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Appendix D6:
Heritage Impact Assessment

HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999)

FOR THE PROPOSED DE RUST SOLAR PV 2 SOLAR ENERGY FACILITY (SEF), POFADDER, NORTHERN CAPE PROVINCE

Type of development:

Photovoltaic Power Plant

Client:

Enviro-Insight

Applicant:

FE De Rust (Pty) Ltd

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Project Reference:
Project number 23037
Report date:
April 2023

APPROVAL PAGE

Project Name	De Rust Solar PV2 Project.
Report Title	Heritage Impact Assessment for the Proposed De Rust Solar PV 2 Solar Energy Facility (SEF), Pofadder, Northern Cape Province.
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	FE De Rust (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
Fieldwork and reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	March - April 2023
Fieldwork	Ruan van der Merwe - Archaeologist	BA Hons Archaeology	March 2023
Report Writing and Archaeological support	Lara Kraljević – Archaeologist	MA Archaeology	April 2023

Document Progress

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15 April 2023	23036	Enviro-Insight	Electronic Copy
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Amendments on Document

Date	Report Reference Number	Description of Amendment

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REPORT OUTLINE

Appendix 6 of the GNR 326 Environmental Impact Assessment (EIA) Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	*Declaration of Independence*
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA)an indication of the quality and age of base data used for the specialist report	Section 3.4, 7and 8.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment or activities;	Section 1.3
(k) Mitigation measures for inclusion in the EMPr	Section 10.1
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1.
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 5.
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.3
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 5
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to EIA report
(q) Any other information requested by the competent authority	N.A

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I: • I act as an independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations, and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 49 A of the Act.of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	14/04/2023

a) Expertise of the specialist

Jaco van der Walt has been practising as a Cultural Resource Management (CRM) archaeologist for 15 years. Jaco is an accredited member of the Association of South African Professional Archaeologists (ASAPA) (#159) and APHP #114 and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, Kwa Zulu Natal (KZN) as well as the Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, Democratic Republic of the Congo (DRC) Zambia, Guinea, Afghanistan, Nigeria and Tanzania. Through this, he has a sound understanding of the International Finance Corporations (IFC) Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage

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Executive Summary

Enviro-Insight was appointed as the Environmental Assessment Practitioner (EAP) by FE De Rust (Pty) Ltd to undertake the required Environmental Authorisation Process for the proposed development of a Photovoltaic Solar Energy Facility (De Rust Solar PV 2) that will form part of the De Rust development of two (2) Wind Energy Facilities (WEF) and two (2) Solar Energy Facilities (SEF). Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the Project and the study area was assessed on a desktop level and by a non-intrusive pedestrian field survey. This report is for the De Rust Solar PV 2 facility. Key findings of the assessment include:

- Bushmanland is an archaeologically rich landscape and Beaumont et al (1995), have noted that there is a low-density background scatter of artefacts throughout Bushmanland, although in Pofadder/ Aggeneys region this scatter tends to be quite ephemeral. Several other surveys in the region support this distribution of archaeological materials (Morris 2011a; 2011b; 2013, Orton 2015; 2016, Webley & Halkett 2012).
- Heritage sites in the region date to the Stone Age and is clustered around topographical focal points like rocky outcrops, hills, pans and drainage lines. The region is sparsely populated with a few farmsteads and associated buildings that are found in the area, some which is older than 60 years;
- Topographically the Project area lacks any of the aforementioned focal points and is characterised by undulating featureless plains and is considered to be of low heritage potential. This was confirmed during the survey of the impact footprint of the Project and no heritage resources of significance were identified;
- The palaeontological sensitivity of the project area is indicated as insignificant/zero and low and no further studies are required for this aspect.

The impact of the project on heritage resources is low, and the project can commence provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

Recommendations:

Avoidance of recorded heritage observations is the preferred course of action; if this is not possible the following apply:

- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction.

ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DFFE: Department of Fisheries, Forestry and Environment,
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EAP Environmental Assessment Practitioner
EMPr: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
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, 2002 (Act No. 28 of 2002)
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
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 (~ 2.6 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 Introduction and Terms of Reference:

Beyond Heritage was appointed to conduct a HIA for the proposed development of the De Rust Solar PV 2 on approximately 461 hectares that will form part of the De Rust cluster development of two (2) Wind Energy Facilities (WEF) and two (2) Solar Energy Facilities (SEF). The site is located approximately 15 km south of Pofadder within the Khâi-Ma Local Municipality, in the Northern Cape. (Figure 1.1 to 1.3). The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme Report (EMPr) for the development.

The aim of the study is to survey the proposed development footprint to understand the cultural layering of the area. 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 No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes Phase 1, review of relevant literature; 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 heritage sites of significance were identified. 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. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study
Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

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, SAHRA minimum standards 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 No 25 of 1999).

1.2 Project Description

Project components and the location of the proposed project are outlined under Table 2 and 3.

Table 2: Project Description

Project area	The proposed project is situated on Portion 1 of the Farm Samoep 147
Magisterial District	Khâi-Ma Local Municipality
Central co-ordinate of the development	29°21'28.74"S 19°23'55.43"E
Topographic Map Number	2919AD

Table 3: Infrastructure and project activities

Type of development	Photovoltaic Power Plant
Size of development	461 hectares
Project Components	The project comprises of the development of a Photovoltaic Solar Energy Facility (SEF) and associated infrastructure.

