

HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED GRID CONNECTION INFRASTRUCTURE FOR THE
AUTHORISED PHOFU SOLAR POWER PLANT, NEAR VIERFONTEIN, FREE STATE
PROVINCE

Type of development:

Grid Connection Infrastructure

Client:

Blue Crane Environmental (Pty) Ltd

Applicant:

Phofu Solar Power Plant (RF) (Pty) Ltd

Report Prepared by:



Beyond Heritage

Private Bag X 1049

Suite 34

Modimolle

0510

Tel: 082 373 8491

Fax: 086 691 6461

E-Mail: jaco@heritageconsultants.co.za

Report Author:

Mr. J. van der Walt

Project Reference:

Project number 23120

Report date:

October 2023

APPROVAL PAGE

Project Name	Phofu Grid Connection Infrastructure
Report Title	Heritage Impact Assessment for the proposed Grid Connection Infrastructure for the Authorised Phofu Solar Power Plant, near Vierfontein, Free State Province
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	Phofu Solar Power Plant (RF) (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
Fieldwork and reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	June- October 2023
Fieldwork	Ruan van der Merwe - Archaeologist	BA Hons Archaeology	June 2023
Report writing and archaeological support	Lara Kraljević - Archaeologist	MA Archaeology	October 2023
Specialist Reviewer	Jean Pierre Celliers	MA Archaeology ASAPA #25	October 2023

DOCUMENT PROGRESS**Distribution List**

Date	Report Reference Number	Document Distribution	Number of Copies
October 2023	23120	Blue Crane Environmental (Pty) Ltd	Electronic Copy

Amendments on Document

Date	Report Reference Number	Description of Amendment

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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.	<i>Declaration of Independence</i>
(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

Phofu Solar Power Plant (RF) (Pty) is proposing the development of grid connection infrastructure for the authorised 150MW Phofu Solar Power Plant (DFFE Ref.: 14/12/16/3/3/1/2543). The grid connection infrastructure includes a 132kV overhead power line (either 2 single circuit power lines to enable a loop-in loop-out connection or a double circuit power line) and substation to enable the evacuation of the generated electricity from the Solar Power Plant to the national grid. The Project area is situated approximately 6km east of the town of Vierfontein in the Moqhaka Local Municipality within the Fezile Dabi District Municipality, in the Free State Province of South Africa. Phofu Solar Power Plant (RF) (Pty) 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 characterized by extensive cultivation that would have obliterated any surface indicators of heritage resources and is considered to be of low archaeological potential;
- This was confirmed during the survey and recorded heritage resources were limited to a burial site (PF001), and foundations of recent past structures (PF002);
- The recorded features are located well away from the study area and no impact is expected;
- According to the South African Heritage Resource Authority (SAHRA) Paleontological sensitivity map the study area is moderate sensitivity and an independent study was commissioned for the project. A protocol for finds is included in this report.


The impact on heritage resources is low and the project can be authorised, provided that the recommendations in this report are adhered to and based on the SAHRA's approval.

Recommendations:

The following recommendations for Environmental Authorisation apply and the Project may only proceed after receiving comment from SAHRA:

- Burial site PF001 must be avoided with a 30m buffer zone;
- Final pylon positions must be assessed prior to construction;
- Monitoring of the Project area by the ECO during pre-construction and construction phases for heritage and paleontological chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	<p>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:</p> <ul style="list-style-type: none"> • 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	25/10/2023

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 development of grid connection infrastructure for the authorised 150MW Phofu Solar Power Plant (DFFE Ref.: 14/12/16/3/3/1/2543). The grid connection infrastructure includes a 132kV overhead power line (either 2 single circuit power lines to enable a loop-in loop-out connection or a double circuit power line) and substation to enable the evacuation of the generated electricity from the Solar Power Plant to the national grid. This is the grid connection solution for the authorised solar power plant. The development is located approximately 6km east of the town of Vierfontein. The Project area is situated in the Moqhaka Local Municipality within the Fezile Dabi District Municipality, Free State Province of South Africa (Figure 1.1 to 1.3). The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) for the development and informs the EIA 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 responsible cultural resources management measures that may 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, a burial site and foundations of recent past structures 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.

