HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED BOTHAVILLE SOLAR PHOTOVOLTAIC SOLAR ENERGY FACILITY AND GRID CONNECTION INFRASTRUCTURE NEAR BOTHAVILLE, FREE STATE PROVINCE.

Type of development:

Photovoltaic Solar Facility

Client:

Blue Crane Environmental (Pty) Ltd

Applicant:

Bothaville Solar (Pty) Ltd

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Project Reference:
Project number 23084
Report date:
8 August 2023
Revised 13 September 2023

APPROVAL PAGE

Project Name	Bothaville Solar
Report Title	Heritage Impact Assessment for the proposed Bothaville Solar Photovoltaic Solar Energy Facility and Grid Connection Infrastructure near Bothaville, Free State Province.
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	Bothaville Solar (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
Fieldwork and reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	July-August 2023
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Report writing and archaeological support	Lara Kraljević - Archaeologist	MA Archaeology	August 2023

DOCUMENT PROGRESS

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Amendments on Document

Date	Report Reference Number	Description of Amendment
13 September 2023	23084	Lay out change and Technical revision
27 September 2023	23084	Technical Revision

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REPORT OUTLINE

Appendix 6 of the GNR 326 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
(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.
(cB) A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change.	Section 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 7, 8 and 9
(g) Identification of any areas to be avoided, including buffers.	Section 7,8 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 9.1 and 9.5
(l) Conditions for inclusion in the environmental authorisation.	Section 9. 1 and 9.5
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation.	Section 9.6
(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 9.3
(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.	Refer to the EIA report
(q) Any other information requested by the competent authority.	No other information requested at this time

Executive Summary

Bothaville Solar (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility and grid connection (known as Bothaville Solar), approximately 11 km southwest of Bothaville in the Free State Province. The solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 100 MW. Bothaville Solar (Pty) Ltd appointed Blue Crane Environmental (Pty) Ltd as the independent environmental assessment practitioner (EAP) to apply for Environmental Authorization for the Project. Blue Crane Environmental (Pty) Ltd, in turn, appointed Beyond Heritage to conduct a Heritage Impact Assessment (HIA) for the Project and the study area was assessed through a desktop assessment and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- The Project area is marked by extensive agricultural activities and an existing powerline which has transformed sections of the Project area. These activities would have impacted on surface indicators of heritage resources if any ever existed in these areas;
- Surveys in the wider area found no heritage resources (Dreyer 2007, Daya 2018, de Bruyn 2018) however during the current assessment Iron Age stone-packed enclosures (BV001 and BV002), isolated Middle Stone Age artefacts (BV003, BV004 and BV005), high density Stone Age scatters (BV006 and BV007) a burial site (BV008), and remnants of a farmstead (BV009) were recorded;
- BV007, BV008 and BV009 are located outside of the development footprint;
- According to the South African Heritage Resource Authority (SAHRA) Paleontological sensitivity map the study area is of insignificant, moderate, and very high sensitivity and an independent study was conducted for this aspect. Bamford (2023) concluded that it is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr.

The impact on heritage resources can be mitigated to an acceptable level, and the Project can be authorised provided that the recommendations in this report are adhered to and based on the SAHRA's approval.

Recommendations:

- Site-specific recommendations for sites within the development footprint include:
    - **Iron Age Site BV001 and BV002**
      Phase 2 archaeological mitigation that will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.
    - **Stone Age findspots BV003, BV004, BV005**
      Sufficiently recorded in this report no further mitigation required.
    - **BV006**
      Avoid the site with a 30 m buffer; alternatively surface sampling adhering to legislative requirements prior to application for a destruction permit.
- BV007 alludes to more subsurface artefacts in the powerline corridor and all pylon excavations should be monitored by an archaeologist and if any artefacts are uncovered these should be recorded and described.
- Heritage walk-down of the final development footprint prior to construction, including Portion 2 of the Farm Balkfontein No. 224 that was added to the study area after the initial survey;
- Recorded features outside of the project footprint should be monitored by the ECO to ensure that project activities do not inadvertently encroach on heritage sites;
- Monitoring of the Project area by the ECO during pre-construction and construction phases for heritage chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9.

- After the field work the development footprint was amended slightly to include Portion 2 of the Farm Balkfontein No. 224 (as indicated in Figure 1.3), this area will have to be subjected to a heritage walkdown prior to development.

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 (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.
Signature	
Date	07/08/2023

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 has 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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ABBREVIATIONS

ASAPA	Association of South African Professional Archaeologists
BGG	Burial Ground and Graves
CFPs	Chance Find Procedures
CMP	Conservation Management Plan
CoGHSTA	Co-operative Governance, Human Settlements and Traditional Affairs
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
NCHM	National Cultural History Museum
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 the historic period
The Iron Age	~ AD 400 to 1840
Historic	~ AD 1840 to 1950
Historic building	Over 60 years old

1 Introduction

Blue Crane Environmental (Pty) Ltd appointed Beyond Heritage to conduct a Heritage Impact Assessment (HIA) for the construction of a photovoltaic (PV) solar energy facility (known as Bothaville Solar) located on the Remaining Extent of Farm Balkfontein No. 224; Portion 3 and 10 of Farm Balkfontein No. 224; Portion 2 of the Farm Balkfontein No. 224 and Farm Balkfontein No. 1213 approximately 11 km southwest of Bothaville in the Free State Province. The development area is situated within the Nala Local Municipality within the Lejweleputswa District Municipality (Figures 1.1 to 1.4). After the initial survey the study area was amended to include Portion 2 of the Farm Balkfontein No.224 and the additional area is indicated in Figure 1.3. The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) for the development and informs the scoping phase of this process.

The aim of the study was to survey the proposed development footprint to understand the cultural layering of the area, and if heritage features are found, to assess their importance within local, provincial, and national context. It further served to assess the impact of the proposed Project on non-renewable heritage resources. The study will 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. Recommendations are included to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999) (NHRA).

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, stone packed enclosures, isolated stone tools, two high density Stone Age sites, a burial site, and a broken-down farmstead were recorded in the study area. General site conditions and features in the study area were recorded by means of photographs, GPS locations and descriptions. Possible impacts were identified, and mitigation measures are proposed in this report.
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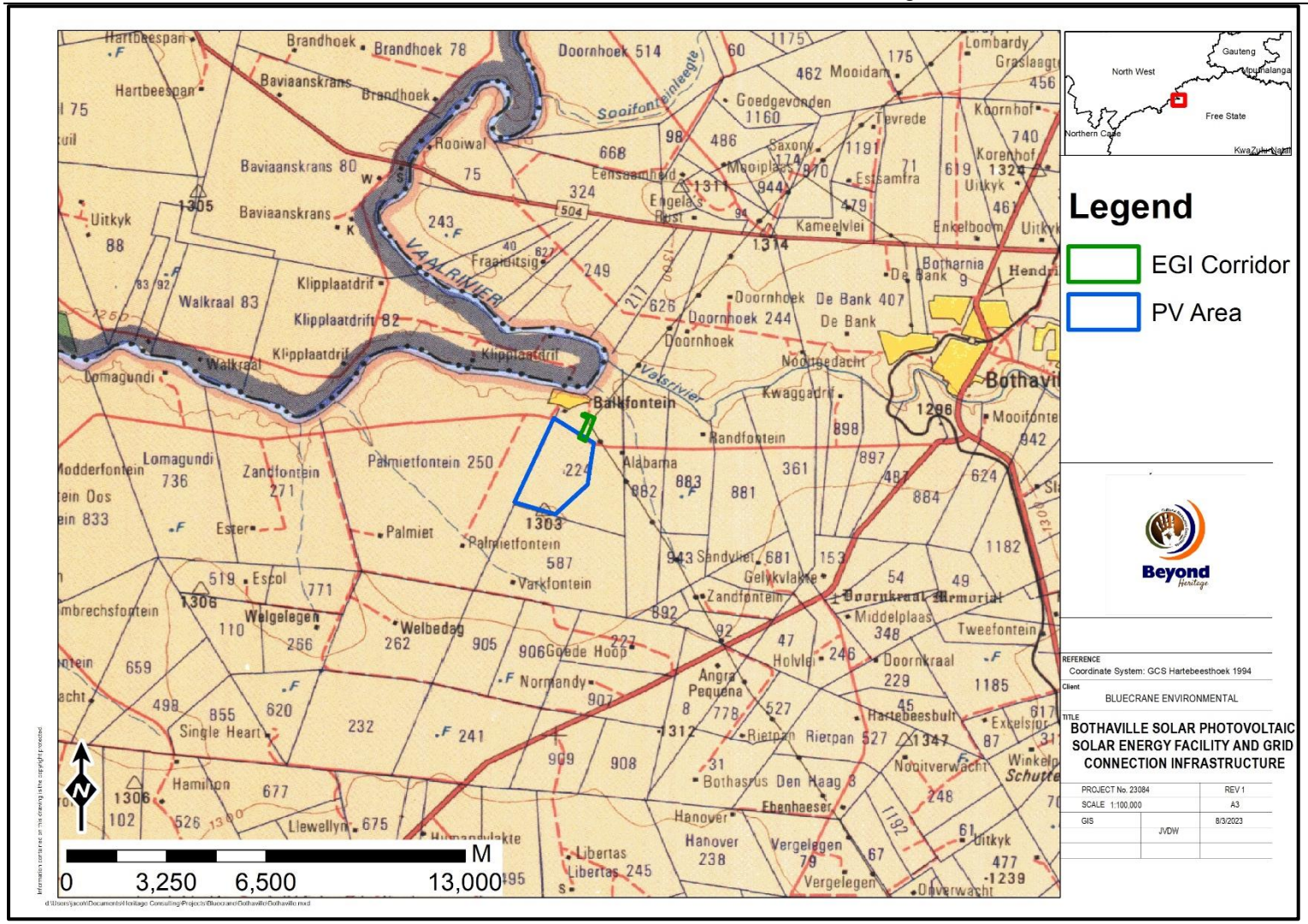


Figure 1.1. Regional setting of the Project (2726 1: 250 000 topographical map).