1.3 Alternatives

No alternatives were provided, but the area assessed allows for siting of the development to avoid impacts to heritage resources.

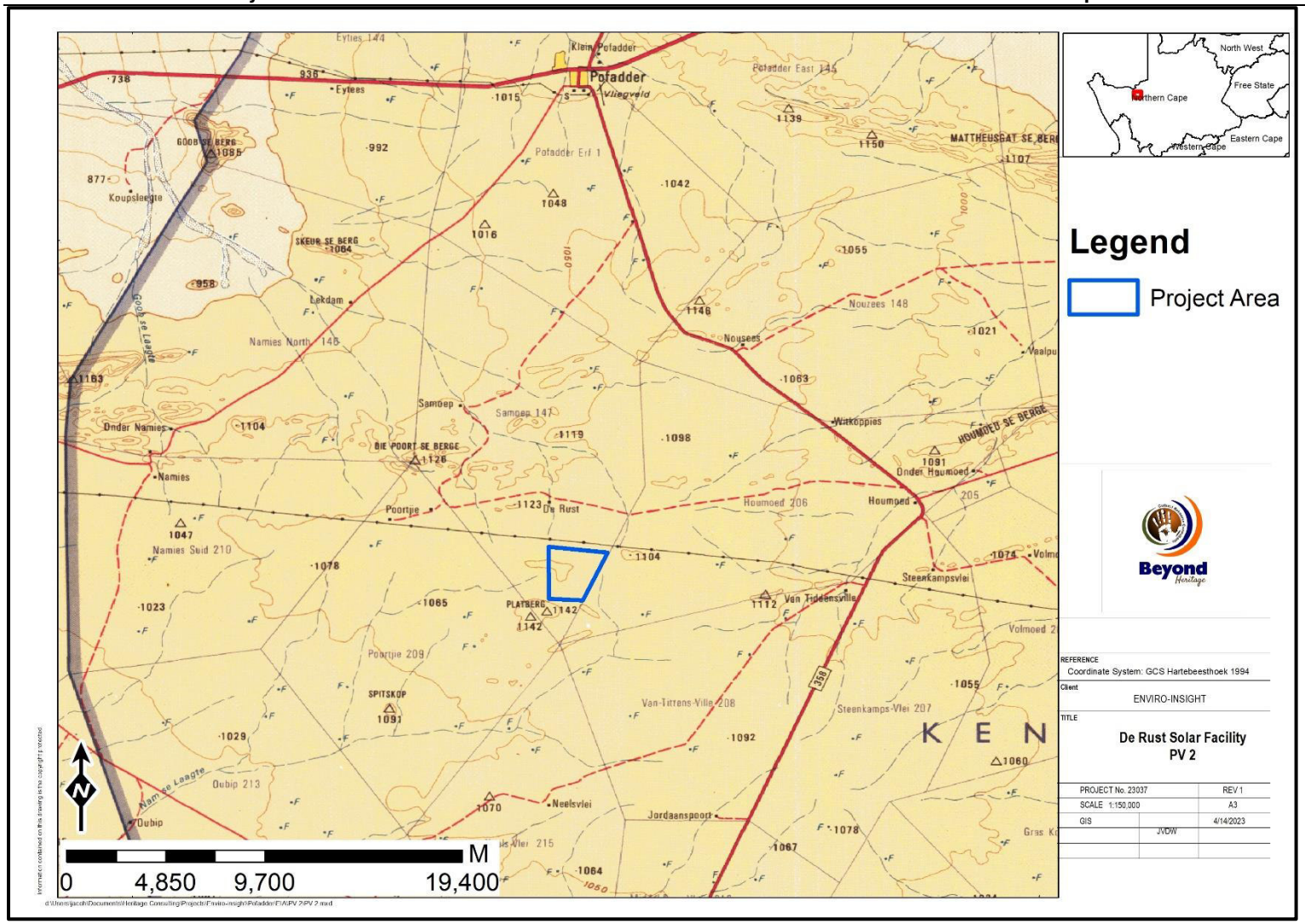

Figure 1.1. Regional setting of the Project (1: 250 000 topographical map).