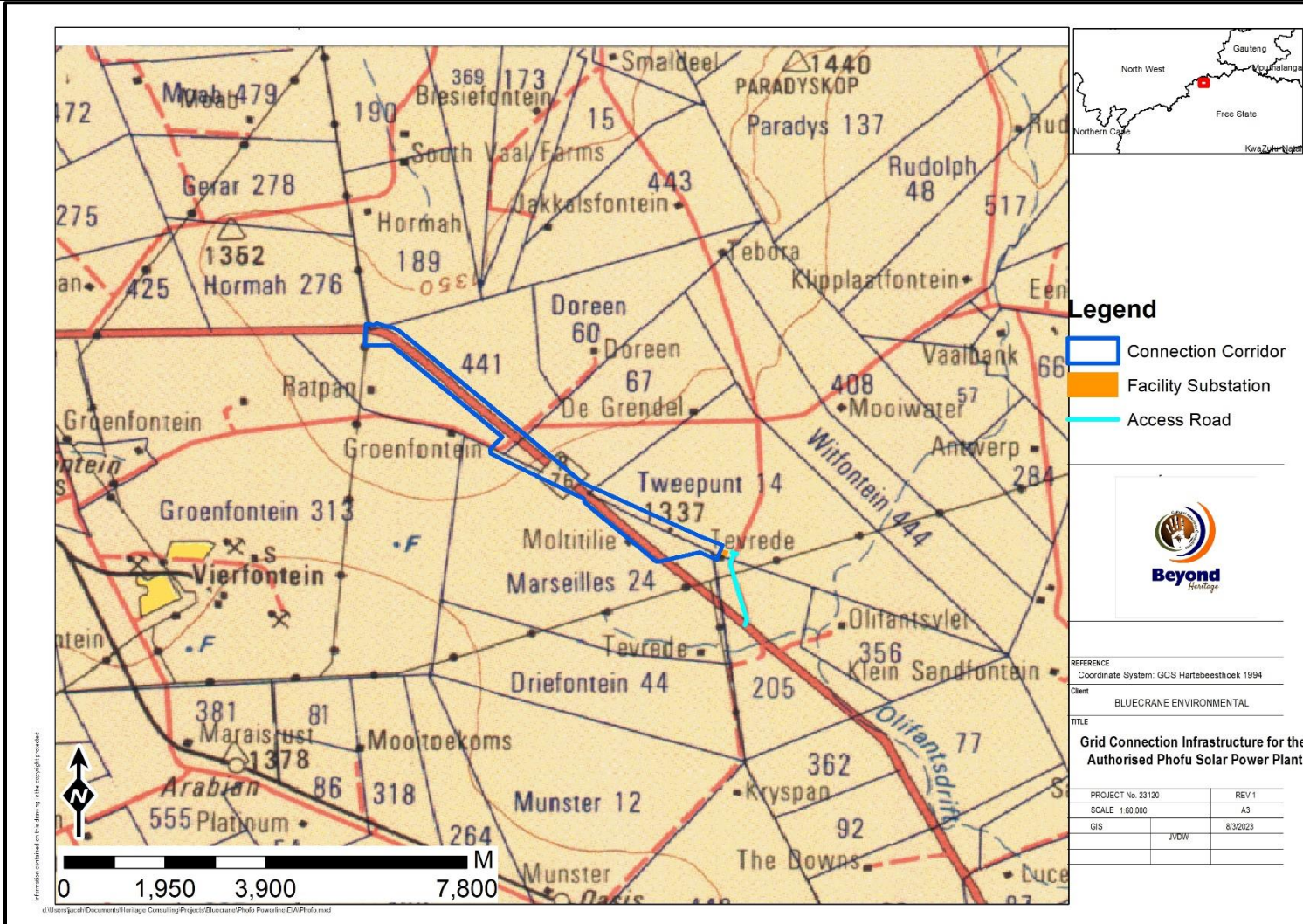


Figure 1.1. Regional setting of the Project (Extract of the 2726 1: 250 000 topographical map).