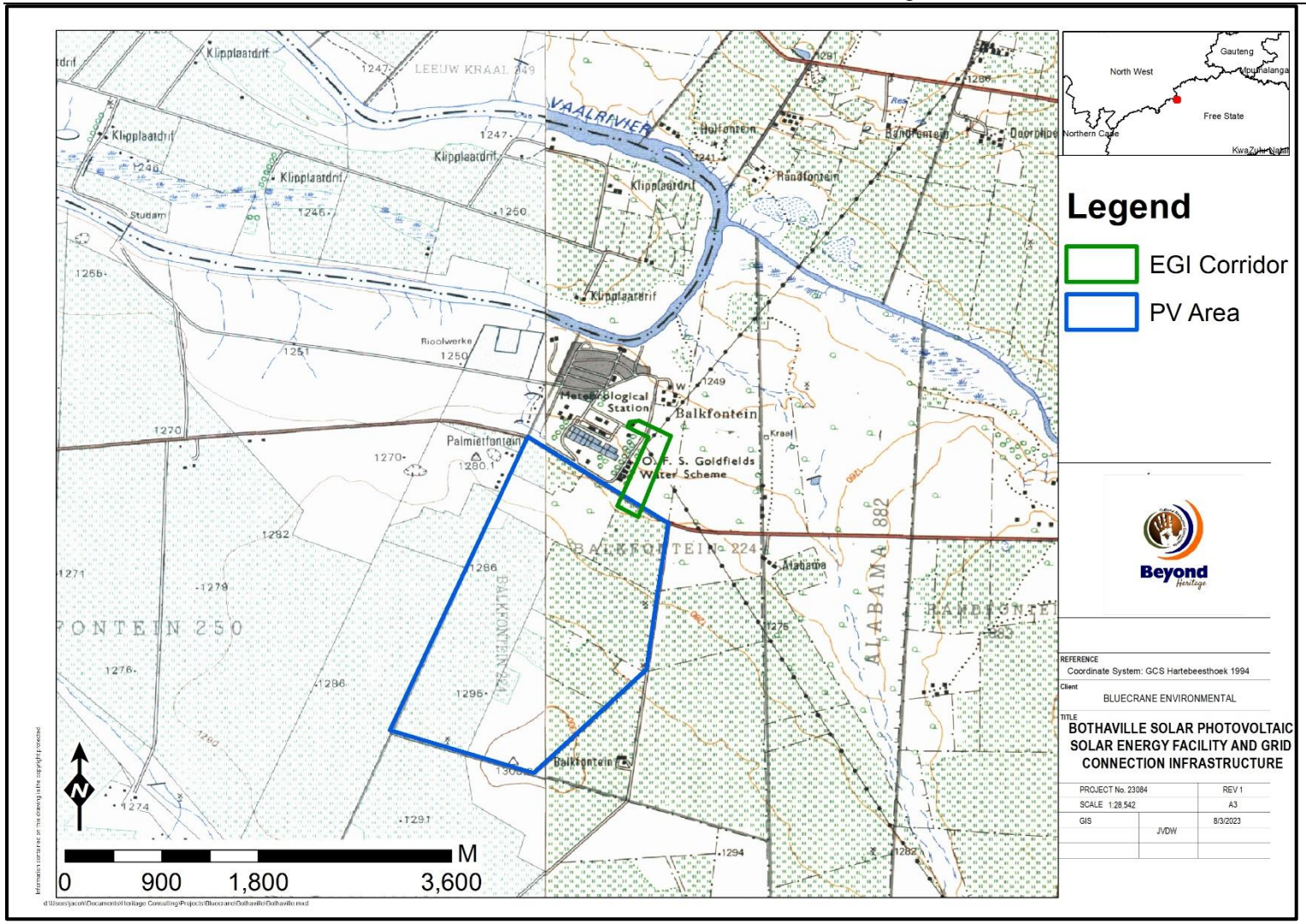
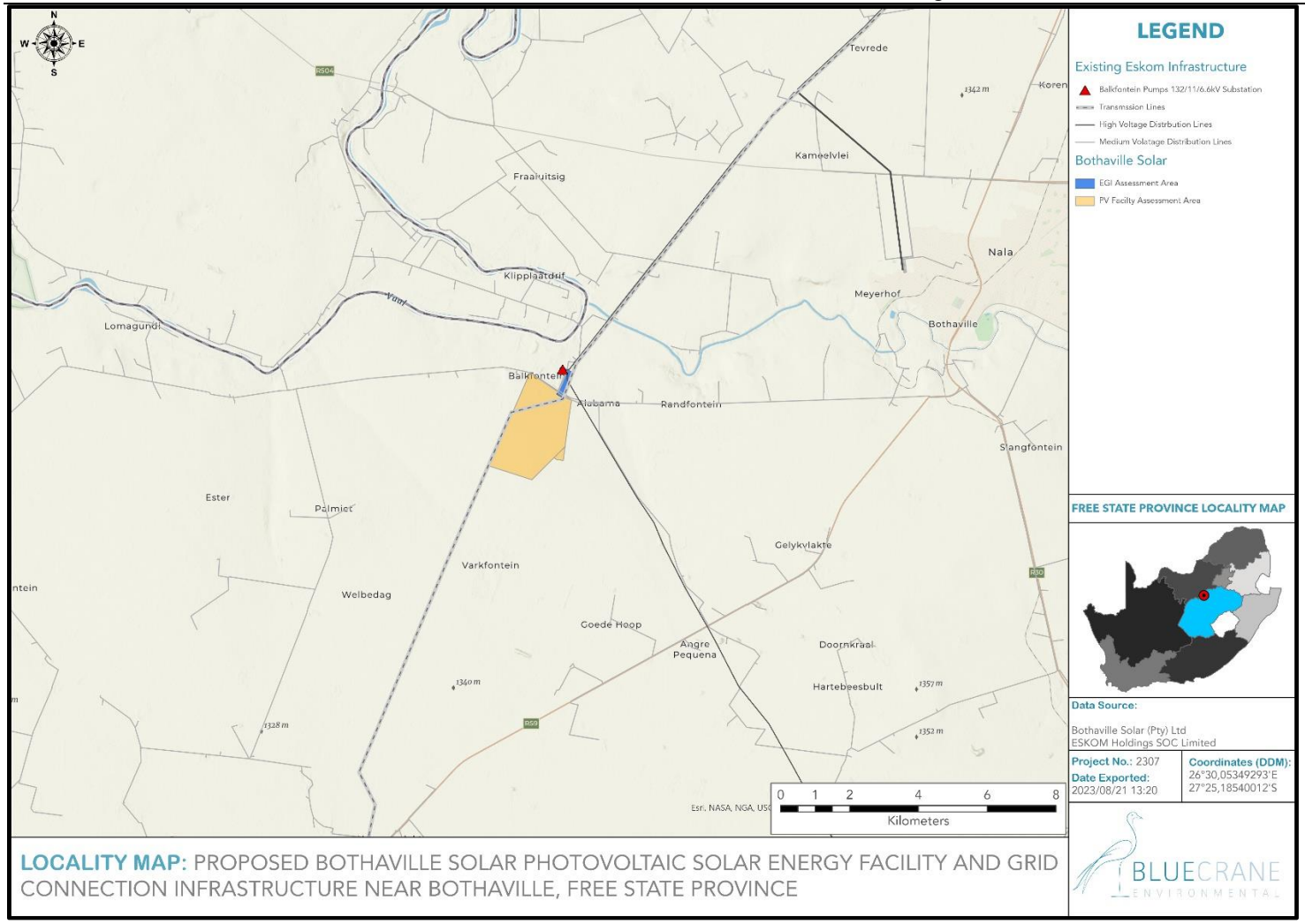


Figure 1.2. Local setting of the Project (2726AD & BC 1: 50 000 topographical map).



- Figure 1.3. Locality map of the study area, as provided by Blue Crane Environmental (including Portion 2 of the Farm Balkfontein No. 224)

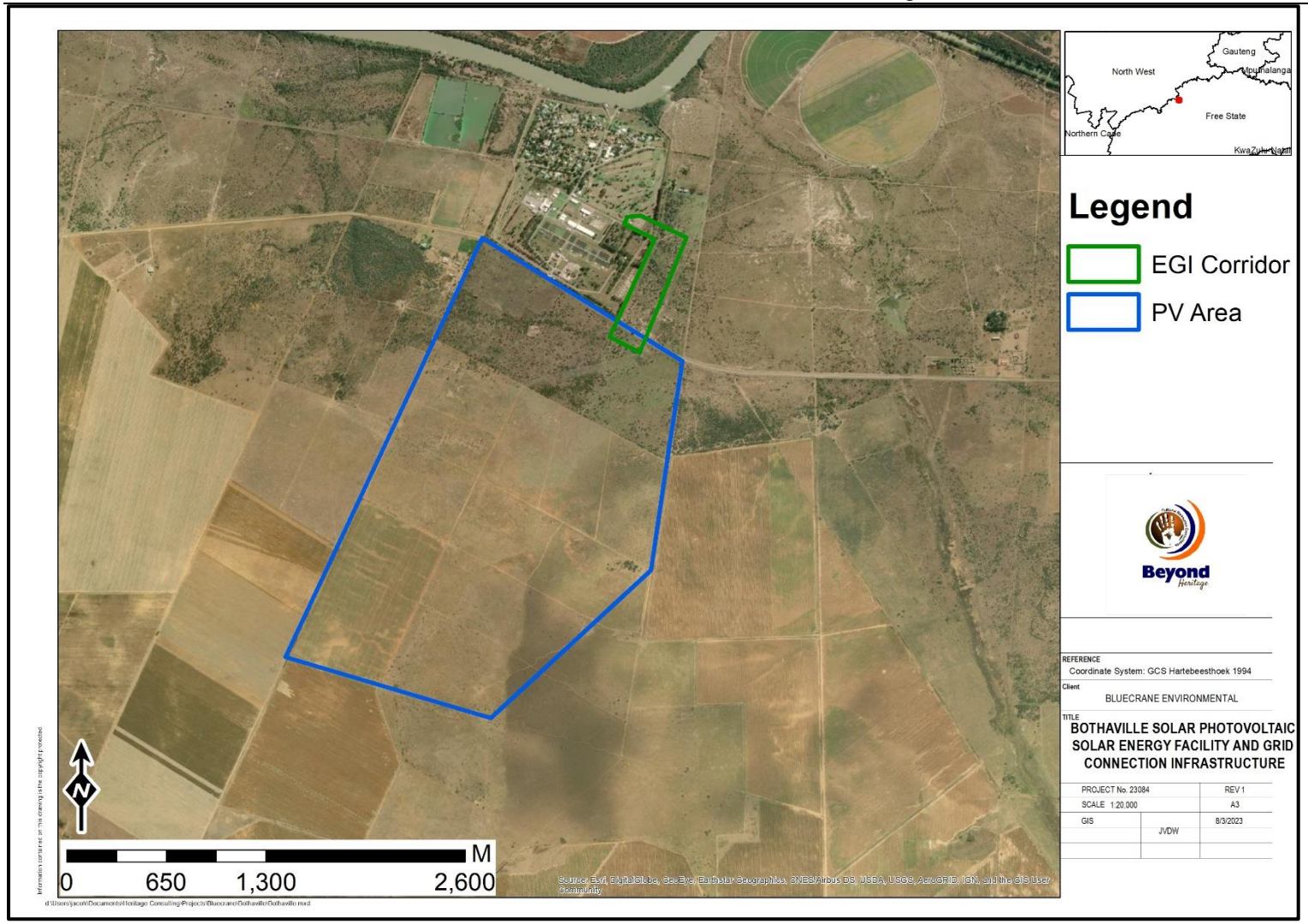


Figure 1.4. Aerial image of the Project area and surrounds (*Google Earth 2023*).

1.1 Terms of Reference

The following Terms of Reference were adhered to in conducting this HIA.

Field study

Conduct a field study to: (a) survey the development footprint to understand the heritage character of the impact area; 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 Association of South African Professional Archaeologists (ASAPA).

Recommendations are provided 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 Bothaville Solar Project are outlined in Tables 2 and 3.

Table 2: Project Description

Magisterial District	Nala Local Municipality within the Lejweleputswa District Municipality
Central co-ordinate of the development	27°25'22.07"S & 26°29'56.66"E
1:50 000 Topographic Map Number	2726AD & BC

Table 3: Infrastructure and project activities

Type of development	Photovoltaic (PV) Solar Facility
Description of affected farm portions	Solar PV Facility: • Remaining Extent of Farm Balkfontein No. 224 • Portion 2 of the Farm Balkfontein No. 224 • Portion 3 of Farm Balkfontein No. 224 • Portion 10 of Farm Balkfontein No. 224 Grid Connection Infrastructure: • Remaining Extent of Farm Balkfontein No. 224 • Farm Balkfontein No. 1213 Access Road: Remaining Extent of Farm Balkfontein No. 224
Generation capacity	Up to 100 MW
Area of the PV Array	To be confirmed once the development footprint is available. Will be located within the 425 ha development area (excluding linear components).
Structure orientation	Monofacial or Bifacial PV panels will be utilised. The panels will either be fixed to a single-axis and/or double horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun. PV panels with single axis tracking is preferred over fixed-axis or double axis tracking systems due to the potential to achieve higher annual energy yields whilst minimising the balance of system (BOS) costs, resulting in the lowest levelized cost of energy (LCOE). The development of the PV facility will take into consideration during the final design phase the use of either tracker vs fixed-tilt mounting structures. Both options are considered feasible for the site.
Structure Height	• Panels up to 5.5 m

	• Buildings up to 12 m • Power line up to 32 m • Fencing up to 3.5 m
Area of the Battery Storage	Within a 5-ha area or spread out within the facility next to the inverters. The infrastructure will be located within the development footprint. Lithium-ion or other solid-state battery technology proposed for implementation.
Capacity of the Battery Storage	Unspecified. To be confirmed prior to construction activity.
Area of the facility substation, switching station and collector substation	• Facility substation: up to 1 ha • Switching Station (Eskom): up to 1 ha
Capacity of the facility substation, switching station and collector substation	• Facility substation: up to 132 kV • Switching Station (Eskom): up to 132 kV
Laydown area dimensions	Temporary laydown areas will occupy up to 5 hectares while 1 hectare will remain in place for the permanent laydown area as required for facility operation.
Area occupied by buildings	An area of up to 1.5 ha will be occupied by buildings which will include (but not limited to) a 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control centre.
Width of internal roads	Up to 10 m wide
Length of internal roads	Up to 33 km in total

1.3 Alternatives

The following details were provided for the project:

Table 4. Alternatives for the project.

Alternatives considered	Description of the Alternative relating to the development
Site specific and Layout Alternatives	One preferred site / development area has been identified for the development of Bothaville Solar PV facility and grid infrastructure based on specific site characteristics such as the solar resource, land availability, topographical characteristics and environmental features. The development area of 425 ha (excluding linear components) is

	considered to be sufficient for the development of a solar facility with a contracted capacity of up to 100 MW.
Activity Alternatives	Only the development of a renewable energy facility is considered by Bothaville Solar (Pty) Ltd. Due to the location of the site / development area and the suitability of the solar resource, only the development of a solar PV facility is considered feasible considering the natural resources available to the area and the current land-use activities undertaken within the site (i.e., agricultural activities).
Technology Alternatives	Only the development of a photovoltaic solar facility is considered due to the characteristics of the site, including the natural resources available.
Grid Connection Alternatives	In order to evacuate the generated electricity into the national grid, the Applicant, Bothaville Solar (Pty) Ltd, proposes the construction of a 132 kV overhead powerline which will connect directly into the existing Eskom Balkfontein Pumps Substation. A 1 km long and 200 m wide grid corridor has been identified for assessment. The final grid route will be based on feedback provided by the Eskom Grid Access Unit as the process advances.
'Do-nothing Alternative	The option to not construct the Bothaville Solar PV facility and grid connection infrastructure. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within or within the surrounding areas of the site. The opportunities associated with the development of the solar facility for the Bothaville area will however not be made available.

