

# DESKTOP HERITAGE SENSITIVITY STUDY

FOR THE PROPOSED KAREEKLOOF PV ENERGY FACILITY AND BESS,  
DE AAR, EASTERN CAPE PROVINCE

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## EXECUTIVE SUMMARY

Kareekloof Energy (Pty) Ltd is proposing to develop a PV facility with BESS and associated infrastructure, near the town of De Aar, in the Northern Cape Province. The Kareekloof PV Facility with BESS and associated infrastructure is located on Portion 1 of the farm Basberg 88 and Portions 11, 16 & 17 of the Farm Kareekloof 85. Beyond Heritage (Pty) Ltd were appointed to undertake a desk-based site sensitivity Assessment of the project area. The landscape setting in which the project is located consists of the following topographical features with varying levels of heritage potential as outlined below:

1. Flat shrubland plains that are of low heritage potential;
2. Rocky outcrops and elevated areas that are of medium to high heritage potential;
3. Transformed areas (through cultivation) that are of low heritage potential;

Based on previous heritage surveys in the area, the following known heritage features could occur in the project area:

1. Stone Age Features
2. Structures older than 60 years;
3. Graves and burial sites; and
4. According to the SAHRA Paleontological sensitivity map the area is of low to moderate and very high paleontological sensitivity.

The sensitivity study did not identify any fatal flaws in the project area and the project is acceptable from a heritage point of view. It is expected that if any sites are identified during the next phase of the study (Heritage Impact Assessment) within the development footprint, the sites can be mitigated, either by avoidance or by a Phase 2 assessment.

To comply with the National Heritage Resources Act (NHRA) and with cognisance of known heritage resources in the larger area it is recommended that the study area should be subjected to a field-based Heritage Impact Assessment (HIA).

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**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)

Earlier Stone Age (2 million to 300 000 years ago)

Middle Stone Age (300 000 to 30 000 years ago)

Later Stone Age (30 000 years ago until recent)

Historic (approximately AD 1840 to 1950)

Historic building (over 60 years old)

Lithics: Stone Age artefacts

### 1. INTRODUCTION

Beyond Heritage was appointed for a desktop heritage sensitivity study for the proposed Kareekloof Energy PV Energy Facility and BESS Development on Portion 1 of the farm Basberg 88 and Portions 11, 16 & 17 of the Farm Kareekloof 85 (Figure 1.1)

These areas are undergoing detailed environmental screening. This screening will generate sensitivity mapping for the farm portions, identify potentially developable areas and confirm the specialist studies required for the Environmental Impact Assessment (EIA) phase.