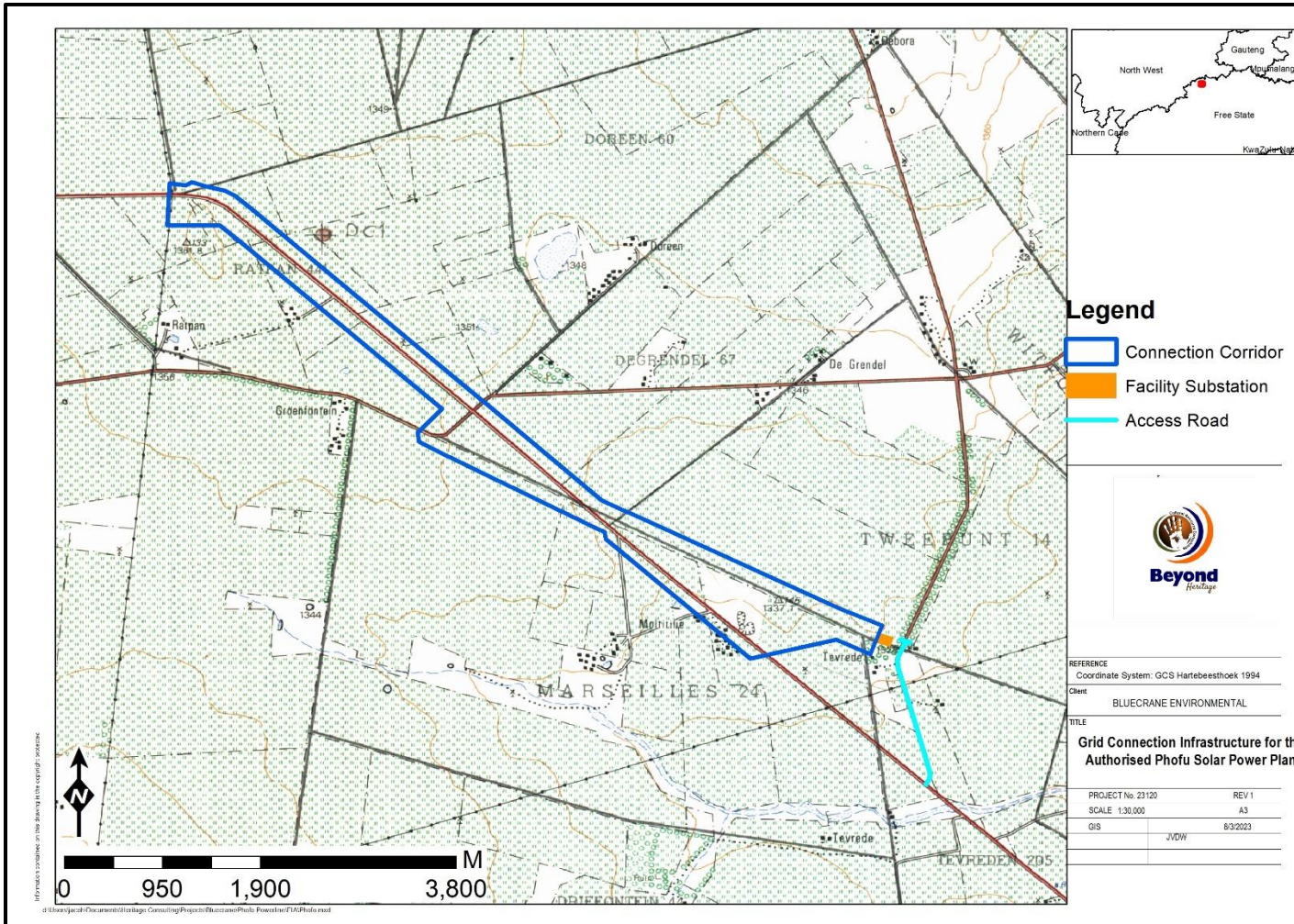


Figure 1.2. Local setting of the Project (Extract from 1:50 000 topographic map sheets 2726 BB).