2 Legislative Requirements

The HIA, as a specialist study to 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;
- 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 The South African Heritage Resources Agency (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.

SAHRA as a commenting authority under section 38(8) of the NHRA require all environmental documents, compiled in support of an EA application as defined by the National Environmental Management Act (NEMA) (Act No 107 of 1998) to be submitted to SAHRA for commenting. Environmental Impact Assessment (EIA) Regulations section 40 (1) and (2). The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended) 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).

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 HIAs 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 (refer to Section 3.5). Relevant conservation or mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

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

Conservation or 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 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 of the National Heritage Resources Act (NHRA), as well as the National Health Act of 2003 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) re-instituted by Proclamation 109 of 17 June 1994 and implemented by CoGHSTA as well as the National Health Act 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 and background study

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). Findings are included in Section 6.1 and 6.2.

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 topographic maps of the area were utilised to identify possible places of heritage sensitivity might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society of South Africa (GSSA) was consulted to collect data on any known graves in the area. Results are included in Section 6.3.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EIA 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 process undertaken by the EAP was to capture and address any issues raised by community members and other stakeholders. Results are included in Section 5 and the final EIA report.

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 area and to 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 recorded in the Project area.

Table 5: Site Investigation Details

	Site Investigation
Date	26 July 2023
Season	Winter – The time of year and season had a limited effect on the results of the survey since some areas were being ploughed and not accessible. Much of the study area is marked by dense grass cover after the rainy season that limited archaeological visibility. The Project area was however sufficiently covered to understand the heritage character of the area (Figure 3.1).

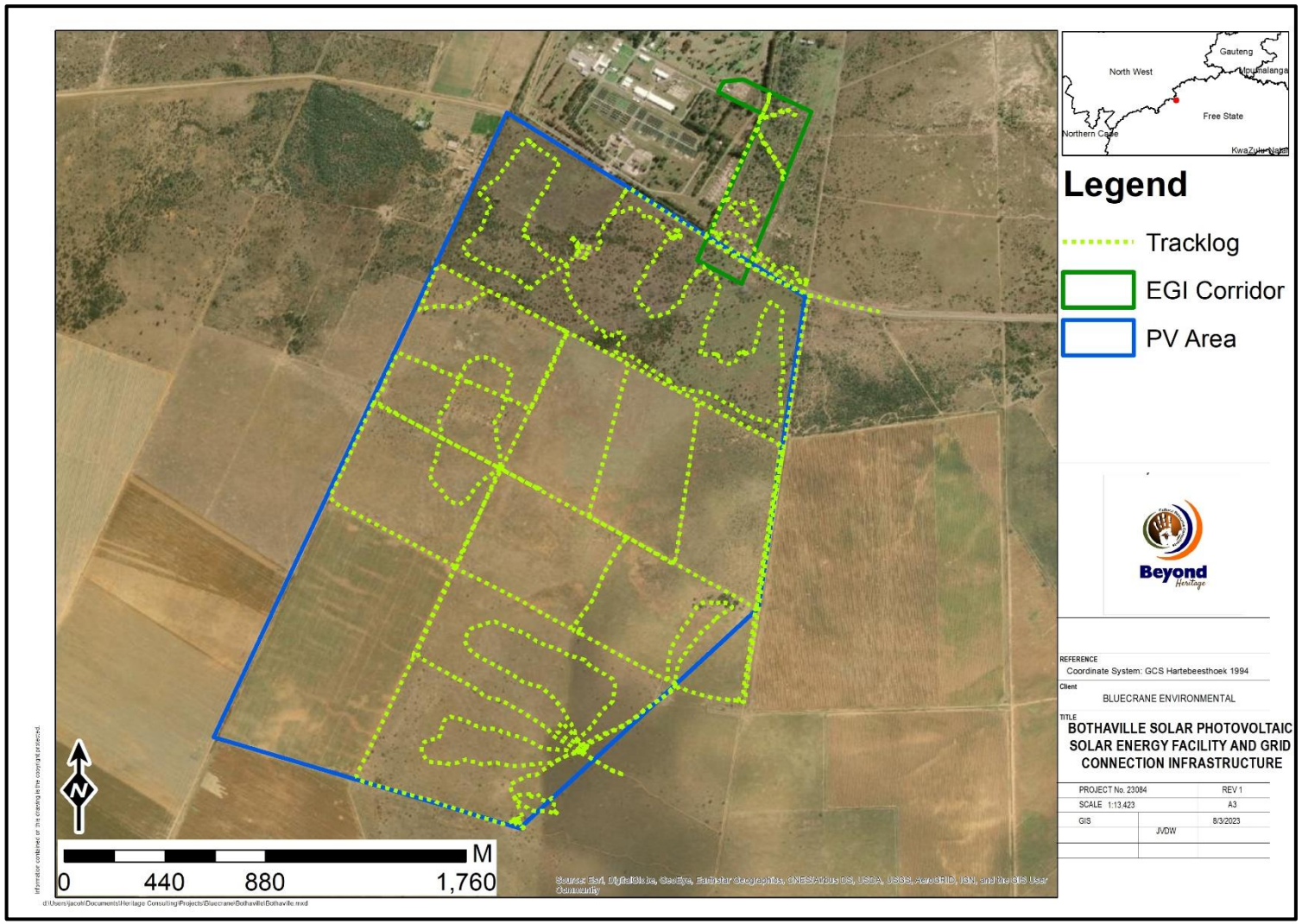


Figure 3.1. Tracklog of the survey path in green. Open areas were being ploughed and not surveyed.

3.5 Site Significance and Field Rating

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 to Heritage Resources is assigned based on the guidelines provided by the SAHRA Minimum Standards for Heritage Specialist Studies in terms of Section 38 of the National Heritage Resources Act (No. 25 of 1999) (2016). The Field-Rating of a feature is a product of the Cultural Significance and Integrity of the feature. Where Cultural Significance is based on the rating from criteria in section 3 of the NHRA and the integrity of the resource is discussed in terms of preservation issues, weathering, erosion etc.

Field Ratings for the resources(s) are included to comply with section 7(2) and 38(3)b of the NHRA, as detailed and described below and in Table 5:

a. **Proposed Field Rating I National Resource**: This resource is considered to be of Field Rating **I** (mention must be made of any relevant international ranking), a protected buffer zone must be proposed/noted (if not in place already), these resources must be maintained *in situ* and a CMP must be recommended for the *in situ* conservation of the site;

b. **Proposed Field Rating II**: This resource is considered to be of Field Rating **II**, a protected buffer zone must be considered, these resources must be maintained *in situ* and a CMP must be recommended for the *in-situ* conservation of the resource;

c. Proposed Field Rating IIIA Local Resource: The resource must be retained as part of the heritage register (High significance) and so mitigation as part of the development process is not advised, a protected buffer zone must be considered, these resources must be maintained *in situ* and a CMP must be recommended for the *in-situ* conservation of the resource;

d. **Proposed Field Rating IIIB Local Resource**: This resource could be mitigated and (partly) retained as part of the heritage register (High/Medium significance), Mitigation of these resources must be subject to a formal permit application process lodged with the relevant heritage resources authority;

e. **Proposed Field Rating IIIC Local Resource**: These are resources that have been assigned a Low-Medium/Low field rating which, once adequately described, may be granted authorisation for destruction outside of the formal permitting process at the discretion of the relevant heritage authority, (*with regard to section 38(8) cases, this will be subject to the granting of the Environmental Authorisation*).

Table 6. Field Rating and Cultural Significance

Field Rating	Integrity	No information yield, completely degraded	- Degraded to the extent that little meaning can be derived	Preserved to some extent	Well preserved	Excellent preservation
Cultural Significance	Negligible	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource
	Low	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource
	Low – Medium	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource	IIIC Local Resource
	Medium	**Rating IIIB Local Resource**	**Rating IIIB Local Resource**	Rating IIIB Local Resource	Rating IIIB Local Resource	Rating IIIB Local Resource
	Medium High	**Rating IIIB Local Resource**	**Rating IIIB Local Resource**	Rating IIIB Local Resource	Rating IIIB Local Resource	Rating IIIB Local Resource
	High	**Rating IIIB Local Resource**	**Rating IIIB Local Resource**	**IIIA Local Resource**	**IIIA Local Resource**	**IIIA Local Resource**

3.6 Impact Assessment Methodology

The Impact Assessment Methodology was provided by Blue Crane Environmental (Pty) Ltd.

The environmental impact assessment aims to identify the various possible environmental impacts that could result from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Impact assessment must take into account the nature, scale, and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the Project phases:

- planning
- construction
- operation
- decommissioning

NATURE		
Include a brief description of the impact of the environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.

3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

3	High	Impact affects the continued viability of the system/ component, and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible, rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible, and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

3.7 Assumptions and limitations of the study

- The authors acknowledge that the brief literature review is not exhaustive of the literature of the area.
- Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. This limitation is successfully mitigated with the implementation of a Chance Find Procedure (CFP) and monitoring of the study area by the Environmental Control Officer (ECO).
- This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys.
- After completion of the initial site survey the study area was changes resulting in a small area that was not covered during field work. This area should be subjected to a heritage walkdown prior to development;
- This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components will be highlighted through the public consultation process if relevant. This process is facilitated by the EAP and if not done this can be considered a significant limitation and as a potential Project risk. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 Description of Socio-Economic Environment

According to StatsSA "*According to Census 2011, Nala Local Municipality has a total population of 81 220, of which 91,3% are black African, 5,8% are white, with the other population groups making up the remaining 2,9%*

Of those aged 20 years and older, 7,4% have completed primary school, 34,7% have some secondary education, 22,2% have completed matric and 5,6% have some form of higher education.

There are 26 611 economically active (employed or unemployed but looking for work) people, and of these 35,9% are unemployed. Of the 12 357 economically active youth (15–35 years) in the area, 47,6% are unemployed."

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5 Results of Public Consultation and Stakeholder Engagement:

In line with the NHRA, stakeholder engagement is a key component of any EA process, it involves stakeholders interested in, or affected by the proposed development. At the time of writing no heritage concerns have been raised. EIA site notices were placed near the main entrance of the Project area. Wimpie Badenhorst (083 441 0228) and Ludiek Prinsloo (082 659 2046), the farm owners were consulted regarding any possible graves situated within the project area. Ludiek Prinsloo noted that two graves were located near the powerline corridor across the road towards the substation. The farm foreman working for Wimpie also advised about some packed stone structures situated near the southern boundary of the Project area.

6 Contextualising the study area

6.1 Archaeological Background

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

The Vaal Gravels are known to contain Early and Middle Stone Age Artefacts (van Riet Lowe 1937, 1952; Butzer et al. 1973; Helgren 1978; Gibbon, et al. 2009). Some important ESA sites providing background to the larger study area are included below:

Site Name	Period	Source
Pneil	Acheulean	Beaumont & Morris 1990
Power's Site	Acheulean	Power 1955; Beaumont & Morris 1990
Riverview Estate	Acheulean	van Riet Lowe 1945; Helgren 1978

Van Schalkwyk (2013), identified cores and tools of the Fauresmith industry near the Vaal River, approximately 30km north of the project area.

Some Rock Engraving sites are also on record around the greater study area including the rock engraving site of Leeuwkuil. Hollmann (1999) described the sites as being located on a small island in the Vaal River. Engravings are concentrated on the south-eastern part of the peninsula.

The images are dominated by Eland and other antelope, which appeared to be in the San hunter-gatherer engraving tradition (Hollmann, 1999). Pistorius (2007) discusses the Redan rock engraving site which contains up to 244 rock engravings. These engravings depict animals, geometric designs as well as San weapons (Du Piesani 2014).

6.1.2 Iron Age

The archaeology of farming communities of southern Africa encompasses three phases. The Early Iron Age (200-900 CE) represents the arrival of Bantu-speaking farmers in southern Africa. Living in sedentary settlements often located next to rivers, these farmers cultivated sorghum, beans, cowpeas, and kept livestock. The Middle Iron Age (900-1300 CE) is mostly confined to the Limpopo Valley in southern Africa with Mapungubwe Hill probably representing the earliest 'state' in this region (Huffman 2007). There are no Early Iron Age sites on record for this region and Iron Age occupation only occurred from the Late Iron Age.

The Late Iron Age (1300-1840s CE) marks the arrival and spread of ancestral Eastern Bantu-speaking Nguni and Sotho-Tswana communities into southern Africa. The location of Late Iron Age settlements is usually on or near hilltops for defensive purposes. The Late Iron Age as an archaeological period ended by 1840 CE, when the Mfecane caused major socio-political disruptions in southern Africa (Huffman 2007). The area mainly saw expansive Later Iron Age communities which settled the region with early Tswana people occupying the region. Research on settlement patterns found that the area between Bothaville and Doornberg have a distinct settlement pattern, labelled as Type Z settlement sites (Maggs 1972). Extensive stone walled enclosures were recorded and large complexes up to 2km were recorded. Analysis of aerial photography of the sites found the placement of the enclosures to encapsulate that of a composite flower (Maggs 1972). Type Z settlements are comprised of group of primary circular enclosures in the centre with thickened walls on their entrances. The dwellings are then arranged around the primary enclosures. Huts were a shape of cone-on-cylinder (Maggs 1976), and the conical roof was made from thatch. Type Z settlements are also classified as bilobial dwellings which are distinguished by the semi-circular courtyards in the front and back which encircle each hut (Maggs 1976).