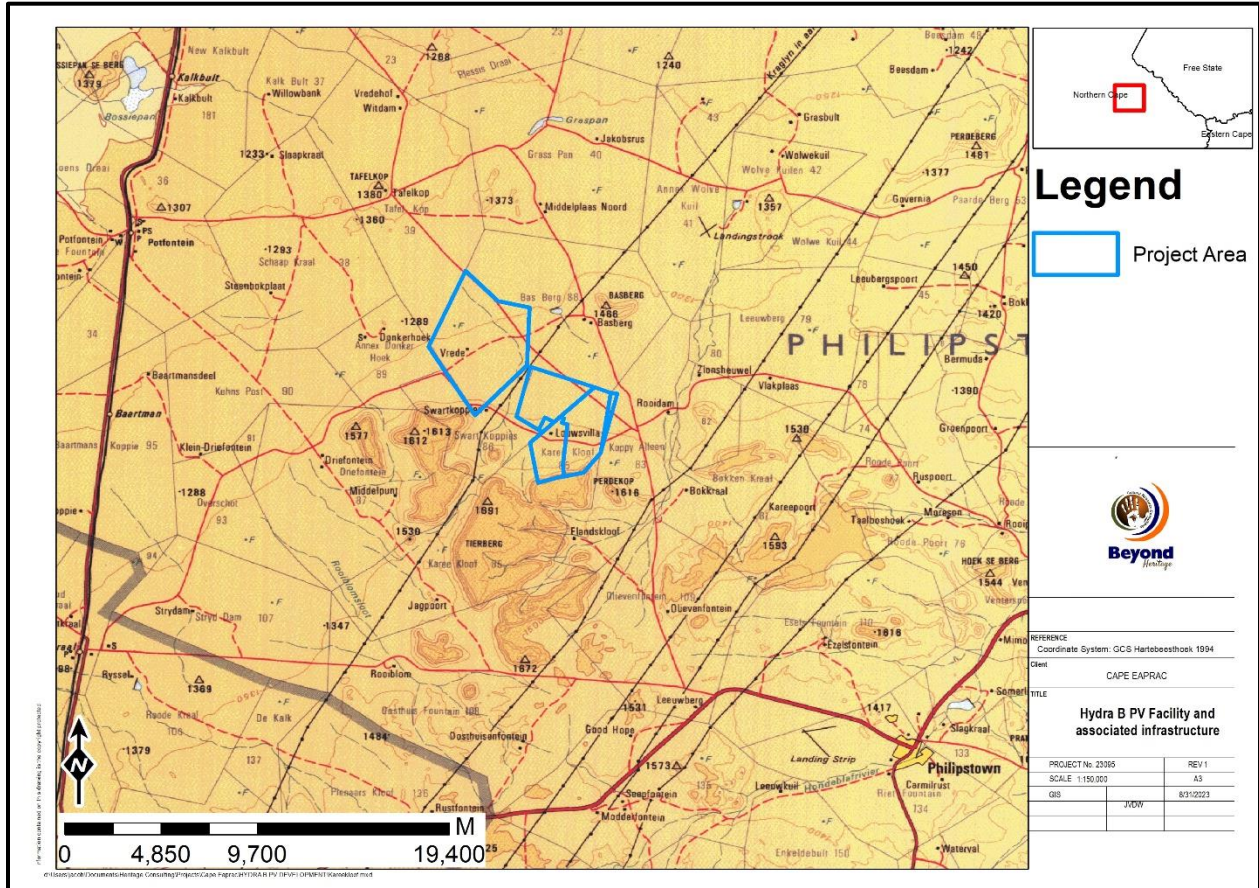


Figure 1.1. Regional setting of the project.



## 1.1 Terms of Reference

The Terms of Reference for the Heritage Sensitivity Study are as follows:

- Based on desktop review, provide a brief but comprehensive description of the region from a heritage perspective;
- Undertake a desktop analysis of available secondary data;
- Develop a sensitivity rating scheme;
- Identify potential sensitivities in the provisional project areas based on, *inter alia*:
  - Current condition;
  - Tolerance to disturbance;
  - Importance to conservation or scientific understanding; and
  - Remaining extent / rarity;
- Present the findings of the sensitivity analysis in a report.

## 1.2 Nature of the development

The proposed facility includes an up to 900MW PV Development and 3.6GWh BESS and associated infrastructure. The exact specifications of the proposed project components will be determined during the detailed engineering phase.

## 1.3 The receiving environment

The proposed project is situated on the plateau of the mountain ranges to the southeast of de Aar. The area is rugged and falls within the bioregion described by Mucina et al (2006) as the Upper Karoo Bioregion with the vegetation described as Northern Upper Karoo. Land use in the general area is characterized by agriculture and dominated by sheep farming. The specific segment of land investigated for this study comprises an undulating landscape with shallow soil veneers with calcrete and dolerite substrates with dolerite outcrops throughout the study area.

## **2. APPROACH AND METHODOLOGY**

The aim of the sensitivity study is to assess the heritage potential of the study area since it was not previously surveyed. This was accomplished by means of the following phases (the results are represented in section 5 of this report):

### **2.1 Literature search**

A literature search was conducted utilising data from published articles on the archaeology and history of the area. 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.

### **2.2 Information collection**

SAHRIS was consulted to collect data from CRM practitioners who undertook work in the area to provide the most comprehensive account of the history of the area where possible.

### **2.3 Google Earth and mapping survey**

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

### **2.4 Genealogical Society of South Africa**

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

### **2.5. Land use paradigms**

A heritage sensitivity predictive model was developed for the study area considering existing Landscape Use paradigms, to identify areas with the greatest archaeological potential or sensitivity.

### 3. LEGISLATION

For this project the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is of importance and the following sites and features are protected:

- a. Archaeological artefacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

The national estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Archaeological and palaeontological importance
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g., archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

Section 34 (1) of the act deals with structures which is older than 60 years. Section 35(4) of this act deals with archaeology, palaeontology and meteorites. Section 36(3) of the National Heritage Resources Act deals with human remains older than 60 years. Unidentified/unknown graves are also handled as older than 60 until proven otherwise.

### 3.1 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. 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. National and Provincial Monuments are recognised for conservation purposes. The following interrelated criteria were used to establish site significance:

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

The criteria above will be used to place identified sites with in SAHRA's (2006) system of grading of places and objects which form part of the national estate. This system is approved by ASAPA for the SADC region. The recommendations for each site should be read in conjunction with section 9 of this report.