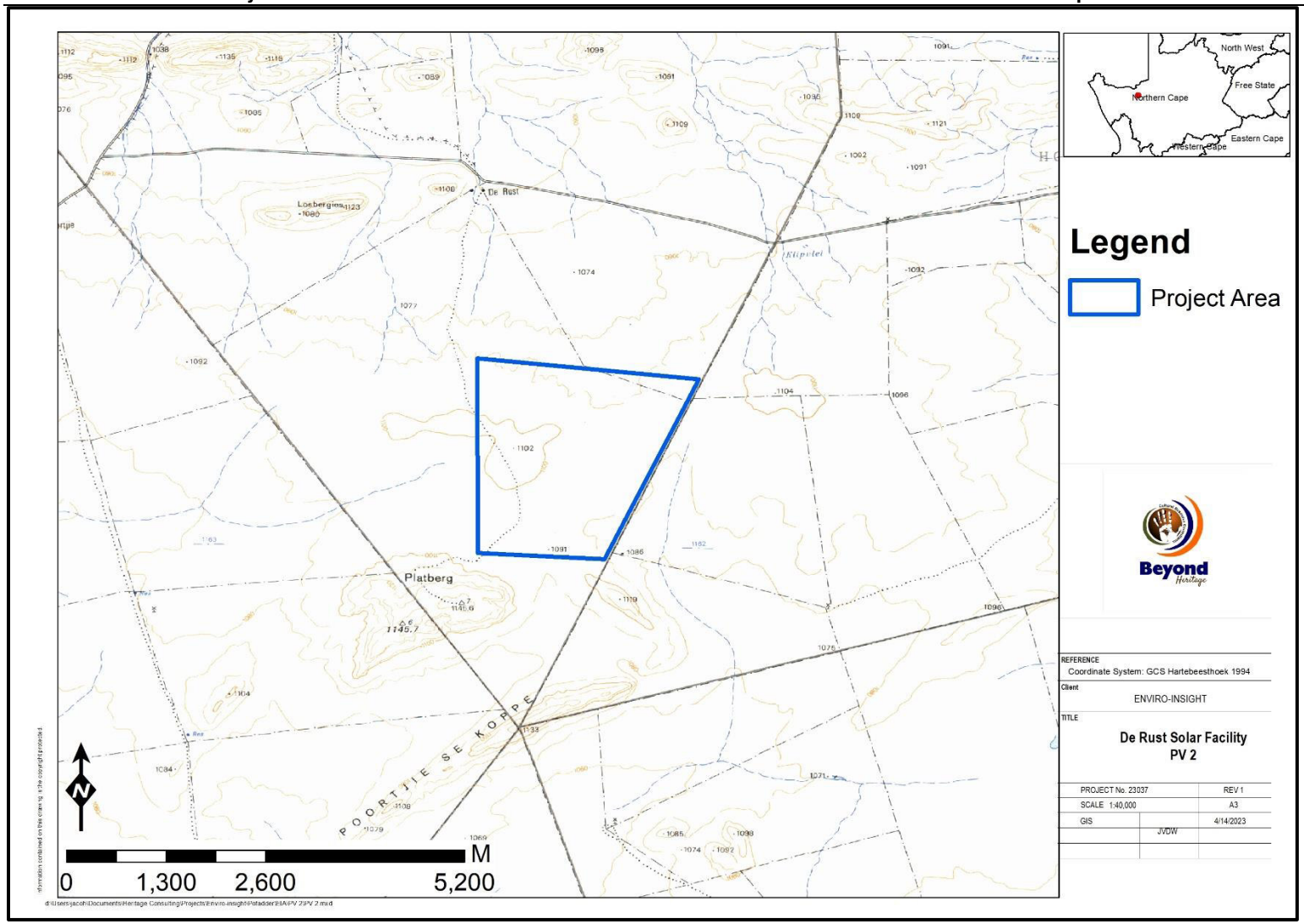

Figure 1.2. Local setting of the Project (1: 50 000 topographical map).