Comparatively, Type Z settlements of this region bare the most similarity to the settlements is the Rolong and Thlaping (Maggs 1976). It is therefore possible that the Iron Age communities associated with these Type Z settlements had some connection to the Rolong and Thlaping. The Rolong capital of Thabeng is also situated further north of Klerksdorp (White 1977), and is situated just outside the area defined by the Type Z settlement sites.

6.1.3 Historical Period

The Historical period of the area can be traced back to the 1830s to 1840s when Voortrekkers crossed over the Vaal River and began establishing farms within the greater region (Bergh 1999). Theunis Louis Botha

purchased the farm Botharnia and the town of Bothaville was established on the farm in 1893 and was named after him (Raper 2004). In 1914, Bothaville received municipal status. In 1918, a Dutch Reformed Church which was designed by architect Gerard Moerdyk, was built in Bothaville. The church was built from sandstone and the church was declared as a Provincial Heritage Site in 1983.

6.1.4 Anglo-Boer War

A British troop under the command of Major-General Knox had reached Bothaville while on pursuit of the Boers. Other troops led by Colonel de Lille and Colonel la Gallais who also reached Bothaville. Before dawn on November 6th 1900, Colonel le Gallais and Major Lean led their troops and came across a Boer camp by Doornkraal. The British launched an ambush on the Boer commando and the Boers who could find a horse managed to escape, while the others stayed and armed themselves and took shelter. Amongst the Boer commando were General De Wet and the Free State President Marthinus Steyn who had managed to escape the battle by horseback. The battle only lasted a few hours when the Boers who had remained surrendered to the British. Around 25 Boer soldiers were killed during the battle while the British took the remaining Boers prisoner along with their weapons. Thirteen British men were killed at the Battle of Doornkraal, of those, three were officers were killed including Colonel le Galais (Nöthling 1983). Although the battle marked a big loss for the Boers, the British were unsuccessful in capturing General De Wet and President Steyn.
The Battle of Doornkraal monument was unveiled on 13 April 1938 to commemorate the battle and those who died (Nöthling 1983). The monument is situated approximately 8km east of the project area, situated next to the R59. The site was declared a Provincial Heritage Site in 1993.

6.2 Literature Review (SAHRIS)

Several Cultural Resource Management (CRM) surveys are on record for the area e.g., Dreyer (2007; 2013), Daya (2018), can Schalkwyk (2003; 2013), Rossouw (2023), de Bruyn (2018). The relevant results of these studies are briefly discussed below and outlined in Table 6.

Surveys conducted in the area in which the Project area sits, found no heritage resources. A survey conducted directly east of the Project area for prospecting rights covered approximately 6 829.27 hectares and no sites were recorded (Daya 2018). 6km north of the project area, near the River banks also found no heritage resources (Dreyer 2007).

One of the closest recorded finds is situated approximately 30km north of the Project area whereby a low-density stone tool scatter associated with the Fauresmith industry with core pieces and tools were identified (van Schalkwyk 2013). Multiple old farm labourer homesteads were also found. An informal burial site with approximately 15 graves was also found on the farm. The graves had no headstones and were only marked with stone cairns.

The Project area has multiple rocky outcrops throughout and is in close proximity to the Vaal River. These focal points make the likeliness of archaeological sites higher as these features are preferable for occupation.

Table 7. Selected studies consulted for this project.

Author	Year	Project	Findings
Dreyer, C.	2007	First Phase Archaeological and Historical Investigation of the Proposed Residential Developments on the Farm Kransdrift 243, Bothaville, Free State.	No sites were identified.
Dreyer, C.	2013	Letter of Recommendation for the Exemption from a First Phase Archaeological & Heritage Investigation of the Proposed Ethanol Fuel Plant at Bothaville, Free State	No sites were identified.
Daya, J.	2018	Specialist Report: Heritage Impact Assessment for the Prospecting Right and Environmental Authorisation of the Proposed Western Margin Gap West Project, Bothaville, Free State Province, South Africa.	No sites were identified.
Van Schalkwyk, J.A.	2003	Mercury-Perseus 400 kV Transmission Line, Cultural Heritage Resources.	No sites were identified in the current project area region
Van Schalkwyk, J.A.	2013	Heritage Impact Assessment for the Proposed Development of a Photovoltaic Power Plant on a Portion of the Farm Matjesspruit 145HP, Leeudoringstad Region, North West Province.	Stone Age scatter, multiple old farm labourer homesteads, an informal graveyard.
Rossouw, L.	2023	Construction of a proposed new Gauging Weir in the Vals River near Bothaville, FS Province: Exemption from Phase 1 HIA.	No sites were identified.
De Bruyn, C.	2018	Specialist Report: Heritage Impact Assessment for the amendment of an existing prospecting right and environmental authorization for Bothaville NE Ext A, situated in the Free State Province.	No sites were identified.

6.3 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.

7 Heritage Baseline

7.1 Description of the Physical Environment

The vegetation type and landscape features of the project area form largely part of the Val-Vet Sandy Grassland. It is described as plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall. The northern section as well as the corridor form part of the Highveld Alluvial Vegetation. It is described as flat topography supporting riparian thickets mostly dominated by *Acacia karroo*, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants (Mucina & Rutherford, 2006).

The Project area of ~425ha area is situated about 12km southwest of Bothaville along the R59, 1,5km south of the Vaal River. Most of the Project area is on the southern side of the road and consists of large open grassland with red sandy soil. A 90ha portion right against the road seems to be natural and consists of thick, overgrown grasses and scattered thickets of trees that are spread out across the entire 90ha area. Some rocky outcrops are visible along the edge of the road near the northeastern boundary of the Project area. Past excavations and surface disturbances are also visible. This may have been caused by the excavation of gravels for the construction of roads. A large burrow pit is located towards the centre of the Project area.

The rest of the Project area south of this portion consists of large fields that were last ploughed 15 years ago according to the farm foreman. After that time the farm was re-purposed as a hunting farm. The entire area lacks any trees with only one thicket situated towards the eastern boundary.
The area has become overgrown with dense grass cover and some scattered thickets of shrubs. Some rocky outcrops were also seen within the Project area. A large currently ploughed maize field is situated in the southwestern corner of the Project area. This block was locked during the survey and contained freshly harvested maize as well as grazing cattle.

The powerline corridor from the Project area across the road towards the small substation situated north of the Sedibeng water treatment plant near the Sedibeng country club and is largely disturbed. This is due to the large powerlines traversing this area as well as the northwestern corner of the larger PV area. Two separate powerlines are located along the western and eastern boundaries of the corridor. The vegetation between the two powerlines have become extremely overgrown with thickets of thorn trees.

Existing infrastructure includes various small gravel roads that traverses the Project area as well as the large powerlines. General site conditions are indicated in (Figure 7.1 to 7.6).

Figure 7.1. General view of the large open grassland situated across the majority of the Project area - Image taken towards the northern section of the past ploughed fields.

Figure 7.2. Image showing the various gravel roads that were used to access the Project area. Image taken along the eastern boundary of the Project area.

Figure 7.3. Image showing the existing powerlines across the north western corner of the Project area.

Figure 7.4. View of animal burrows showing the deep layer of sand throughout the Project area.

Figure 7.5. This portion in the southwestern portion was locked during the survey.

Figure 7.6. General view of the large burrow pit situated near the centre of the 90ha portion situated against the road.

7.2 Heritage Resources

Heritage observations within the study area include stone packed enclosures dating to the Iron Age, isolated stone tools, two high density Stone Age sites, a burial site, and a broken-down farmstead, and were labelled with the prefix BV (for Bothaville) and number numerically. General site distribution of the recorded observations is illustrated in Figure 7.7 and briefly described in Table 7. Recorded features in relation to the study area are illustrated in Figure 7.7 to 7.31.

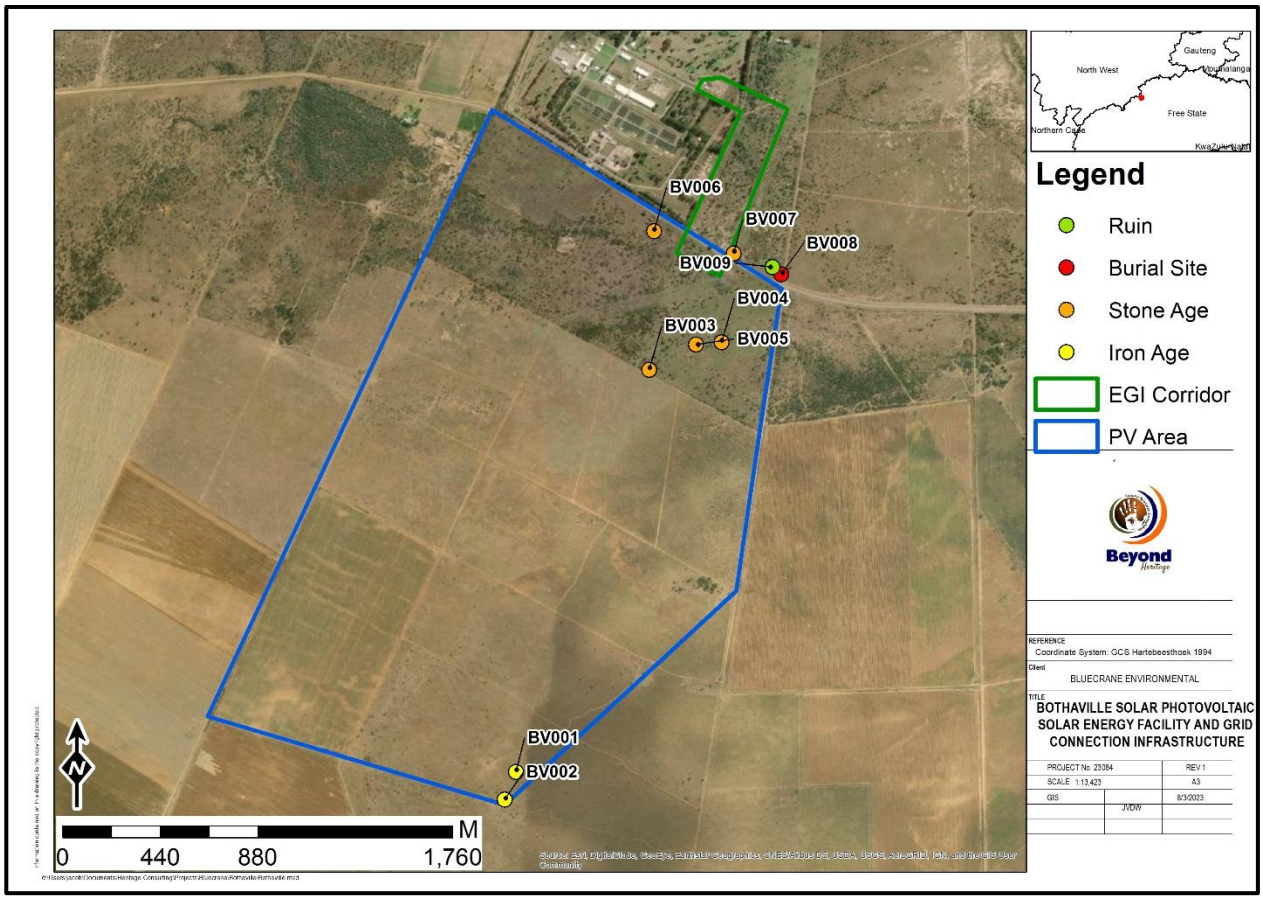

Figure 7.7. Site distribution map.