Table 1. Heritage significance and field ratings

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

## **4. CONTEXTUALISING THE STUDY AREA**

### **4.1 General Information**

#### **4.1.1. Literature search**

Several previous heritage studies were conducted in the general study area. Cultural Resource Management (CRM) projects by Van Ryneveld (2008), Kaplan (2010), van der Walt (2011), Morris (2011), Kruger (2012) and Orton (2012) as well as Fourie (2014) has revealed a rich archaeological and historical background to the greater study area ranging from Earlier Stone Age (ESA) through to the Later Stone Age (LSA) and herder settlements represented by stonewalled kraals along numerous ridges in the greater study area. The colonial period is also represented by historical farm infrastructure as well as Anglo Boer War remains.

#### **4.1.3. Google Earth and mapping survey**

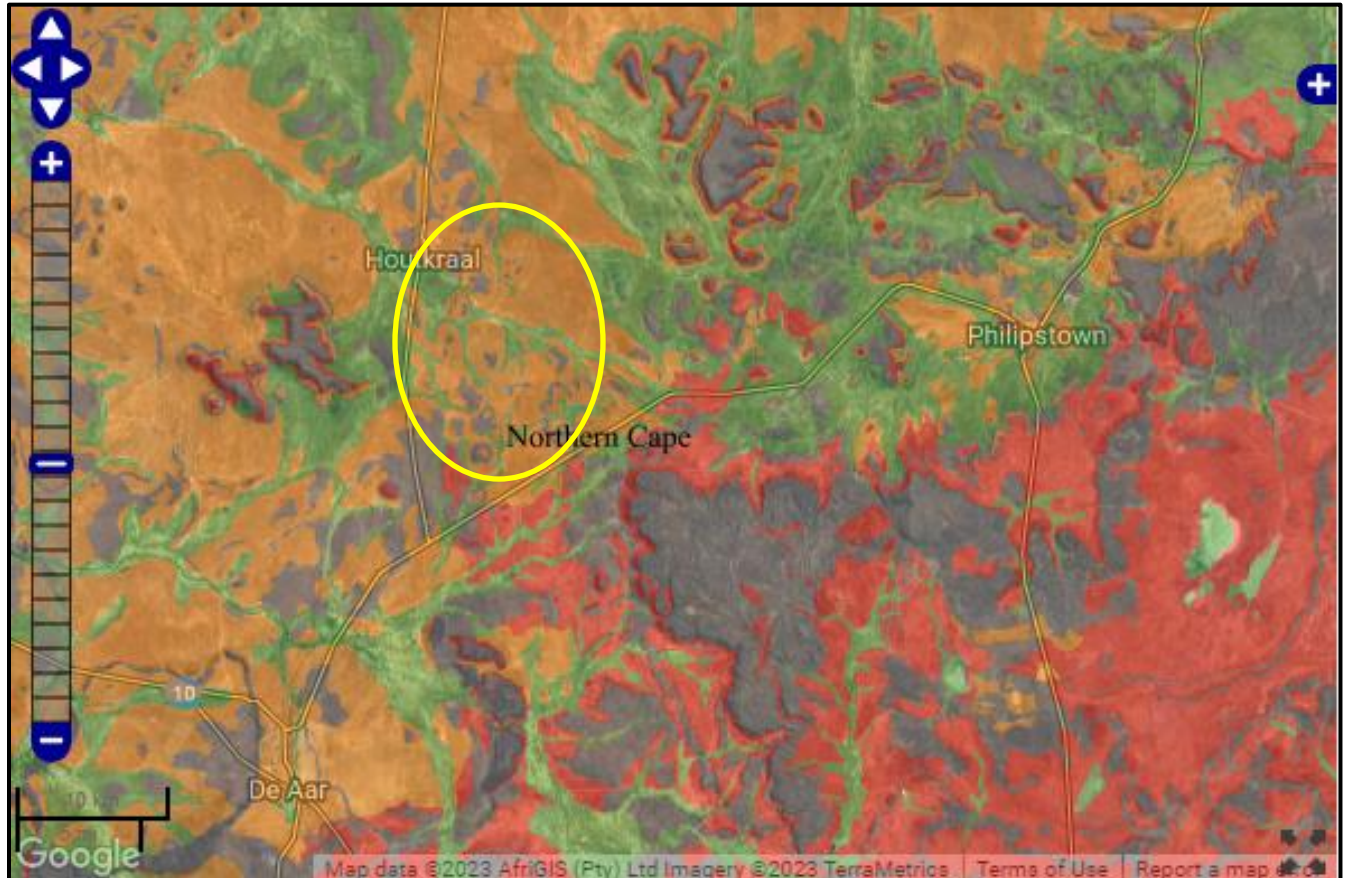
Google Earth and 1:50 000 maps of the area was utilised to identify possible places where archaeological sites might be located.