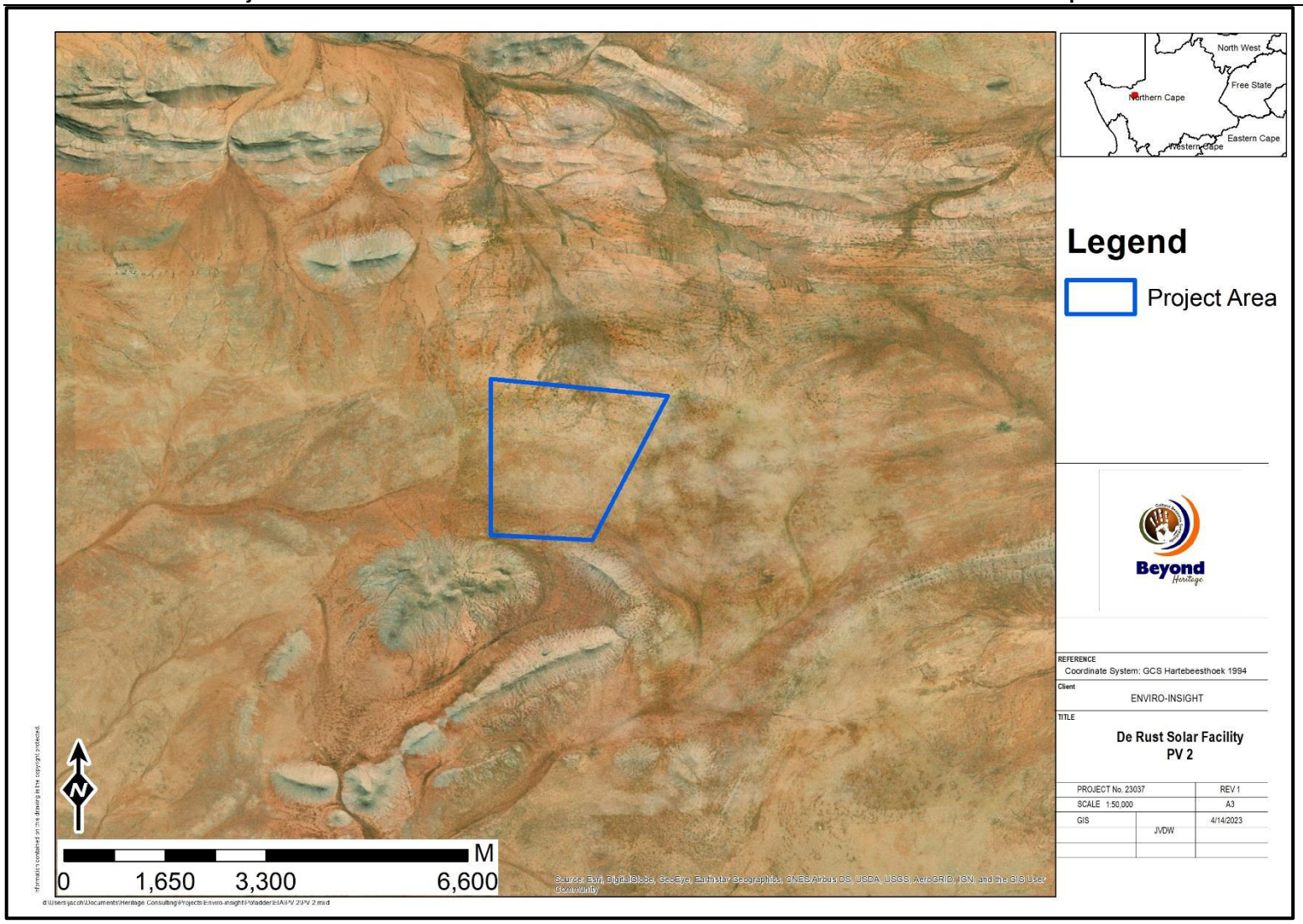

Figure 1.3. Aerial image of the study area.

2 Legislative Requirements

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), (Act No. 107 of 1998 - Section 23(2)(b))

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of 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; and
- Make recommendations for the appropriate heritage management (or avoidance) of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the Provincial Heritage Resource Agency (PHRA) or to SAHRA. SAHRA will ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 HIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

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 Southern African Development Community (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 HIA's are primarily concerned with the location and identification of heritage 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 include (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 with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36 and GNR 548 as well as the SAHRA BGG Policy 2020. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (NHRA), as well as the National Health Act of 2003 and are under 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) re-instituted by Proclamation 109 of 17 June 1994 and implemented by CoGHSTA as well as the National Health Act of 2003 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. . Authorisation for exhumation and reinternment 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 the National Health Act of 2003.

3 METHODOLOGY

3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation (conducted by the EAP) process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings.

3.4 Site Investigation

The aim of the site visit was to:

a) survey the proposed project area to understand the heritage character of the development footprint (focussing on the current layout);

b) record GPS points of sites/areas identified as significant areas;

c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Table 4: Site Investigation Details

	Site Investigation
Date	Week of the 23 March 2023
Season	Summer – The time of year did not influence the outcome of the survey and the development footprint was sufficiently covered to understand the heritage character of the area (Figure 3.1).