Table 8. Recorded finds in the study area

Label	Description	Longitude	Latitude	Significance/ Field Rating
BV001	The site is 3 x 3m in size and consists of a small semi-circular/semi-square packed stone feature situated near a rocky outcrop near the southern boundary of the Project area. The feature consists of s small section of packed stone walling that is fairly degraded. The feature seems to have been built with stones gathered from the nearby outcropping. The feature seems to have two straight sides with a rounded third edge creating an irregular shape. No cultural material was recorded but construction of the stone walling with two rows of larger stones that is filled with smaller stones used in the core-and-rubble construction	26°29'57.08"E	27°26'0.11"S	Low to Medium Significance GP IIIB

	technique characteristic of Iron Age settlements (e.g. Walton 1958). The feature may have been part of a small informal structure related to the possible packed stone kraal situated at BV002			
BV002	The site is 30 x 30m in size and consists of Remnants of a large rounded packed stone enclosure. The feature is difficult to assess due to large portions being fairly degraded and partially buried. The feature is a large rounded packed stone feature that resembles a possible kraal. Only the foundations of the packed stone walling can still be seen. No cultural material was recorded but construction of the stone walling with two rows of larger stones that is filled with smaller stones used in the core-and-rubble construction technique characteristic of Iron Age settlements (e.g. Walton 1958).	26°29'55.27"E	27°26'4.48"S	Low to Medium Significance GP IIIB
BV003	Small broken MSA blade with dorsal removal on fine grained raw material exposed by a small cattle trail through the dense grass cover.	26°30'16.47"E	27°25'1.38"S	Low Significance GP IIIC
BV004	Isolated miscellaneous flake made on a course raw material. Identified next to a large animal burrow. The artefact seems to have been excavated out of the animal burrow.	26°30'26.95"E	27°24'57.43"S	Low Significance GP IIIC
BV005	Isolated miscellaneous chunk on raw material located in a cattle trail in the dense grass cover. The artefact is probably characteristic of the MSA.	26°30'23.33"E	27°24'58.07"S	Low Significance GP IIIC
BV006	The site is 2x2 m in size and consist of a dense concentration of MSA lithics. The material is found in a deflated context on top of a rocky substrata with no deposit. Artefacts consist of chunks, cores, blades pointed flakes and could relate to a knapping site. Raw material used for knapping is fine grained and could be Crypto Crystalline Silica (CCS). The artefact ratio of the site is >20 artefacts p.m²	26°30'17.32"E	27°24'41.48"S	Medium Significance GP IIIA
BV007	The site is 10 x 10m in size and consists of a high concentration of MSA lithic artefacts, located under an existing powerline. The artefacts are exposed through surface disturbance related to the construction of the powerline and powerline pylons. Raw material used for the knapping process differs from the raw material used at BV006 and is highly patinated, and therefore not possible to classify. A high proportion of blades, blade blanks, side scrapers with the occasional core was noted here. It is highly likely that more artefacts are located beneath the surface. The artefact ratio of the site is >20 artefacts p.m²	26°30'28.86"E	27°24'44.32"S	Medium Significance GP IIIB

BV008	The site is 20 x 10m in size and consists of a small burial site situated about 230m east of the proposed corridor near the R59. The burial site consists of two visible graves that have granite headstones and covers. These two graves seem to be older, and more packed stone graves with the granite having been added later. The remnants of the original packed stone covers can still be seen scattered throughout the area. Other features nearby resemble degraded and partially buried graves. More graves are likely located within the area. The remnants of a wire fence are visible around the burial site. The site is located **outside** of the Project area.	26°30'35.78"E	27°24'47.37"S	High Significance GP IIIA
BV009	The site is 80 x 80m in size and consists of a small informal, degraded, and broken-down farmstead situated about 150 m east of the corridor towards the small substation. The site includes various remnants of small structures and building rubble scattered around a small area. Red clay bricks with the stamped inscription 'Pretoria' are scattered on the site. These bricks are associated with the Pretoria Portland Cement factory and could date to around the 1900's. Two water reservoirs as well as a broken wind pump were also situated near the site. The graves marked BV008 area is also situated about 50 m east of this location and may be related.	26°30'34.48"E	27°24'46.67"S	Low Significance GP IIIC

Figure 7.8. General view of the small, stone packed feature at BV001 - Image facing east.

Figure 7.9. View of a section of stone packed walling at BV001.

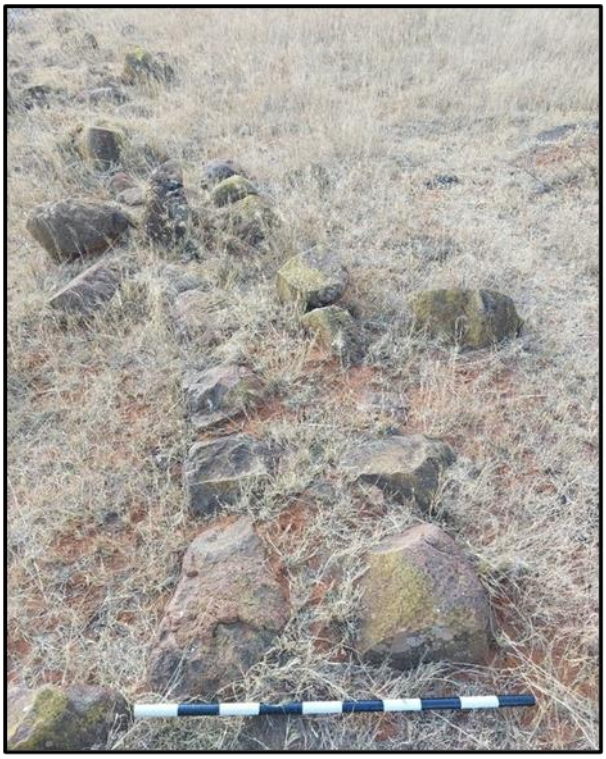

Figure 7.10. Image showing the rounded shape and construction method of walling at BV002.

. Figure 7.11. Small broken lithic artefact at BV003

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Figure 7.12. Isolated lithic at BV004 found in the soft excavated soil next to an animal burrow.

Figure 7.13. Isolated MSA Lithic artefact at BV005.

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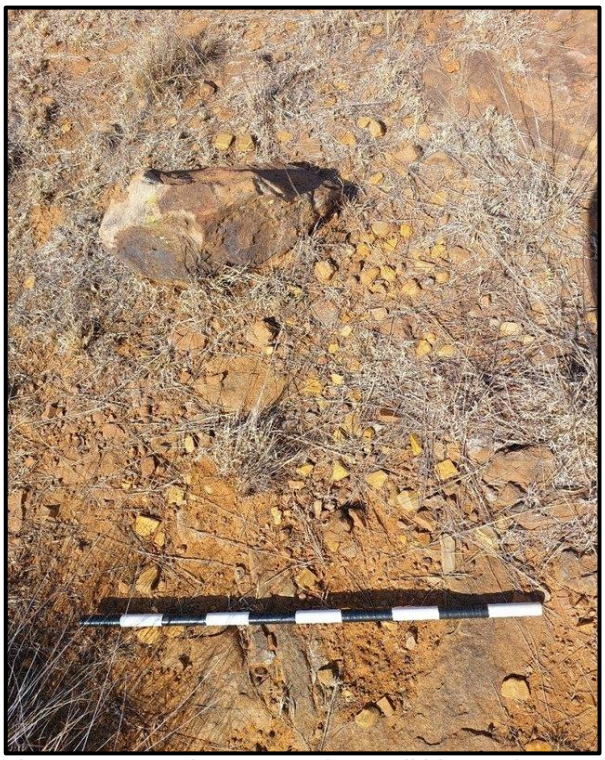


Figure 7.14. Main scatter of MSA lithic artefacts at BV006.

Figure 7.15. General view of the surrounding environment of BV006.

Figure 7.16. Artefacts at BV006.

Figure 7.17. Artefacts at BV006.

Figure 7.18. View of the disturbed soil with various lithic artefacts at BV007.

Figure 7.19. Artefacts at BV007.

Figure 7.20. General view of the burial site at BV008.

Figure 7.21. Grave at BV008 with granite headstone, skirting and gravel fill.

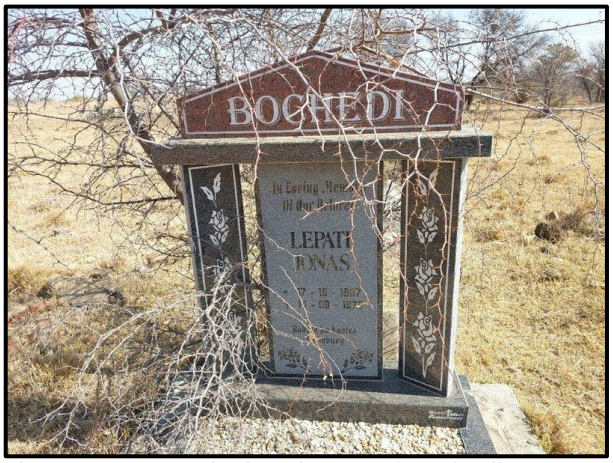


Figure 7.22. Granite headstone of Bochedi 1970 at BV008.

Figure 7.23. Remnants of the older grave stone and covers still visible behind the newer grave stone at BV008.

Figure 7.24. Possible third grave at BV008 located nearby.

Figure 7.25. Upright stone, possibly the remnants of another grave nearby at BV008.

Figure 7.26. Packed bricks, possibly the grave dressing of another grave situated nearby at BV008.

Figure 7.27. General view of the small burial site BV008 - image taken from the southern side. – Image showing the remnants of a small fence.

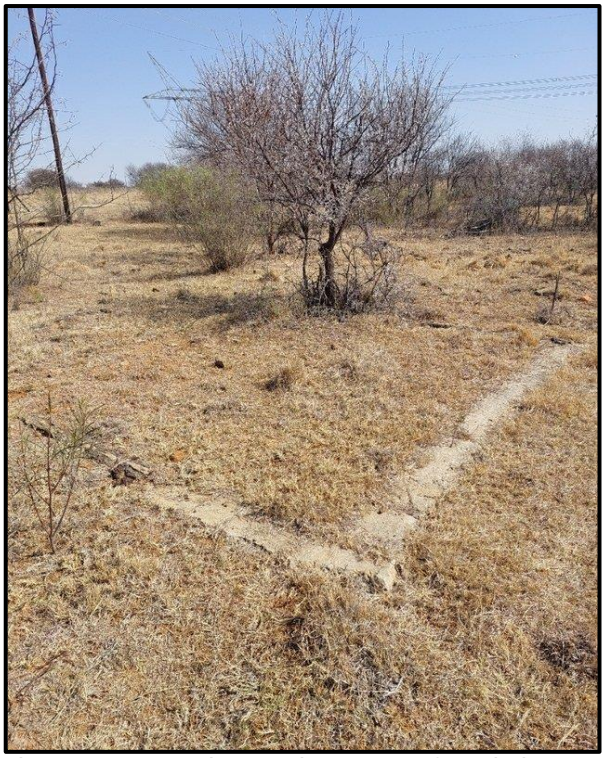


Figure 7.28. Ephemeral cement foundation at BV009 – The feature is totally demolished.

Figure 7.29. Remains of a rectangular structure at BV009.

Figure 7.30. Building rubble at BV009 with fire clay brick with an inscription ‘Pretoria’.

Figure 7.31. Water reservoirs and a wind pump near BV009.

7.3 Cultural Landscape

The Project area is in a vast, open landscape, dotted with the remnants of historical farming and to this day the greater area is characterised by large scale agricultural activities (Figure 7.32 to 7.35).

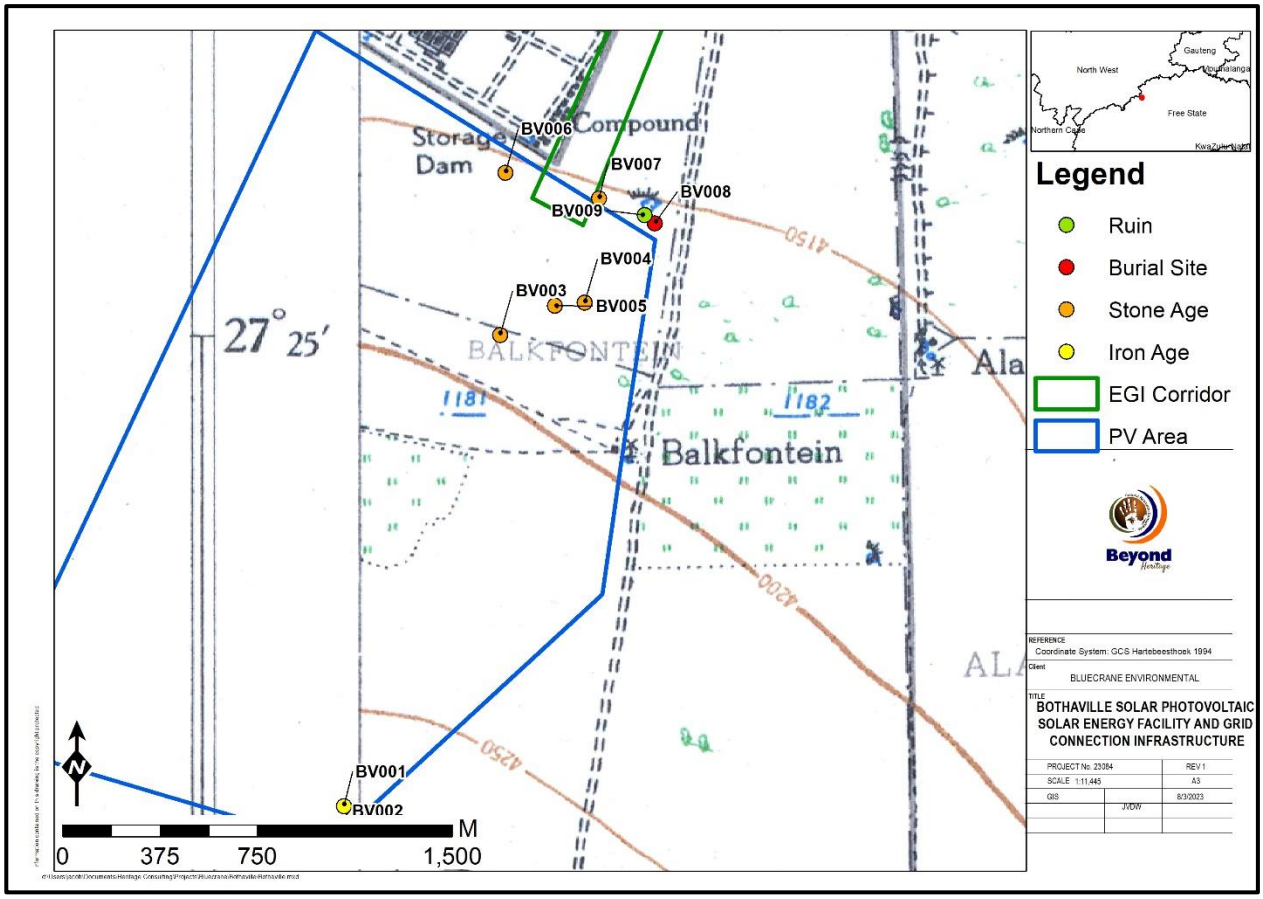


Figure 7.32. Extract of the 1947 Topographic map (1: 50 000) of the eastern section indicating a structure along the eastern boundary of the Project area. An area of cultivation is also indicated within the Project area.