#### **4.1.4. Genealogical Society of South Africa**

No grave sites are indicated within the study area.

#### 4.2. Palaeontology

The study area ranges from low to moderate and high paleontological sensitivity based on the SAHRA paleontological sensitivity map (Figure 4.1). Based on the SAHRA requirements a desktop palaeontological study will have to be conducted prior to development for all areas.



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 4.1. Palaeontological sensitivity map of the approximate study area (yellow polygon).

### 4.3 Archaeological and Historical background

The town of De Aar was founded in 1881 on the farm by the same name. The farm originally belonged to Jan Vermeulen who sold it for the purpose of the development of the town. With the development of railways the town became an important station with one of the largest marshaling yards in the country.

Occupation by early humans would probably date to at least the Middle Stone Age (Earlier Stone Age sites are known in the wider region) and would consist of open sites near stream beds or hills and outcrops. Raw material sources would have been amongst the foci for Stone Age activity. Population density might have increased during the Later Stone Age and people would have occupied rock shelters where available, as well as open sites. During this later period they also produced rock engravings, of which some are known to occur on the farm Tafelkop north of the study area, as well as rock paintings, some of which occur on the farm Veekraal east of the study area and others on Jakkalsfontein north of the study area.

The following heritage sites, features, and objects are known to occur in the larger region (Morris 2011):

- » Stone Age sites located near the foot of hills and in rock shelters where these have developed;
- » Sites with either rock engravings or rock paintings. Dolerite koppies in the region are known to have rock engravings (Fock & Fock 1989; Morris 1988; Parkington *et al.* 2008);
- » Stock enclosures constructed of stone;
- » Burial sites;
- » Houses and other structures older than 60 years;
- » Farming infrastructure such as wind mills, etc.

A variety of heritage resources occur in the larger region and there is thus a likelihood that similar resources will be in the study area. Sites can be expected especially in the areas where hills and outcrops occur.

#### 4.3.4. Graves and Burial sites

No grave sites in the study are indicated on the Genealogical Society of South Africa's Database.

#### 4.3.5. Cultural Landscape

Historical land use and the cultural landscape are linked since the cultural landscape is shaped to some extent by the history of the area. The study area is characterised by agricultural activities and associated structures. Another historic aspect that left the most visible remains on the landscape is road infrastructure.

## 5. HERITAGE SENSITIVITY

The environmental sensitivity of the proposed development area for the Heritage theme was established by a desktop study and aerial map surveillance and the study area was subjected to a heritage predictive model to determine heritage potential based on land use paradigms and landscape features as described below.

### 5.1. Heritage Potential based on Land Use Paradigms

A heritage sensitivity predictive model was developed for the study area considering existing Landscape Use paradigms (Table 2), to identify areas with the greatest archaeological potential or sensitivity.

Table 2. Brief summary of main Land Use Paradigms

	Focal Point or Land Form	Key Sources
<b>Earlier Stone Age</b>	Standing water	Klein 2000
	Spring eyes & seasonal seeps	Sampson 1998
	Raw material	Kuman 2003
	Raw Material & water	Hallinan & Parkington 2017
	Water (stenotopic)	Deacon 1998
	Focal Points like kopjes for vantage points and shelter and alluvial gravels for raw material	Le Baron <i>et al.</i> 2010
	Avoiding Water. Focussing on raw material	Sampson 1985 & 2001
	Raised hilltop locations for observing animals or other groups	Candel & Connard 2012
<b>Middle Stone Age</b>	Raw material & accessible supply of water	de la Pena <i>et al.</i> , 2016
	Along major Rivers, rocky areas and higher topography	Hallinan & Parkington 2017
	Ephemeral River Bed	Marks 2015
	Spring eyes & seasonal seeps	Sampson 1998
<b>Later Stone Age</b>	Widespread	Deacon 1998
	Ephemeral River Bed	Marks 2015
	On pan or stream-bed margins, near springs, bedrock depressions containing seasonal water, hollows on dunes, and on the flanks or crests of koppies	Beaumont <i>et al.</i> 1995
<b>Iron Age</b>	Cultivable soil, koppies and hills	Huffman 2007



The Predictive sensitivity model for the study area (Graphically represented in Figure 5.1) based on the landscape use outlined above also took into account the ecological sensitivity data (that include focal points highlighted in Table 2) for the area and included the following natural criteria (Table 3):

- Elevation;
- Drainage Lines; and
- Local geology.