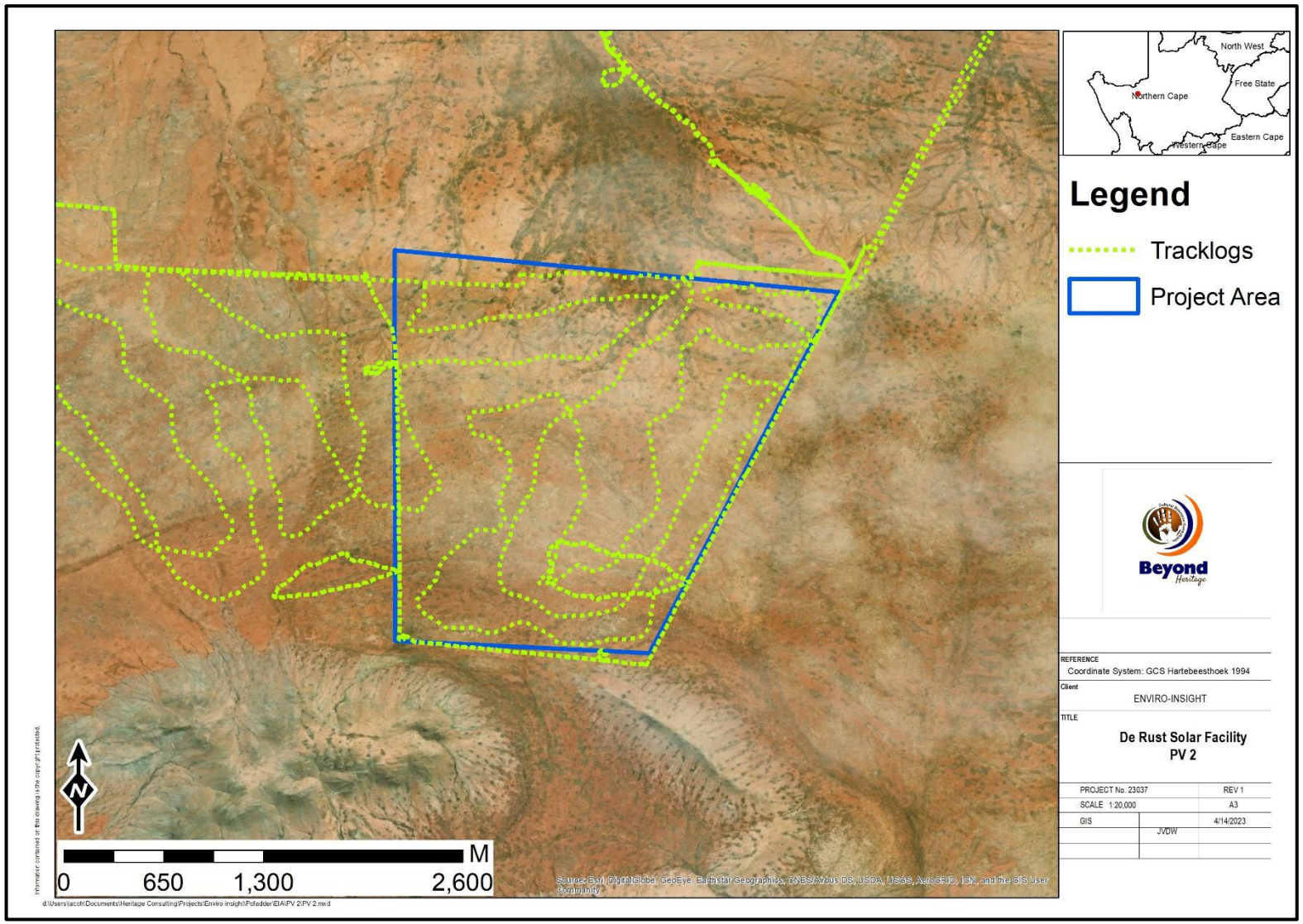

Figure 3.1. Tracklog of the survey path in green.

3.5 Site Significance and Field Rating

Section 3 of the NHRA 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.

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 project 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 with cognisance of Section 3 of the NHRA:

- 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; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2007), and acknowledged 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 10 of this report.

Table 5: 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

3.6 Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- 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).

3.7 Assumptions, Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. Any limitations are successfully mitigated with the implementation of a chance find procedure and monitoring of the study area by the ECO. This report only deals with the current layout of the proposed development and consisted of non-intrusive surface surveys that focussed on tangible resources. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant.

Field data were recorded by handheld GPS and Mobile GPS applications. It must be noted that during the process of converting spatial data to final drawings and maps the accuracy of spatial data may be compromised. Printing or other forms of reproduction might also distort the spatial distribution in maps. Due care has been taken to preserve accuracy. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

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4 Description of Socio-Economic Environment

According to Census 2011, the Khâi-Ma Municipality has a total population of 12 465 people, of which 75,1% are coloured, 17,6% are black African, and 6,0% are white. Other groups make up 0,4% of the population. Of those aged 20 years and older, 46,3% have some secondary schooling, 17,5% have some primary schooling, 18,1 % completed Grade 12/matric, 5 8% have some higher education, 8,4% completed some primary schooling and 3,9% of this municipality have no schooling. Of the 5904 economically active people (employed and unemployed but looking for work), 22,1% are unemployed. 322 are classified as discouraged work-seekers. Of the youth (aged 15 – 34), 2 511 are employed, 776 are unemployed, 192 are classified as discouraged work-seekers, and 1 109 are not economically active. (statssa.gov.za).

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the EIA process by the EAP. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process. No heritage concerns have been raised thus far.

6 Contextualising the study area:

6.1 Literature Review (SAHRIS)

Heritage resources in the region consists of Stone Age scatters grinding grooves, homesteads, and graves. Some surveys in the surrounding area however recorded no heritage resources. The following Cultural Resource Management (CRM) assessments (Table 6) were conducted in the larger area and consulted for this report:

Table 6. CRM reports consulted for the study.

Author	Year	Project	Findings
Hart, T.	2014	Scoping Heritage Impact Assessment for Three Wind Energy Facilities: Poortjies Wind Energy Facility, Khai-Ma Wind Energy Facility and Korana Wind Energy Facility on Four Farm Portions South of Pofadder in the Northern Cape Province.	Grinding grooves, MSA scatters, a quarried quartz outcrop, OES fragments, and a pottery fragment.
Hart, T., Webley, L., Halkett, D, & Kendrick, N.	2014	Heritage Impact Assessment for the Proposed Korana Wind Facility on Farm Portions Namies South 2/212 and Poortjie 1.209 South of Pofadder in the Northern Cape Province.	MSA scatters, graves, and ruins.
Orton, J.	2022	Heritage Impact Assessment: Proposed Pofadder Wind Energy Facility 3, ZF Mgcawu District, Northern Cape.	Stone Age scatters, OES fragments, two graveyards, and four homesteads.
Morris, D.	2014	XiNa Solar Thermal Facility Specialist Input for the Scoping Phase of the Environmental Impact Assessment for the Proposed XiNa Solar Thermal Facility, Pofadder, Northern Cape Province: Archaeology.	OES fragments
Pelser, A.J.	2012	A Report on an Archaeological Impact Assessment (AIA) for the Proposed Solar Energy Plant on Konkoonsies 91, Pofadder District, Northern Cape.	MSA and LSA scatters, OES fragments, and a small shelter with stone tools.
Morris, D.	2016	Paulputs CSP Project near Pofadder, Northern Cape Specialist Input for the Impact Assessment Phase of the Environmental Impact Assessment: Archaeology.	Stone Age scatters, a cemetery, graves, OES fragments, rectangular stone features, grinding cupules on bedrock, and memorial structures.