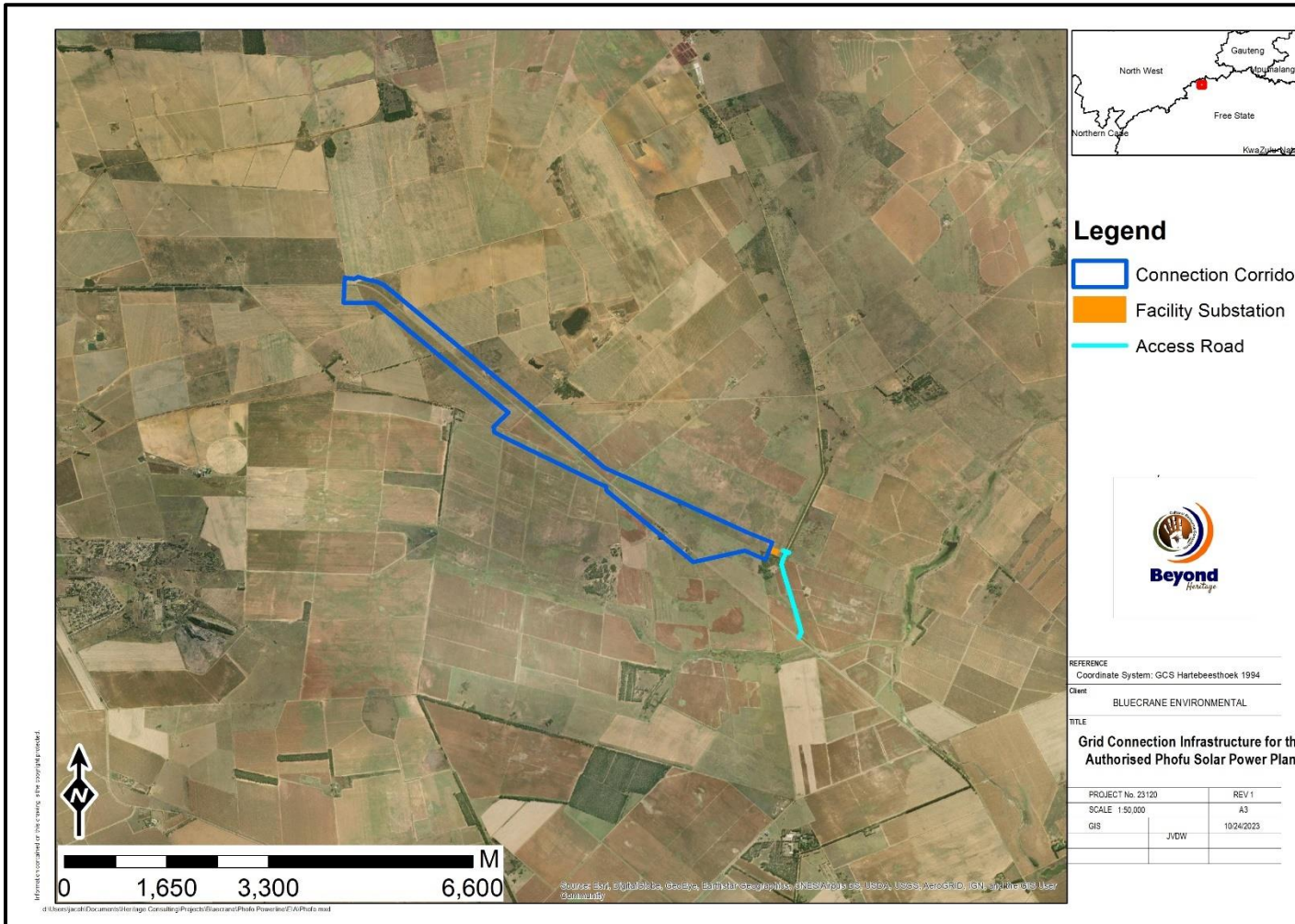


Figure 1.3. Aerial image of the Project area and surrounds.

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 Phofu Grid Connection Infrastructure are outlined in Tables 2 and 3.

Table 2: Project Description

Magisterial District	Moqhaka Local Municipality within the Fezile Dabi Molema District Municipality
Central co-ordinate of the development	27° 4'0.21"S 26°51'46.74"E
2726 BB	2625 BC