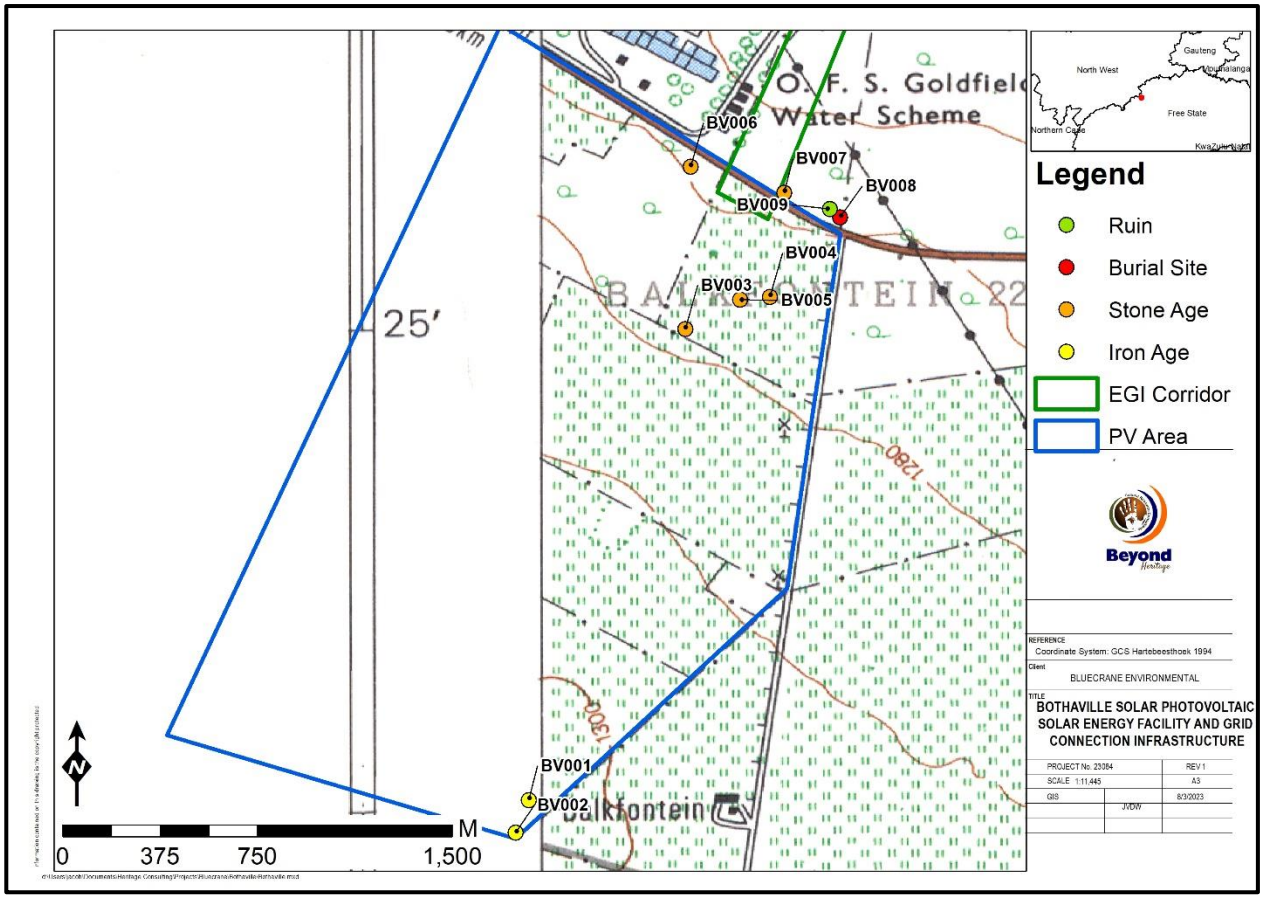


Figure 7.33. Extract of the 1975 Topographic map (1: 50 000) indicating largescale cultivation of the Project area and surrounding area. A road is also indicated along the northern boundary of the Project are with a powerline situated nearby. The structure previously indicated is no longer present.

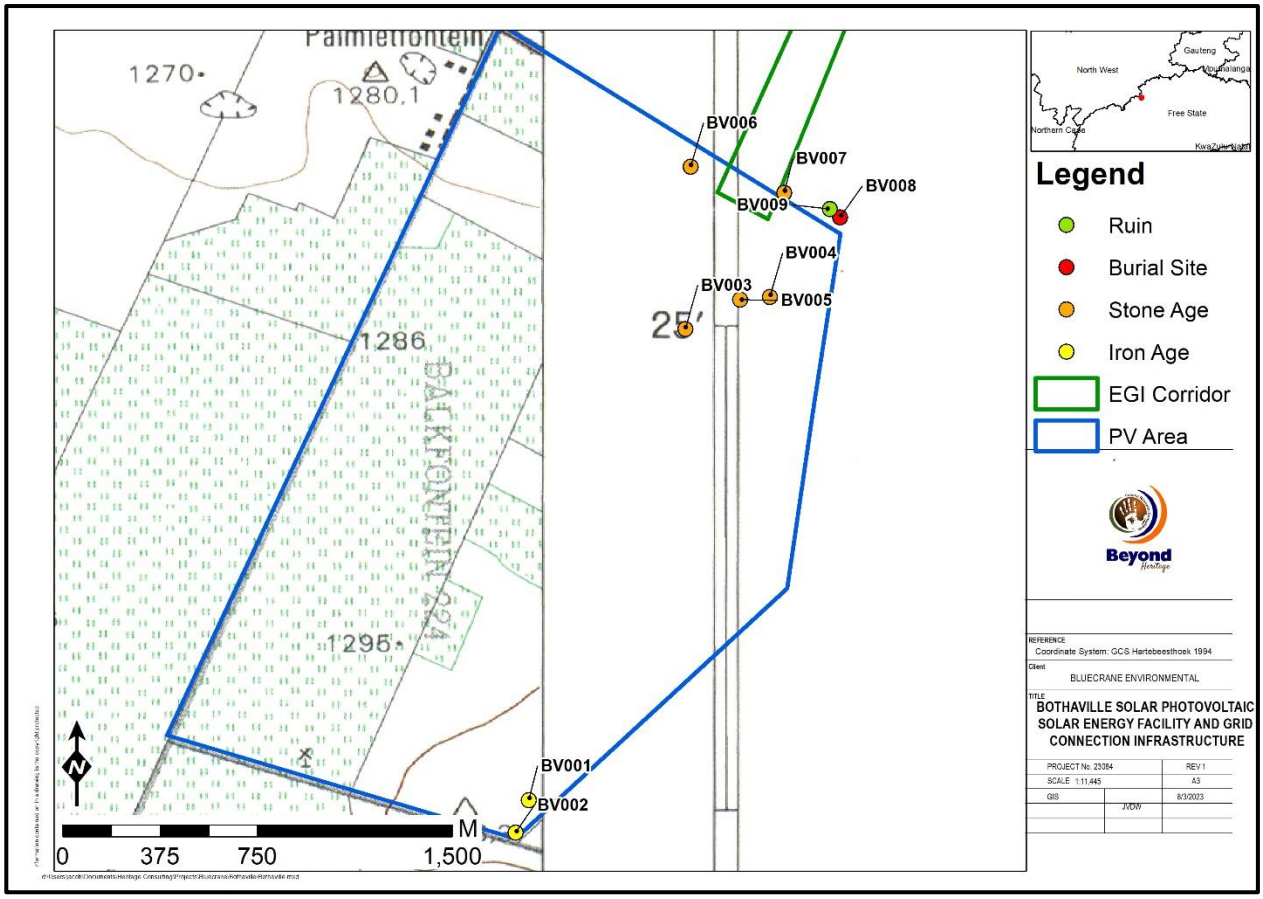


Figure 7.34. Extract of the 1986 Topographic map (1: 50 000) of the western side indicating expansive cultivation within the Project area and surrounding area.