6.1.1 Google Earth and The Genealogical Society of South Africa (Graves and burial sites)

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

6.2 Archaeological Background

The archaeology of the area spans across the Stone Age and Historical period.

6.2.1 Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable. The three main phases can be divided as follows;

- Later Stone Age (LSA); associated with Khoi and San societies and their immediate predecessors. - Recently to ~30 thousand years ago.
- Middle Stone Age (MSA); associated with Homo sapiens and archaic modern human - . 30-300 thousand years ago.
- Earlier Stone Age (ESA); associated with early Homo groups such as Homo habilis and Homo erectus. - 400 000-> 2 million years ago.

The study area and its surroundings have not undergone extensive research apart from surveys conducted in and around Pofadder. Beaumont et al (1995), have noted that there is a low-density background scatter of artefacts throughout Bushmanland, although this region's sites are found to be ephemeral. ESA tools in this region have only been found in low-density scatters through archaeological surveys with no significant ESA sites identified around Pofadder (Morris 2016, Orton 2022). East of the project footprint, Orton (2022) identified numerous ESA handaxes, flakes and cores. Morris (2016), identified handaxes and flakes during a survey south of the project footprint. These finds were however in isolation and were not noted to be of high heritage significance. The nearest ESA sites of high significance were located during surveys conducted by Morris (2010), in Gamsberg where two ESA production sites with Acheulean stone tools were identified. Another site in Gamsberg was identified and showed signs of continued occupation through the ESA and MSA (Morris 2010).

MSA scatters have been identified in and around Pofadder (Hart 2014, Hart et al 2014, Orton 2022, Pelser 2012). The scatters were generally given low heritage ratings due to their isolated nature and lack of context in relation to an archaeological site of significance. Along with the ESA sites of significance identified by Morris (2010), an MSA production site was identified in Gamsberg. Hills and rocky features within the landscape have seen to be the more likely locations of bearing signs of early human occupation. Grinding grooves in bedrock are often a good indicator of human occupation within the landscape. Morris (2016) identified such grooves south of the project footprint. East of the project footprint Hart (2014) also found occurrences of these grinding grooves.

Surveys around Pofadder have identified OES fragments and LSA scatters (Hart 2014, Morris 2014, Orton 2022, Pelser 2012). LSA associated pottery is not found in abundance but finds do occur, Hart (2014), located an LSA pottery fragment east of the project footprint.
Within the region, natural pans situated along water sources have been found to be associated with artefacts and are a seemingly important feature present within the landscape (Orton 2018; 2022). This would have attracted human activity due to the availability and convenience of fresh water in pans. Orton (2022) documented a few pans which are associated with both MSA and LSA artefacts within the region.
Along the Orange River, well preserved rock engravings can be found at various sites. The immediate region surrounding the project footprint however does not present any rock art or engravings.

6.2.2 Historical Period

Because it lies so far from the original Cape Colony (i.e., Cape Town), northern Bushmanland was colonised quite late with most farms only surveyed and granted in the very late 19th or even early 20th centuries. As a result, very few historical structures and features exist on the landscape. Historical features are limited in the area, but some historical structures have been identified through surveys. Multiple farmsteads, historical structures and stone features of historical context have been documented within the region (Hart et al 2014, Morris 2016, Orton 2022, Pelser 2012). Multiple stone kraals have also been identified within the larger region (Hart 2014, Orton 2022).

Pofadder was established in 1875 as a mission station by Reverend Christian Schröder (Hart 2014). It is speculated that the town was named after Klaas Pofadder, a Koranna chief who was killed by farmers.

7 Description of the Physical Environment

The vegetation and landscape are described by Mucina and Rutherford (2006) as Bushmanland Arid Grassland. The Bushmanland Arid Grassland is described as extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semidesert ‘steppe’. In places low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected.

The project area is located approximately 15 km south of Pofadder. The site can be reached via the R358 off the N14. General site conditions are illustrated in Figures 7.1 to 7.4.

Figure 7.1. General site conditions- indicating vegetation in the study area.

Figure 7.2. General site conditions.

Figure 7.3. General site conditions.

Figure 7.4. General site conditions of the landscape indicating the lack of topographic features.

8 Findings of the Survey – Heritage Baseline

8.1 Heritage Resources

Few and mostly localised heritage observations (mostly of low heritage significance) are on record near the Project area (Figure 8.1) and is clustered around topographical focal points like rocky outcrops, hills, pans and drainage lines. Topographically the Project footprint lacks any of the aforementioned focal points and is characterised by undulating featureless plains and is considered to be of low heritage potential. This was confirmed during the survey of the impact footprint of the Project and no heritage resources of significance were identified.