Table 3: Infrastructure and project activities

Type of development	Township Development
Description of affected farm portions	<p><u>Proposed substation for the authorised Phofu Solar Power Plant:</u></p> <ul style="list-style-type: none"> • Portion 3 of the Farm Tweepunt No.14 <p><u>Grid Connection Corridor</u></p> <ul style="list-style-type: none"> • Remaining Extent, Portion 1, Portion 2 and Portion 3 of the Farm Marseilles No. 24 • Remaining Extent and Portion 3 of the Farm Tweepunt No. 14 • Remaining Extent, Portion 1 and Portion 2 of the Farm Degrendel No. 67 • The Farm Ratpan No. 441 • Portion 3 of the Farm Fraai Uitzicht No. 189 • Portion 2 of the Farm Hormah No. 276 <p><u>Access Road:</u> R76 regional road</p>
Type of technology	132 kV overhead power line (either 2 single circuit power lines to enable a loop-in loop-out connection or a double circuit power line)
Structure Height	<ul style="list-style-type: none"> • Power line up to 32 m Substation TBC.
Area of the substation / switching station	Up to 2 hectares
Capacity of the substation / switching station	<ul style="list-style-type: none"> • Up to 132 kV
Length of the power line	~ 7 km
Grid connection corridor width	200 m wide
Servitude width	~36 m
Width of access road	Up to 10 m wide
Laydown area extent	Temporary laydown areas will be required during the construction phase. These areas will be located within the grid connection corridor under assessment.

1.3 Alternatives

The following alternatives were considered for the Project:

1.3.1 Site specific and Layout Alternatives

Preferred locations have been identified for the development of the facility substation as the Solar Power Plant has already been authorised and therefore the location of the substation infrastructure is dependent on the facility layouts of the authorised solar power plant. Infrastructure location is further influenced by the location of existing Eskom infrastructure into which energy can be transmitted. A single preferred grid connection corridor alternative will be assessed against the Do-nothing (no-go) alternative.

The preferred grid connection corridor was identified by the Applicant through the consideration of both environmental and technical aspects. Originally three options were considered, however two of the options were not preferable and is therefore not taken forward for assessment and presentation for approval.

1.3.2 Activity Alternatives

Only the proposed Phofu Grid Connection Infrastructure project is considered for assessment as the proposed grid connection infrastructure (including power line and substation) and associated infrastructure is the preferred grid connection solution for the already authorised Phofu Solar Power Plant.

1.3.3 Technology Alternatives

The following technology alternatives will be considered for the proposed overhead power line (OHPL):

- Single Circuit OHPL (two single circuit lines located within the grid connection corridor to enable a loop-in loop-out connection)
- Double Circuit OHPL

1.3.4 Grid Connection Alternatives

A single preferred corridor has been identified for the placement of the grid infrastructure. A 200 m wide grid connection corridor has been identified at a length of up to 7 km long. The grid connection corridor has been identified as the most feasible option due to the short corridor length and the specific connection point that must be utilised to connect into the national grid. The grid connection corridor is also determined based on the location and requirements of the already authorised Solar Power Plant.

The preferred grid connection corridor was identified by the Applicant through consideration of both environmental and technical aspects. Originally three options were considered however two of the options were not considered to be preferred and is therefore not taken forward for assessment and presented for approval.

1.3.5 Do-nothing Alternative

The no-go alternative has been assessed and this assumes that the proposed activity does not go ahead, and the status quo will continue. The authorised Phofu Solar Power Plant (DFFE Ref No: 14/12/16/3/3/1/2543) would not be able to proceed and the assessment area will remain unchanged. The land would continue to be used for agricultural purposes. This alternative can provide the baseline scenario against which other alternatives can be compared. In this case the benefits of the solar power plant project as a whole will be relinquished and the opportunity to provide renewable energy contributing to national targets would not be achieved in this instance. Other benefits such as employment opportunities and local economic growth would also be relinquished. Without the development of the proposed grid connection infrastructure the operation of the Phofu Solar Power Plant will not be possible.

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 administered by a local authority. Graves in this age category, located inside a formal cemetery administered 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 reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under 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 4: Site Investigation Details

	Site Investigation
Date	22 June 2023
Season	Winter – The time of year and season had limited effect on the results of the survey as most of the Project Area was being ploughed or under cultivation and the remaining areas were characterised by dense grass cover. The Project area was however sufficiently traversed to understand the heritage character of the area (Figure 3.1).

