renoster River for underprivileged whites. He donated his Farm "Rooipoort" in order to relieve the poverty caused by the war in the form of a few morgen irrigation land, and then a few morgen "dry" land for cultivating maize. Inhabitants were supplied with a few eggs and a paraffin lamp/hatcher for the eggs. In 1926 this settlement achieved municipal rights and became the town of Koppies.

By demand/pressure of General De Wet, the "Koppies Dam" was constructed to supply water for irrigation, and work to the local people who needed it badly.

WWI: At the start of the 1914-Rebellion (or "Armed protest" as it was called), it is decided in Koppies, OFS, that Gen. C.R. de Wet is to lead the rebels in the Free state (7 000 men), while Gen. C.F. Beyers (after whom "Oom Bey" was later named), is to lead the 3 000 rebels in the Transvaal (SA History 2013). About 2 000 take up arms in the Cape Province. This decision was made in the old NG-church, the Minister was C.R Ferreira. After the war, he returned to minister in Koppies. He passed away in 1932 and was buried in the church grounds.

Figure 6: Moedergemeente NG Church in Koppies

Figure 7: Gravestone of CR Ferreira in the church grounds.

Though segregation and apartheid would later be rife in South Africa, black and white relations were nonetheless at times also interdependent in nature. After the Great Trek, when white farmers had settled in various areas, wealthier farmers were often willing to lodge needy white families on their property in exchange for odd jobs and commando service. This *bywoner* often arrived with a family and a few cows. He would till the soil and pay a minimal rent to the farmer from the crops he grew. The farmer did not consider him a laborer, but mostly kept black workers for hard labour on the farm. After the Anglo-Boer War, many families were left destitute. Post war years of severe droughts and locust plagues did not ameliorate this state of affairs. All of these factors resulted in what became known as the 'poor white problem'. On the advent of commercial farming in South Africa, white landowners soon found bywoners to be a financial burden, and many were evicted from farms. In many cases, wealthier landlords found it far more profitable to rent their land to blacks than to bywoners. This enabled them to create reservoirs of black labour (for which mine recruiting agencies were prepared to pay handsome commissions), while it was also possible to draw more rent from their black tenants. This practice was outlawed by the 1913 Natives Land Act, which forbade more than five black families from living on white farms as peasant squatters. (Readers Digest 1992: 329-332)

The Koppies dam wall was raised to its current level in 1960. Today Koppies is located in the Ngwathe Municipality, South Africa. (Wikipedia 2012).

6. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES

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

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

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;

- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites;
- Potential to answer present research questions.

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

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

6.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and approved by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 7 of this report.

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

6.2 Impact Rating of Assessment

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

» The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

» The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

» The **duration**, wherein it will be indicated whether:

- the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
- the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
- medium-term (5-15 years), assigned a score of 3;
- long term (> 15 years), assigned a score of 4; or
- permanent, assigned a score of 5;

» The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and

» the **status**, which will be described as either positive, negative or neutral.

» the degree to which the impact can be reversed.

» the degree to which the impact may cause irreplaceable loss of resources.

» the *degree* to which the impact can be mitigated.

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

S= (E+D+M)P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

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

» < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),

» 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),

» > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

7. BASELINE STUDY-DESCRIPTION OF SITES

It is important to note that the entire farm was not surveyed but only the footprint of the proposed alternatives for the PV layout area, power line for connection to the grid and access routes as indicated in Figure 1. No heritage sites are located within the proposed alternatives (figure 8) although an informal cemetery (**Site 1**) is located to the north west of the proposed alternatives. The study area consists of a featureless flat plain with low grass cover that used to be extensively used for crop0 farming (Figure 9 -19.