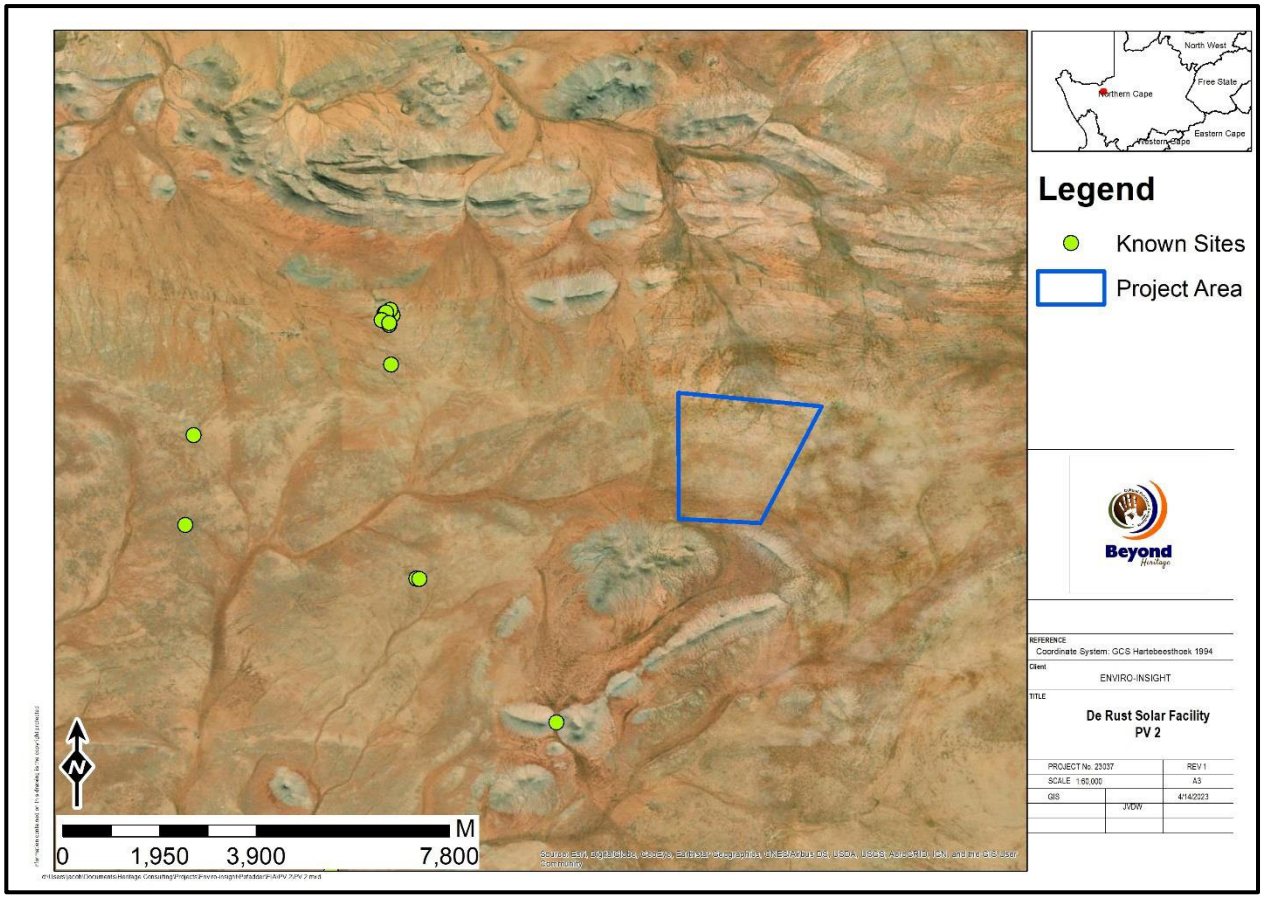

Figure 8.1. Known sites in relation to the project area.

8.2 Cultural Landscape

The project area falls within an undeveloped landscape and the project area is currently used for agricultural activities. A Cultural Landscape feature of significance in this area is the “Cultural Heritage of the Gamsberg”, which is located 30 km to the west of the project area. The area surrounding the Project has already been impacted on by mining at Black Mountain and Gamsberg with several developments between Gamsberg and Pofadder.