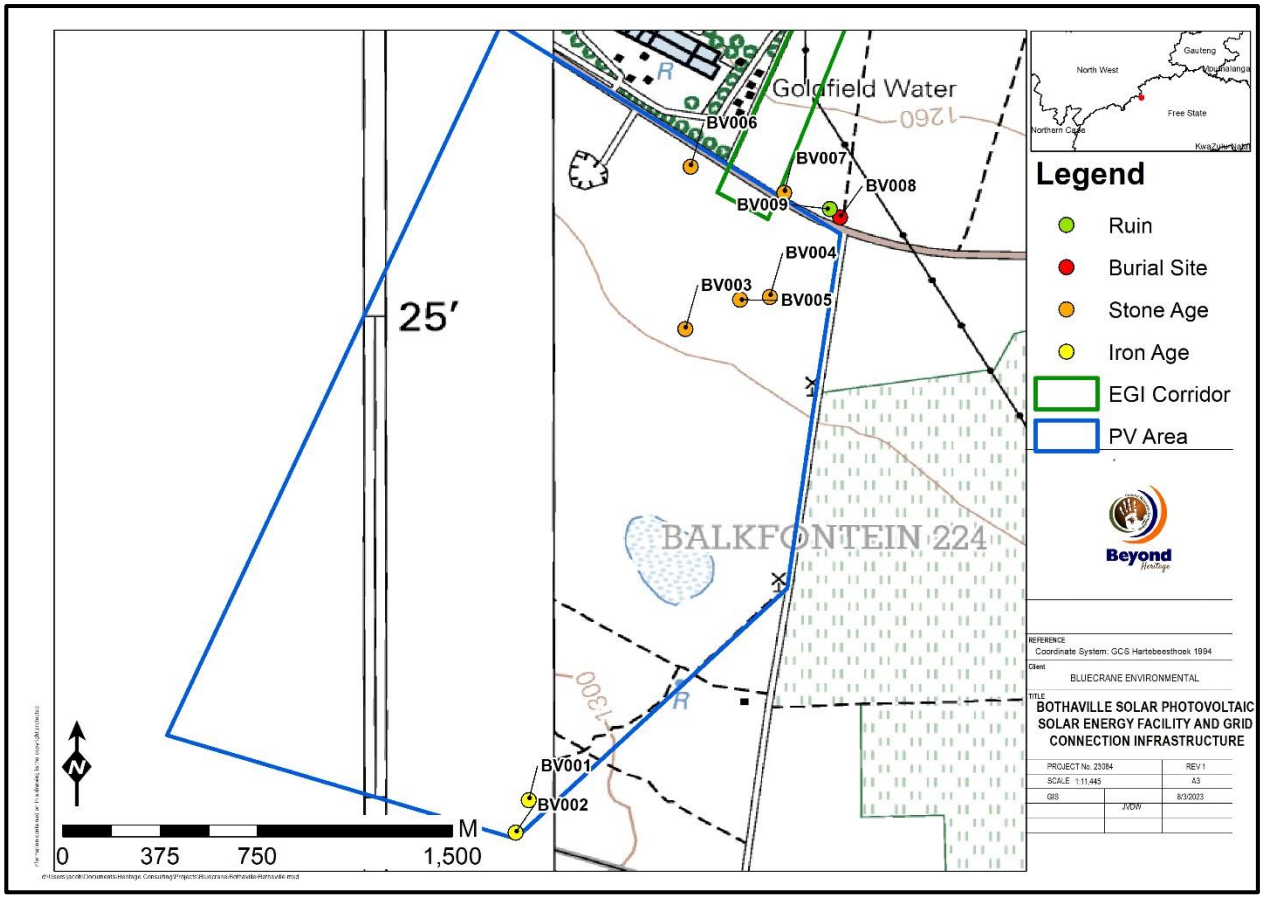
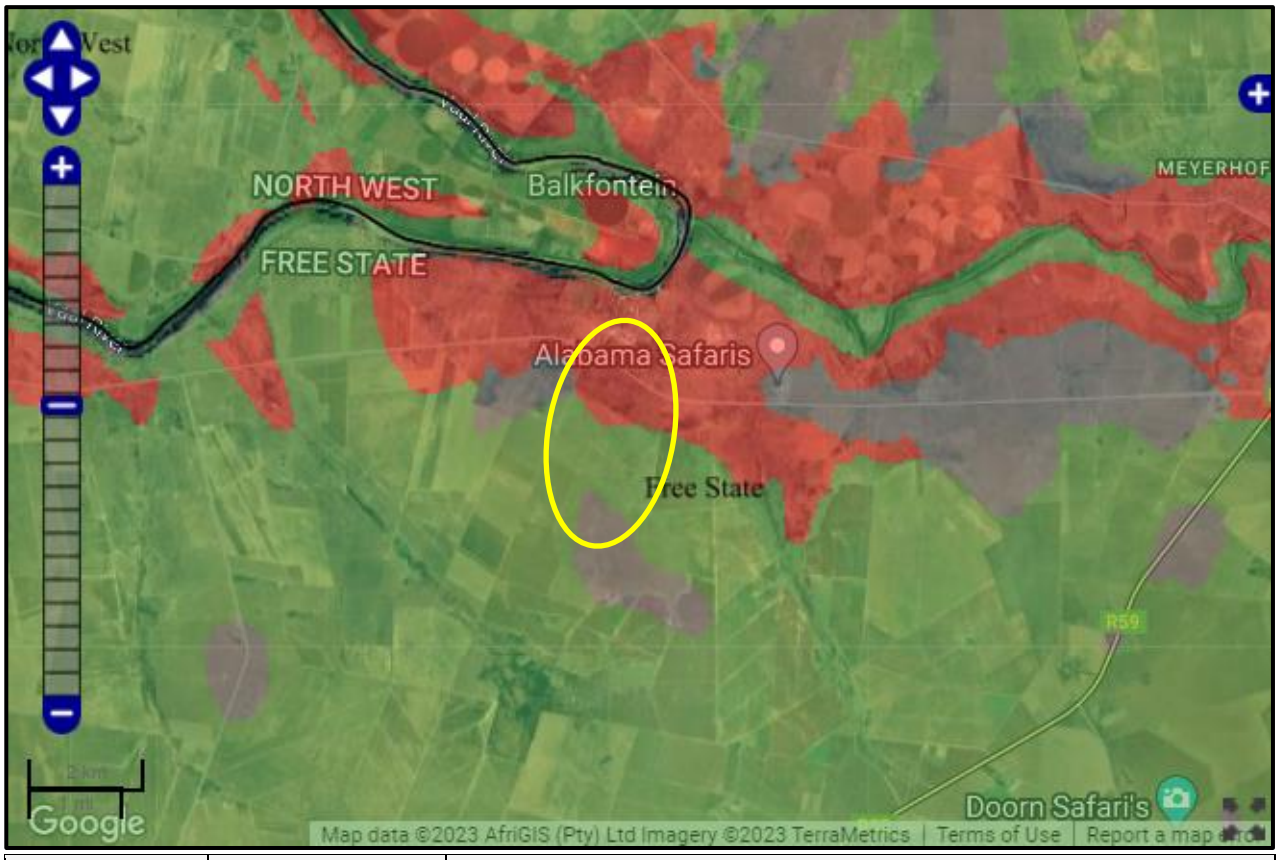


Figure 7.35. Extract of the 2008 Topographic map (1: 50 000) of the eastern side indicating an area of excavation in the Project area.

7.4 Paleontological Heritage

According to the SAHRA palaeontological sensitivity map, the study area is indicated as of varying palaeontological sensitivity of insignificant, moderate and very high (Figure 7.36). An independent study was conducted for this aspect by Bamford (2023). The study concluded that the northern part of the Project and the grid connection lie on the very highly sensitive Vryheid Formation (Ecca Group, Karoo Supergroup) and the rest on moderately sensitive Quaternary sands and alluvium. The site visit and walk through in late July 2023 (winter) by palaeontologists confirmed that NO FOSSILS of any kind are present on the ground surface of the Project footprint. Since it is not known what lies below the surface, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, developer, environmental officer, or other designated responsible person once excavations for foundations and infrastructure have commenced. Since the impact will be negative low pre-mitigation and positive low post-mitigation, as far as the palaeontology is concerned, the Project should be authorised. There are no no-go areas and no cumulative impact.



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

8 Assessment of impacts

8.1 Impacts on tangible heritage resources.

The main cause of impacts to heritage resources is physical disturbance of the cultural 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 in the construction phase.

- Establishment of new roads and upgrade of existing roads;
- Earthworks for temporary infrastructure including laydown areas;
- Visual impact of the PV Facility and powerlines on the landscape and sense of place;
- Excavation and levelling of the PV facility footprint;
- Trenches for cables and erection of powerlines;
- Influx of people into the area;
- Excavations during construction of the sub stations.

Expected impacts to recorded features are illustrated in Figure 8.1 and 8.2 and site specific recommended mitigation measures are described in Table 8.

Table 9. Impacts and recommended mitigation measures.

Label	Description	Impact	Mitigation	Significance/ Field Rating
BV001	Small semi-circular/semi-square packed stone packed feature situated near a rocky outcrop near the southern boundary of the Project area.	Direct impact	Avoidance of the site with a 30 m buffer zone or alternatively Phase 2 archaeological mitigation that will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.	Low to Medium Significance GP IIIB
BV002	Remnants of a large rounded packed stone enclosure.	Direct impact	Avoidance of the site with a 30 m buffer zone or alternatively Phase 2 archaeological mitigation that will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.	Low to Medium Significance GP IIIB
BV003	Small broken MSA blade	Direct impact	Sufficiently recorded in this report no further mitigation required.	Low Significance GP IIIC
BV004	Isolated miscellaneous flake	Direct impact	Sufficiently recorded in this report no further mitigation required.	Low Significance GP IIIC
BV005	Isolated miscellaneous chunk	Direct impact	Sufficiently recorded in this report no further mitigation required.	Low Significance GP IIIC
BV006	The site is 2x2 m in size and consist of a dense concentration of MSA lithics.	Direct impact	Avoid the site with a 30 m buffer; alternatively surface sampling adhering to legislative requirements prior to application for a destruction permit.	Medium Significance GP IIIA

BV007	The site is 10 x 10m in size and consists of a high concentration of MSA lithic artefacts, located under an existing powerline.	No direct impact	Indicate on development plans and avoid. The site alludes to more subsurface artefacts in the powerline corridor and all pylon excavations should be monitored and if any artefacts are uncovered these should be recorded and described.	Medium Significance GP IIIB
BV008	Cemetery	No direct impact	Indicate on development plans and avoid. Monitoring of the site by the ECO.	High Significance GP IIIA
BV009	The site is 80 x 80m in size and consists of a small informal, degraded, and broken-down farmstead	No direct impact	Indicate on development plans and avoid. Monitoring of the site by the ECO	Low Significance GP IIIC

8.1.1 Cumulative impacts

The cumulative impact of the Project area can be mitigated to an acceptable level with the implementation of the mitigation measures in this report.

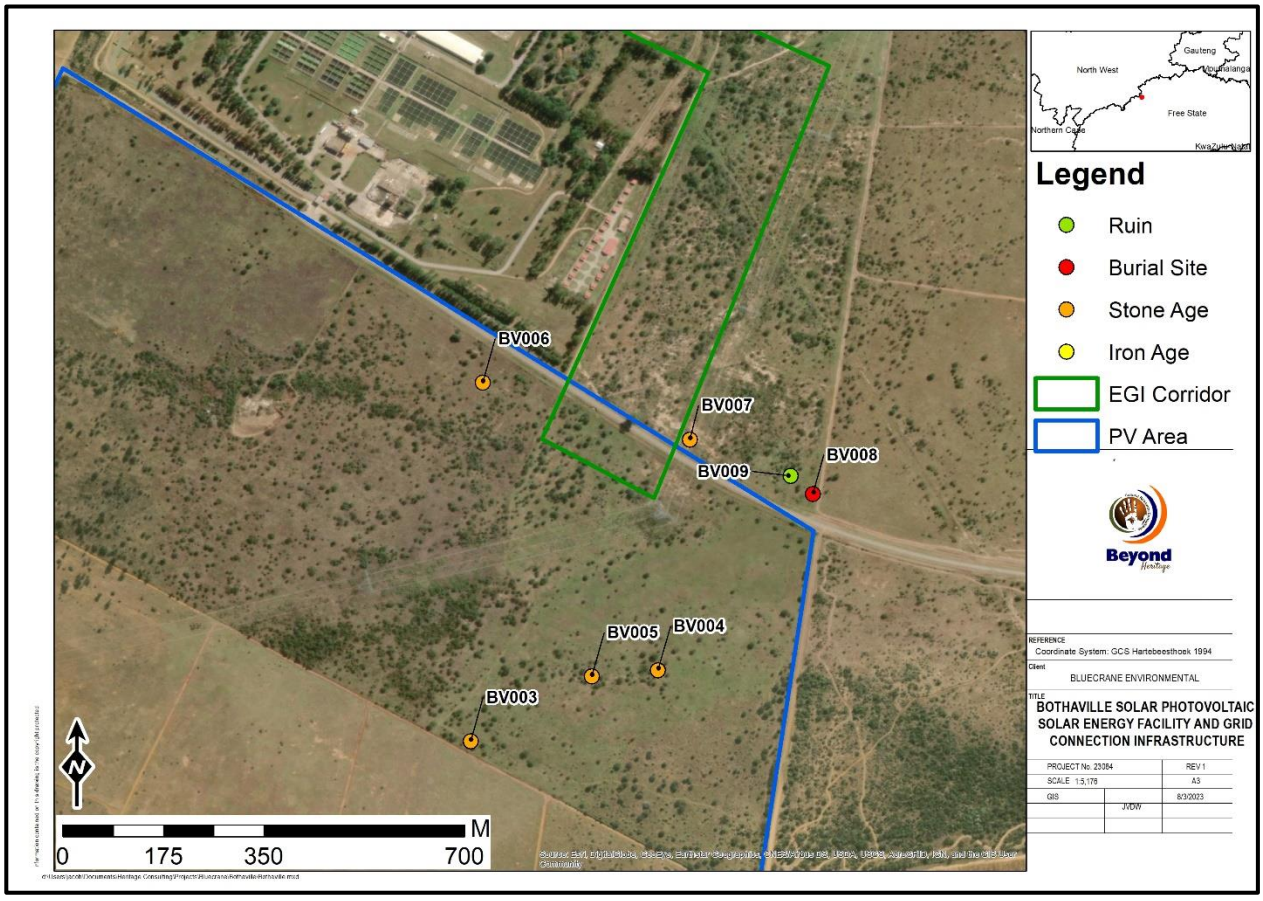


Figure 8.1. Observation points in relation to the Project lay out.