Table 3. Natural criteria and GIS Methodology

Criteria	Description and GIS Methodology
<b>Elevation</b>	GIS data sourced from a private third party provided elevation data for the Digital Elevation Model (DEM) with a five-meter accuracy. From a landscape approach, the micro topography for the SEF facility is important. Although elevation is mostly flat, elevated areas occur that are archaeologically speaking of interest and the field survey concentrated on these areas.
<b>Pans and Drainage Lines</b>	The importance of water sources is highlighted in Table 1. The ArcGIS “Buffer Wizard” tool was utilised to delineate a 100 m buffer around these features.
<b>Geology</b>	Studies in the area showed that palimpsest of Stone Age Material occur in areas where raw material suitable for knapping occurs. In addition, stone walled settlements in the Iron Age are constructed near building material

Results are also represented in Annexure A.

### 5.2. Potential Heritage Sensitivity

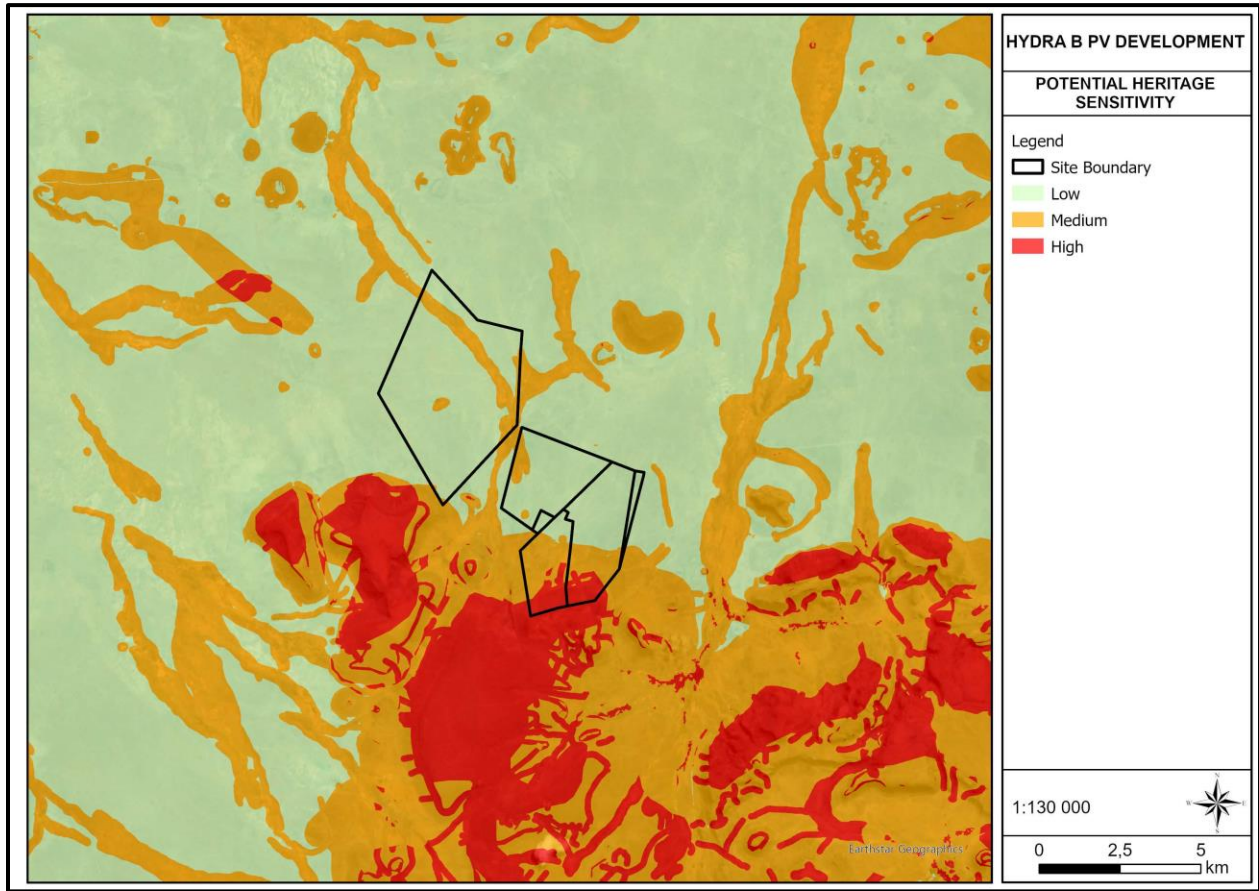


Figure 5.1 illustrates the potential heritage sensitivity of the project area showing areas of low, medium and high heritage potential.