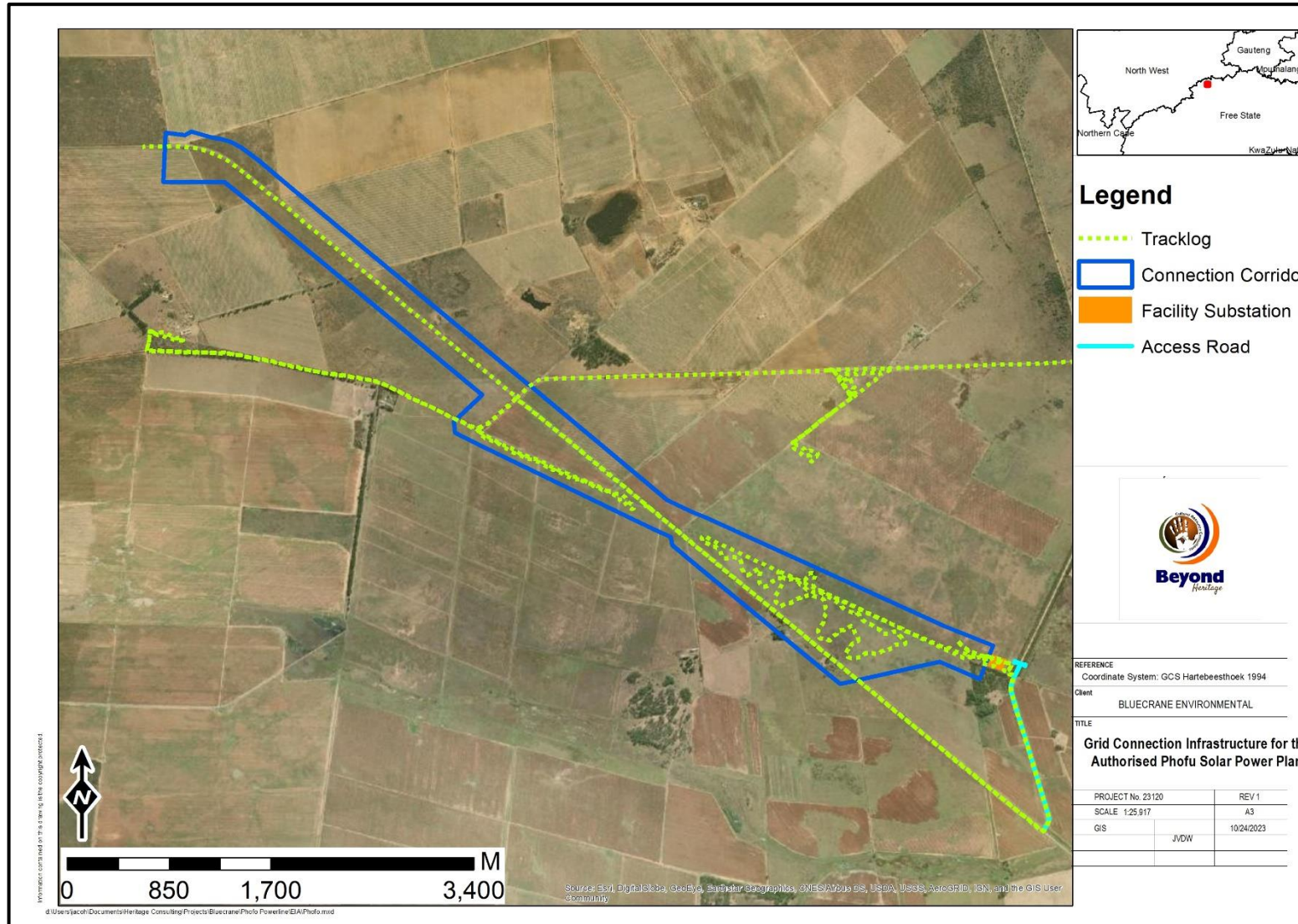


Figure 3.1. Tracklog of the survey path in green.