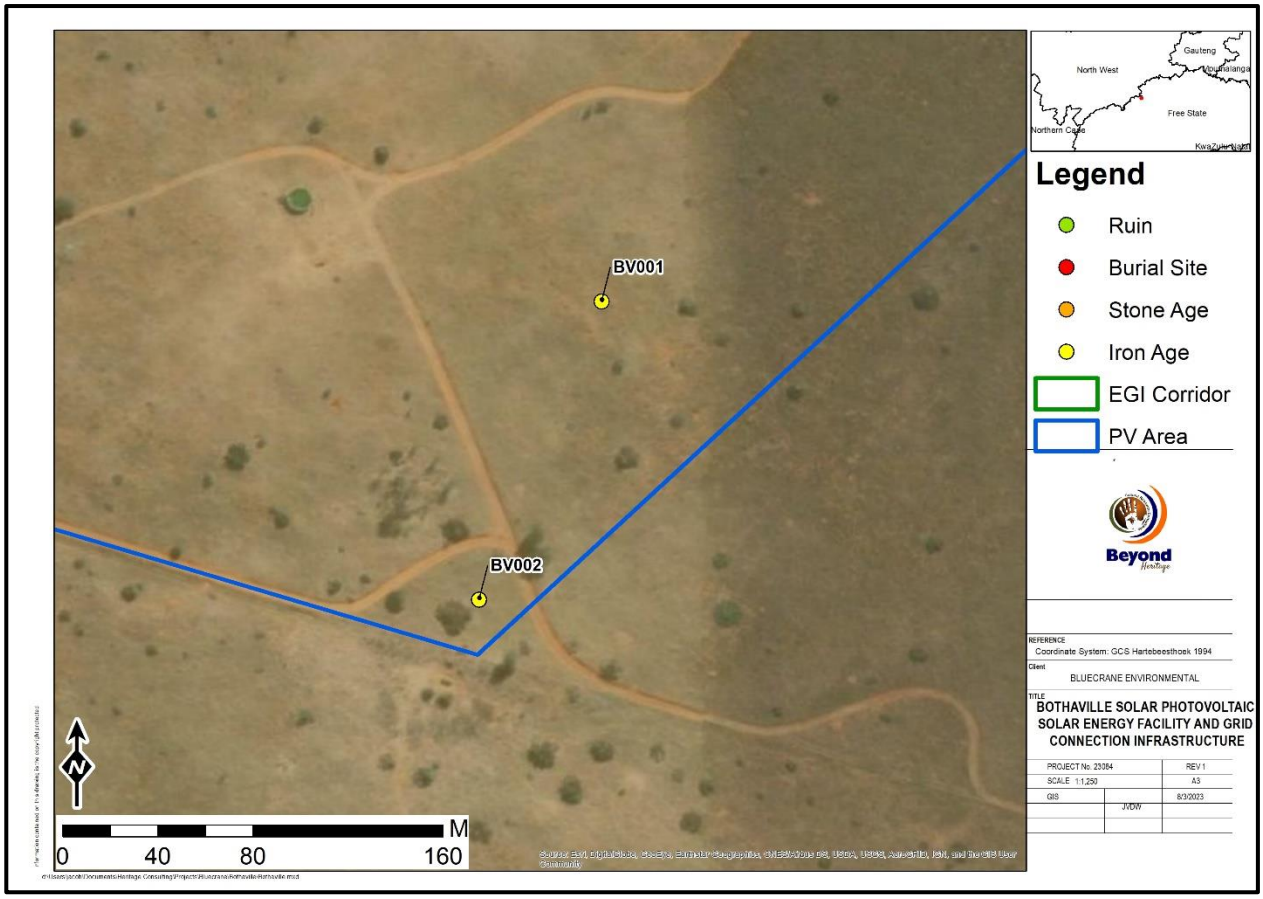


Figure 8.2. Observation points in relation to the Project lay out.

8.2 Impact Assessment Tables

Table 10. Impact assessment for the construction phase of the Project.

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable ?	Proposed Mitigation Measures
Impacts on stone enclosures BV001, BV002	Before mitigation	Negative	2	2	3	3	4	2	2	32	Medium (29-50)	Yes	Yes	Avoidance of the site with a 30 m buffer zone or alternatively Phase 2 archaeological mitigation that will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			
Impacts on isolated finds BV003, BV004, BV005	Before mitigation	Negative	1	2	3	3	4	1	1	14	Low (6-28)	Yes	Yes	•Sufficiently recorded in this report no further mitigation required
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			
Impacts on Stone Age Site BV006	Before mitigation	Negative	2	3	3	3	4	2	3	51	High (51-73)	Yes	Yes	• Avoid the site with a 30 m buffer; alternatively surface sampling adhering to legislative requirements prior to application for a destruction permit.
	After mitigation	Negative	2	1	3	3	4	1	2	28	Low (6-28)			
Impacts on Stone Age site BV007 (Accidental damage to site by development activities and expanding of the development).	Before mitigation	Negative	2	2	3	3	4	2	2	32	Medium (29-50)	Yes	Yes	• Indicate on development plans and avoid. The site alludes to more subsurface artefacts in the powerline corridor and all pylon excavations should be monitored and if any artefacts are uncovered these should be recorded and described. • Implementation of a Heritage Chance Find Procedure
	After mitigation	Negative	2	1	3	3	4	1	1	14	Low (6-28)			

Impacts on burial site BV008 (Accidental damage to site by development activities and expanding of the development).	Before mitigation	Negative	2	2	3	4	4	2	3	51	High (51-73)	Yes	Yes	• Indicate on development plans and avoid. Monitoring of the site by the ECO. • Implementation of a Heritage Chance Find Procedure
	After mitigation	Negative	1	1	3	4	4	1	2	28	Low (6-28)			
Impacts on Farmstead BV009 (Accidental damage to site by development activities and expanding of the development).	Before mitigation	Negative	1	2	3	3	4	1	2	28	Low (6-28)	Yes	Yes	• Indicate on development plans and avoid. Monitoring of the site by the ECO.
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			

Table 11. Impact assessment for the operational phase of the Project (at this stage it is unknown whether sites will be avoided or mitigated and impacts remain the same).

Nature of the Impact	**Status**		**Extent**	**Probability**	**Reversibility**	**Irreplaceability**	**Duration**	**Cumulative Effect**	**Magnitude**	**Impact Significance**	**Impact Rating**	**Can impact be mitigated?**	**Is the impact acceptable ?**	**Proposed Mitigation Measures**
Impacts on stone enclosures BV001, BV002	Before mitigation	Negative	2	2	3	3	4	2	2	32	Medium (29-50)	Yes	Yes	Avoidance of the site with a 30 m buffer zone or alternatively Phase 2 archaeological mitigation that will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			
Impacts on isolated finds BV003, BV004, BV005	Before mitigation	Negative	1	2	3	3	4	1	1	14	Low (6-28)	Yes	Yes	•Sufficiently recorded in this report no further mitigation required
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			

Impacts on Stone Age Site BV006	Before mitigation	Negative	2	3	3	3	4	2	3	51	High (51-73)	Yes	Yes	• Avoid the site with a 30 m buffer; alternatively surface sampling adhering to legislative requirements prior to application for a destruction permit.
	After mitigation	Negative	2	1	3	3	4	1	2	28	Low (6-28)			
Impacts on Stone Age site BV007	Before mitigation	Negative	2	2	3	3	4	2	2	32	Medium (29-50)	Yes	Yes	• Indicate on development plans and avoid. The site alludes to more subsurface artefacts in the powerline corridor and all pylon excavations should be monitored and if any artefacts are uncovered these should be recorded and described. • Implementation of a Heritage Chance Find Procedure
	After mitigation	Negative	2	1	3	3	4	1	1	14	Low (6-28)			
Impacts on burial site BV008	Before mitigation	Negative	2	2	3	4	4	2	3	51	High (51-73)	Yes	Yes	• Indicate on development plans and avoid. Monitoring of the site by the ECO. • Implementation of a Heritage Chance Find Procedure
	After mitigation	Negative	1	1	3	4	4	1	2	28	Low (6-28)			
Impacts on Farmstead BV009	Before mitigation	Negative	1	2	3	3	4	1	2	28	Low (6-28)	Yes	Yes	• Indicate on development plans and avoid. Monitoring of the site by the ECO.
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			

Table 12. Impact assessment for the decommissioning phase of the Project (at this stage it is unknown whether sites will be avoided or mitigated and impacts remain the same).

Nature of the Impact	Status	Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable ?	Proposed Mitigation Measures

Impacts on stone enclosures BV001, BV002	Before mitigation	Negative	2	2	3	3	4	2	2	32	Medium (29-50)	Yes	Yes	Avoidance of the site with a 30 m buffer zone or alternatively Phase 2 archaeological mitigation that will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			
Impacts on isolated finds BV003, BV004, BV005	Before mitigation	Negative	1	2	3	3	4	1	1	14	Low (6-28)	Yes	Yes	•Sufficiently recorded in this report no further mitigation required
	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			
Impacts on Stone Age Site BV006	Before mitigation	Negative	2	3	3	3	4	2	3	51	High (51-73)	Yes	Yes	• Avoid the site with a 30 m buffer; alternatively surface sampling adhering to legislative requirements prior to application for a destruction permit.
	After mitigation	Negative	2	1	3	3	4	1	2	28	Low (6-28)			
Impacts on Stone Age site BV007	Before mitigation	Negative	2	2	3	3	4	2	2	32	Medium (29-50)	Yes	Yes	• Indicate on development plans and avoid. The site alludes to more subsurface artefacts in the powerline corridor and all pylon excavations should be monitored and if any artefacts are uncovered these should be recorded and described. • Implementation of a Heritage Chance Find Procedure
	After mitigation	Negative	2	1	3	3	4	1	1	14	Low (6-28)			
Impacts on burial site BV008	Before mitigation	Negative	2	2	3	4	4	2	3	51	High (51-73)	Yes	Yes	• Indicate on development plans and avoid. Monitoring of the site by the ECO. • Implementation of a Heritage Chance Find Procedure
	After mitigation	Negative	1	1	3	4	4	1	2	28	Low (6-28)			

	Before mitigation	Negative	1	2	3	3	4	1	2	28	Low (6-28)	Yes	Yes	• Indicate on development plans and avoid. Monitoring of the site by the ECO.
Impacts on Farmstead BV009	After mitigation	Negative	1	1	3	3	4	1	1	13	Low (6-28)			

Table 13. Impact assessment for the cumulative impacts of the Project (prior to mitigation).

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable ?	Proposed
Destruction/ damage of heritage resources	Impact in isolation	Negative	2	3	3	3	4	2	2	34	Medium (29-50)	Yes	Yes	Implemen recommen to avoid da of heritage ensure the cumulative acceptable
	Cumulative impact	Negative	2	3	3	3	4	2	2	34	Medium (29-50)			

9 Conclusion and recommendations

During the survey Iron Age stone-packed enclosures (BV001 and BV002), isolated Middle Stone Age artefacts (BV003, BV004 and BV005), high density Stone Age scatters (BV006 and BV007) a burial site (BV008), and remnants of a farmstead (BV009) were recorded. BV007, BV008 and BV009 are located outside of the development footprint.

According to the South African Heritage Resource Authority (SAHRA) Paleontological sensitivity map the study area is of insignificant, moderate, and very high sensitivity and an independent study was conducted for this aspect. Bamford (2023) concluded that it is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr.

The impact to heritage resources can be mitigated to an acceptable level provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

9.1 Recommendations for condition of authorisation

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

- Site-specific recommendations for sites within the development footprint include:
    - **Iron Age Site BV001 and BV002**
      Phase 2 archaeological mitigation that will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.
    - **Stone Age findspots BV003, BV004, BV005**
      Sufficiently recorded in this report no mitigation required.
    - **BV006**
      Avoid the site with a 30 m buffer; alternatively surface sampling adhering to legislative requirements prior to application for a destruction permit.
- BV007 alludes to more subsurface artefacts in the powerline corridor and all pylon excavations should be monitored by an archaeologist and if any artefacts are uncovered these should be recorded and described.
- Heritage walk-down of the final development footprint prior to construction including Portion 2 of the Farm Balkfontein No. 224 that was added to the study area after the initial survey
- Recorded features outside of the project footprint should be monitored by the ECO to ensure that project activities do not inadvertently encroach on heritage sites;
- Monitoring of the Project area by the ECO during pre-construction and construction phases for heritage chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9.

9.2 Chance Find Procedure

9.2.1 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 9.5.

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.

9.2.2 Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the Project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 9). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this Project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the Project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

9.3 Reasoned Opinion

The overall impact of the Project with the recommended mitigation measures is acceptable 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.

9.4 Potential risk

Potential risks to the proposed Project are the occurrence of intangible features and unrecorded cultural resources (of which graves, and subsurface cultural material are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation and possible layout changes. The stakeholder engagement process will assess intangible heritage resources further if this is listed as a concern.

9.5 Monitoring Requirements

Day to day monitoring can be conducted by the 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.
  - Staff should also receive training on the CFP.
- *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. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 14. Monitoring requirements for the Project

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Cultural Heritage Resource Chance Find	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 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.
Pylon Excavations	Pylon Excavations	Project Archaeologist	During Excavations	Pro-Actively	If any artefacts are uncovered these should be recorded and described.
BV008 and BV009	BV008 and BV009	ECO	Weekly (All Phases)	Proactively	• Measure levels of subsidence and compare with recorded baseline conditions; • Status quo will be recorded through photographs; • Results will be maintained; and

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
					Results will be reported in the progress reporting.

9.6 Management Measures for inclusion in the EMPr

Table 15. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General Project area	Monitoring of the Project area by the ECO during pre-construction and construction phases for chance finds, if chance finds are encountered to implement the Chance Find Procedure for the project	Pre-Construction & Construction	Weekly	Applicant Construction Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
Final Impact area	Heritage walk-down of the final development footprint prior to construction;	Pre-Construction	Pre-Construction	Appointed archaeologist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA
BV001 and BV002	Phase 2 archaeological mitigation will require a full permitting process that includes mapping and test excavations after which a destruction permit can be applied for.	All Phases	Pre-Construction	ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA
BV006	Avoid the site with a 30 m buffer; alternatively surface sampling adhering to legislative requirements prior to application for a destruction permit.	Pre-Construction	Pre-Construction	Appointed archaeologist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA
Powerline Corridor	The Powerline corridor and all pylon excavations should be monitored and if any artefacts are uncovered these should be recorded and described.	Construction	Construction	Appointed archaeologist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA
BV007, BV008 and BV009	Indicate on development plans and avoid. Monitoring of the site by the ECO.	All Phases	Pre-Construction	ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA

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