Table 4. Results of the Sensitivity study.

ASPECT	SCREENING TOOL SENSITIVITY	HERITAGE POTENTIAL	OUTCOME STATEMENT/PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Palaeontology	High	Low to Medium	Paleontological Impact Assessment	SAHRA Requirements
Archaeology	Low	Low to high	Heritage Impact Assessment	NHRA Section 38 SAHRA Requirements

Table 5. Summary of the Heritage sensitivity analysis for the Project Areas.

Sensitivity	Sensitivity Feature	Motivation
High	Rocky outcrops and dolerite outcrops	<ul style="list-style-type: none"> <li>Rock art could occur</li> <li>LSA sites can be expected – both open air and in shelters</li> </ul>
High	Pans, seasonal water holes or fissures that hold water after the rains	<ul style="list-style-type: none"> <li>LSA sites can be expected centred around fissures that holds water or rocky outcrops with associated lithics, ostrich eggshell fragments and pottery.</li> </ul>
Medium	Areas next to drainage lines where fine grained raw material occur	<ul style="list-style-type: none"> <li>Isolated Stone Age features can occur.</li> </ul>
Low	Flat plains with shrubland	<ul style="list-style-type: none"> <li>Isolated features can occur.</li> </ul>

## 6. ASSUMPTIONS AND LIMITATIONS

The study area was not subjected to a field survey as this will be conducted in the EIA phase. It is assumed that information obtained for the wider area is applicable to the study area and the authors acknowledge that the brief literature review is not exhaustive on the literature of the area. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would be highlighted through the public consultation process if relevant in the EIA phase. It is possible that new information could come to light in future, which might change the results of this report.

## 7. POTENTIAL SIGNIFICANCE OF HERITAGE RESOURCES

Based on the current information obtained for the area at a desktop level it is anticipated that any heritage resources that occur within the proposed development area will have a Generally Protected B (GP. B) or lower field rating and all sites should be mitigatable either by *in-situ* preservation or phase 2 mitigation. Graves are of high social significance and can be expected anywhere on the landscape.

## 8. CONCLUSION AND PLAN OF STUDY FOR EIA

The sensitivity study did not identify any fatal flaws to the Project from a heritage point of view, although heritage resources are expected in the study area. To comply with the National Heritage Resources Act (Act 25 of 1999) it is recommended that a Phase 1 HIA must be undertaken. During the HIA the potential impact on heritage resources will be determined as well as levels of significance of recorded heritage resources. The HIA will also provide management and mitigation measures should any significant sites be impacted upon, ensuring that all the requirements of the SAHRA are met. The study area is of low to very high paleontological sensitivity and a specialist palaeontological assessment will be required in the EIA phase. During the Public participation and stakeholder consultation process (advertisements & site notices) must reference the National Heritage Resources Act.

## 9. LIST OF PREPARERS

Jaco van der Walt (Archaeologist and Project Manager)

#### **10. STATEMENT OF COMPETENCY**

The author of the report is a member of the Association of Southern African Professional Archaeologists and is also accredited in the following fields of the Cultural Resource Management (CRM) Section (#159): Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. He is also a member of the Association of Professional Heritage Practitioners (#114). Jaco is also an accredited CRM Archaeologist with SAHRA and AMAFA.

Jaco has been involved in research and contract work in South Africa, Afghanistan, Botswana, Mozambique, Zimbabwe, Zambia, Guinea, Tanzania, and the DRC and conducted well over 500 AIAs and HIAs since he started his career in CRM in 2000. This involved several mining operations, Eskom transmission and distribution projects, and renewable energy developments. The results of several of these projects were presented at international and local conferences.

**11. STATEMENT OF INDEPENDENCE**

I, Jaco van der Walt as duly authorised representative of Beyond Heritage, hereby confirm my independence as a specialist and declare that neither I nor the Beyond Heritage 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:**

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