7.1 Site Distribution Map

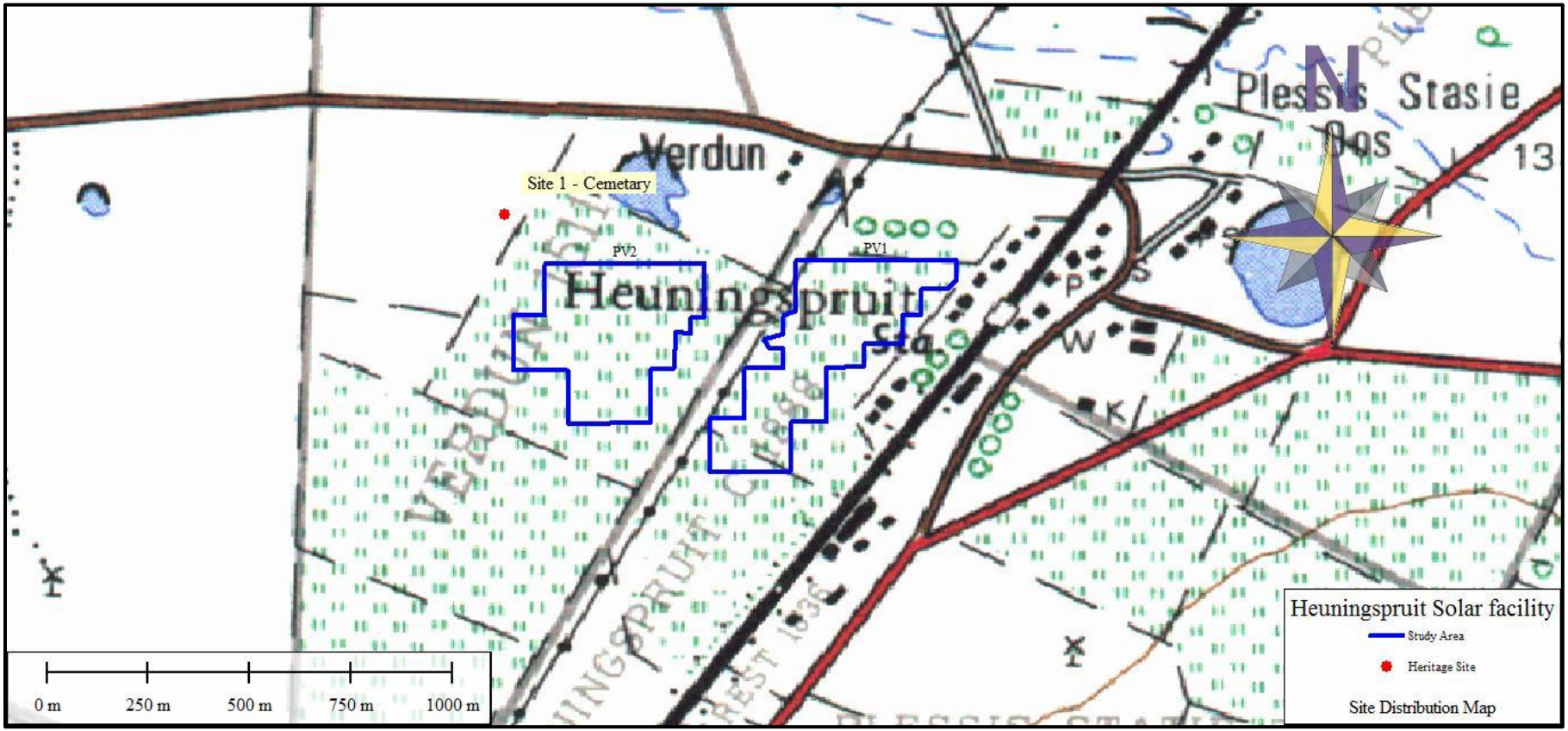

Figure 8: Showing the location of the identified sites in relation to the proposed PV panel options.