3.5. Site Significance and Field Rating

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 or is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

Table 5. Heritage significance and field ratings

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

3.6. Impact Assessment Methodology

The 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.
- Field data were recorded by handheld GPS and Mobile GPS applications. It must be noted that during the process of converting spatial data to final drawings and maps the accuracy of spatial data may be compromised. Printing or other forms of reproduction might also distort the spatial distribution in maps. Due care have been taken to preserve accuracy
- 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 Census 2011, Moqhaka Local Municipality has a total population of 160 532 people, of which 87,2% are black African, 9,3% are white people and with the other population groups making up the remaining 3,5%. Of those aged 20 years and older, 5,5% have completed primary school, 36% have some secondary education, 27,8% have completed matric and 8,6% have some form of higher education. 5,4% of those aged 20 years and older have no form of schooling. There are 55 594 economically active (employed or unemployed but looking for work) people, and of these 35,2% are unemployed. Of the 27 349 economically active youth (15–34 years) in the area, 47,2% are unemployed.

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.

6. Contextualising the study area

6.1. Archaeological Background

6.1.1. Stone Age

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

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

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

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

The well-known rock art site of Bosworth, north of Klerksdorp that also included Later Stone Age artifacts (Mason 1962). The site includes around 600 San and Khoekhoen rock engravings.

6.1.2. Iron Age

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

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

- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. No Sites dating to the Iron Age have been recorded for the study area. However, towards Zeerust and towards Mafikeng, the area is well known for Later Iron Age stone walled settlements archaeologically referred to as Molokwane settlements (Pistorius 1992, Booyens 1998, Huffman 2007). Bergh (1999) reported on some 88 Late Iron Age sites towards Klerksdorp.

There are some Late Iron Age sites in the larger geographical area north and west of the town of Klerksdorp (Bergh 1999: 6-7). The larger region is more known for LIA occupation with Batswana groups, including the Barolong, Bahurutshe, Bakwena, Bakhata, Baphiring, Bataung, and Batlokwa groups from the 18th century onwards. Their widespread occupations included Klerksdorp as well as areas further away such as Marico, Pilanesberg, Rustenburg, Potchefstroom (Breutz 1953; 1954). Some well-known examples of LIA stonewalled sites are Platberg (Wells 1933) and Buisfontein (Thabeng) (Maggs 1976). Another site Palmietfontein, (30km north of Klerksdorp), excavated in 1975 by D.A. White. An article on this work also indicated that the area north of Klerksdorp is relatively rich in terms of Late Iron Age sites, and that the Rolong capital of Thabeng lies within this area (White 1977: 89). Based on the research by Huffman it is possible that sites are related to the Olifantspoort facies of the Urewe Tradition, dating to around AD 1500-1700, and the Thabeng facies of the same tradition (AD 1700-1840) could possibly be found in the area (Huffman 2007). The LIA settlements of the larger region have been classified as Type Z settlement pattern sites (Maggs 1976).

6.1.3. Historical Background

Klerksdorp was founded in 1837 when the Voortrekkers settled on the banks of the Schoonspruit, which flows through the town. The first settlers included C.M. du Plooy, he claimed a farm of about 160 km² and called it Elandsheuwel. Du Plooy gave plots of land and communal grazing rights on this farm to other Voortrekkers in return for their assistance in building a dam and an irrigation canal. This collection of smallholdings was later given the name of Klerksdorp after the first magistrate of the area, Jacob de Clerq (Raper 2004). In August 1886, gold was discovered in the Klerksdorp district as well as on the Witwatersrand about 160 km to the east. Fortune-seekers descended on the small village, turning it into a town with 70 taverns and even a stock exchange of its own. The nature of the gold reef demanded expensive and sophisticated equipment to mine and extract the gold, causing the majority of diggers to move away in the late 1890's and a decline in the gold mining industry.

The gold mining industry was revived by large mining companies in 1932, causing the town to grow, which accelerated after World War II.

6.1.4. Anglo-Boer War

During the Anglo-Boer War (1899-1902), there were many battles in the area around Klerksdorp and the area also housed a large concentration camp. The most famous battle in the Klerksdorp area, is the Battle of Ysterspruit which took place on the 25th of February 1902 (samilitaryhistory.org). The Boer General, Koos de la Rey, achieved a great victory here and the battle is one of the most celebrated of the general's career. General de la Rey led a Boer force of around 900 men to attack a British troop of 900 men who were led by Colonel William Campbell Anderson. It was this battle in which the Boer soldiers pioneered the art of firing from horseback. The site of the Battle of Ysterspruit is situated 15km northeast of the project area.