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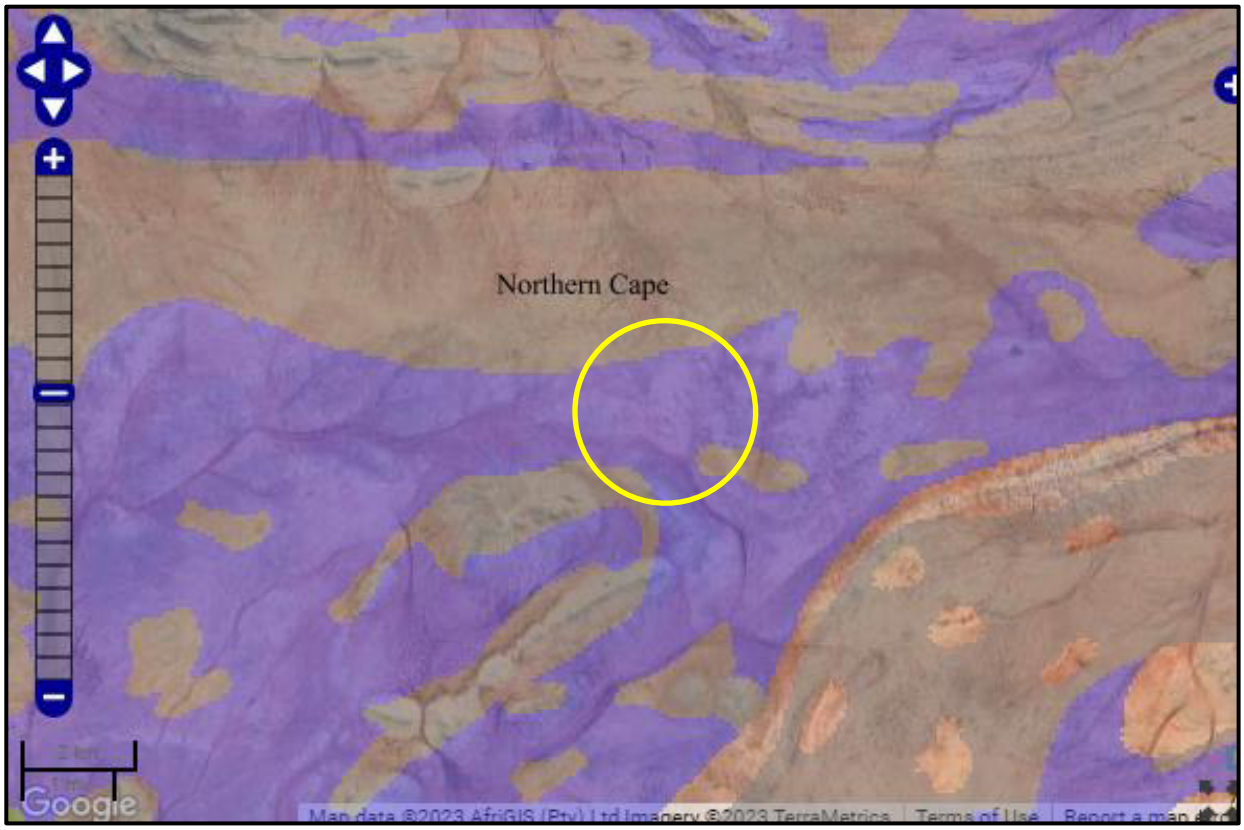
8.3 Paleontological Heritage

The palaeontological sensitivity of the project area is indicated as insignificant/zero and low and no further studies are required for this aspect (Figure 8.2).



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 8.2. Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

9 Potential Impact

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. It is assumed that the pre-construction and construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can impact on heritage features and impacts include destruction or partial destruction of non-renewable heritage resources. Impacts during the operation phase is considered to affect the cultural landscape and sense of place.

9.1.1 Nature of impacts

The main cause of impacts to archaeological resources is physical disturbance of the material itself and its context during removal of topsoil and vegetation as well as the excavations associated with the establishment of infrastructure. In terms of this project the main source of impacts will happen during the following activities.

- Establishment of new roads and upgrade of existing roads;
- Visual impact of the PV Facility on the landscape and sense of place;
- Establishment of laydown areas;
- Excavation and levelling of the PV facility footprint;
- Trenches for cables and erection of powerlines;
- Excavations during construction of the sub stations;

On the current layout no sites of significance will be impacted on, and it is unlikely that any major impact will manifest.

9.1.2 Impact Assessment for the Project

Table 7. Impact assessment on the Project area

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**16 (Low)**	**16 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA
Mitigation: Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction.		
Cumulative impacts: The proposed project will have a low cumulative impact as no significant heritage resources will be adversely affected.		
Residual Impacts: Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

10 Conclusion and recommendations

Beaumont et al (1995), have noted that there is a low-density background scatter of artefacts throughout Bushmanland, although this region's sites are found to be ephemeral. Background scatters are generally not of high heritage significance as they do not depict a definitive archaeological site. Few and mostly localised heritage observations (mostly of low heritage significance) are on record to the west of the Project area (Figure 8.1) and is clustered around topographical focal points like rocky outcrops, hills, pans and drainage lines. Topographically the Project footprint lacks any of the aforementioned focal points and is characterised by undulating featureless plains and no sites of heritage significance were recorded.

The palaeontological sensitivity of the project area is indicated as insignificant/zero and low and no further studies are required for this aspect.

The impact of the project on heritage resources is low, and it is recommended that the project can commence on the condition that the following recommendations (Section 10) are implemented as part of the EMPr and based on approval from SAHRA.

10.1 Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the project may only proceed based on approval from SAHRA:

Recommendations:

Avoidance of recorded heritage observations is the preferred course of action; if this is not possible the following apply:

- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction.

10.2 Reasoned Opinion

The overall impact of the project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.3 Chance Find Procedures

10.3.1 Heritage Resources

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, 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 and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below and monitoring guidelines applicable to the Chance Find procedure is discussed below and monitoring guidelines for this procedure are provided in Section 10.5.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

10.4 Potential risk

Potential risks to the proposed project are the occurrence of intangible features, unrecorded cultural material and burial sites. This can cause delays during construction, as well as additional costs involved in mitigation, as well as possible layout changes.

10.5 Monitoring Requirements

Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief*: As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 8. Monitoring requirements for the project

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Cultural Resources Chance Finds	Entire project area	ECO	Weekly (Pre construction and construction phase)	Proactively	• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist/ palaeontologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. • Only recommence operations once impacts have been mitigated.

10.6 Management Measures for inclusion in the EMPr

Table 9. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction;	Construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

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