Pictures of Heuningspruit PV1 site

Figure 9. PV 1 viewed from the north west

Figure 10.Northern portion of PV1

Figure 11: PV 1 viewed from the south

Figure 12: Plessis Railway station houses viewed from PV1

Figure 13: Heuningspruit substation that the project will feed into

Pictures of PV2 Site

Figure 14. PV 2 conditions in the southern portion of the study area

Figure 15.Conditions in the eastern portion of the study area

Figure 16: Site conditions in the northern portion

Figure 17: PV 2 viewed from the south

7.2. Sites with Coordinates

Site Number	Landscape	Type Site	Cultural Markers	Co ordinate
Site 1	Recent	Informal cemetery	Headstones etc	S27 26 51.6 E27 24 29.8

7.3. Site Descriptions

6.3.2. Informal cemetery (Site 1), located outside (north west) of the development footprint

Site Number	Site 1	**1:50 000 map nr**	2727 AD
Site Data	**Description:**		
Type of site	Open site		
Site categories	Informal cemetery		
Context	**Site 1** consists of approximately 4 demarcated graves. The graves are aligned east to west and are located just outside of the development footprint. The graves are much neglected with the headstones fallen over and broken and borrowing animals digging through the graves causing them to collapse. The site is not located within any of the proposed alternatives and no impact is foreseen on the site.		
Cultural affinities, approximate age and significant features of the site;	The cemetery date from at least 1975 as per the inscription on a cement headstone.		

Photographs

Figure 18: Grave

Figure 19: The oldest visible date at Site 5 .

Figure 20: Broken headstone

Figure 21: Headstone with inscription indicating that the cemetery dates to at least 1975

Field Rating (Recommended grading or field significance) of the site:	Generally Protected A
Statement of Significance (Heritage Value)	High social significance

Impact evaluation of the proposed project on heritage resources

Nature: During the operation of the project an indirect visual impact is expected for the site.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (2)
Probability	Not Probable (2)	Not Probable (1)
Significance	**30 (Low)**	**8 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: The site is located well outside of the development footprint of either alternative and no direct impact is foreseen on the site. However to protect the site from accidental damage it should be fenced off during construction with an access gate for family members. (Please refer to section 7 for full details on recommendations).		
Cumulative impacts: Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: N.A		

8. RECOMMENDATIONS AND CONCLUSIONS

The impacts to heritage resources by the proposed development are considered to be low. The only heritage remains consist of an informal cemetery (**Site 1**) was documented outside of the proposed alternatives and no direct impact is foreseen on the site. However some recommendations are made to protect the site from accidental damage during the construction phase of the project and are discussed below.

Management measures would need to be taken into account to avoid damage to the informal cemetery. Damage can be caused by construction vehicles unknowingly damaging the graves. To prevent this, the area should be demarcated with a fence and all construction activities should be located 15 meters away from the fence around the cemetery.

OBJECTIVE: Prevent unnecessary disturbance and/or destruction of archaeological sites or features that has not been mitigated for the development.

Project component/s	All phases of construction.		
Potential impact	Damage/disturbance to grave site.		
Activity risk/source	Construction vehicles working in that area.		
Mitigation: target/objective	To retain cemetary in undisturbed condition.		
Mitigation: Action/control		Responsibility	Timeframe
Ensure that workers and construction vehicles remain away from the grave sites.		Heuningspruit PV Facility Management and ECO	Construction
Performance indicator	Cemetery remains undamaged.		
Monitoring	No pedestrians or construction vehicles allowed inside the demarcated area.		

No buildings exist on the site and no cultural landscape elements were noted. No further mitigation is recommended for this aspect.

Due to the subsurface nature of archaeological material and unmarked graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.

If the recommendations as made in section 8 of this report are adhered to (subject to approval from SAHRA) there is from an archaeological point of view no reason why the development should not proceed If any possible finds such as tool scatters, bone or fossil remains are exposed or noticed during construction, the operations must be stopped and a qualified archaeologist must be contacted to assess the find.

9. PROJECT TEAM

Jaco van der Walt, Project Manager and Archaeologist

Liesl Bester, Archival Specialist

10. STATEMENT OF COMPETENCY

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

I have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique and Tanzania; having conducted more than 300 AIAs since 2000.

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