On April 11, 1920, Rooiwal, near Klerksdorp, saw the Battle of Rooiwal, the last major engagement of the war, where a Boer charge was beaten off by entrenched British troops. Just under a thousand graves of the victims of the concentration camps, namely Boer women and children

can still be visited today in the old cemetery just outside of Klerksdorp. Klerksdorp was connected by rail to Krugersdorp on 3 August 1897 and to Kimberley in 1906.

Blockhouses and sangars which were built during the war can be still found spread throughout Klerksdorp and Potchefstroom (Bergh 1999).

6.2. Literature Review (SAHRIS)

Few Cultural Resource Management (CRM) surveys are on record for the general area and the relevant results of these studies are briefly discussed below and outlined in Table 6.

Table 6. Studies consulted for the project.

Author	Year	Project	Findings
Huffman, TN.	2005	Archaeological Assessment of the Mispah Tailings Dam Extension. A Phase 1 Report prepared for AngloGold Ashanti.	Historical cemeteries, historical house complex.
Van Schalkwyk, J.A.	2021	Phase 1 Cultural Heritage Impact Assessment: the Proposed Ngwedi Solar Power Plant near Viljoenskroon, Free State Province.	No sites were identified.
Van Schalkwyk, J.A.	2022	Phase 1 Cultural Heritage Impact Assessment: the Proposed Nyarhi Solar Power Plant near Viljoenskroon, Free State Province.	No sites were identified.
Dreyer, C.	2005	Archaeological and Historical Investigation of the Proposed Residential Developments on Subdivision 13 of the Farm Pretoriuskraal 53, Viljoenskroon, Free State.	No sites were identified.
Seliane, M.	2011	Phase I Cultural Heritage Impact Assessment of a proposed replacement of a 88KV Powerline between Viljoenskroon and Vierfontein in the Free State Province, South Africa.	Historical farm house, farm workers' houses and ruins, burial sites.
Lavin, J.	2022	Heritage Impact Assessment in terms of Section 38(8) of the NHRA for the Proposed development of the 100MW Harmony Moab Khotsong Solar PV Facility, Vierfontein, Free State Province.	MSA and LSA artefacts.
Lavin, J., Presnyakova, D.	2022	Heritage Impact Assessment in terms of Section 38(8) of the NHRA for the development of various PV Facilities and their associated grid connections associated with Harmony Gold Mining activities throughout the Free State Province and in the North West Province.	ESA, MSA, LSA artefacts, Historical structures and ruins.

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 Project consists of multiple linear features along existing roads and crop fields as well as some areas where proposed substations will be located. Most of the Project Area is located within existing fields that have been recently ploughed or harvested. The surrounding environment consists of large open fields of dense grasses and some shrubs. The landscapes lack any substantial trees with only one or two thickets of trees scattered within the project area. These thickets mostly include eucalyptus thickets and a planted windbreak along some of the ploughed fields. Existing infrastructure visible on the landscape include various tar and gravel roads that traverse the project area as well as smaller powerlines alongside existing roads. General site conditions are indicated in (Figure 7.1 to 7.4).



Figure 7.1. Small triangular portion of the property on the north eastern corner of the Project Area. - Image showing the dense grass and shrubland with scattered trees.



Figure 7.2. General view of the ploughed fields that dominate the landscape.



Figure 7.3. General view of the planted crops in the project area near the main roads.



Figure 7.4. General view of the surrounding landscape along the proposed corridor next to open fields.

7.2. Heritage Resources

Heritage observations include a burial site, and foundations dating to the recent past and were labelled with the prefixes PF and numbered numerically. Both sites are located well away from the Project Area. The recorded observations are briefly described in Table 7. Selected features are illustrated in Figure 7.6 to 7.21.

Table 7. Recorded finds in the greater study area.

Label	Longitude	Latitude	Type Site	Description	Significance
PF001	26°51'48.15"E	27° 4'7.06"S	Burial Site	Small extremely degraded burial site that is 30 x 10 meters in size and is situated on the edge of a fence line and ploughed fields, south of a broken-down farmstead. The graves are extremely overgrown and very difficult to define. A high amount of burrowing has taken place within the burial site to the extent that some of the graves have completely sunken into the soil and some of the headstones have collapsed. The visible headstones were all noted to date from the 1980s. Some evidence of a derelict fence around the burial site can still be seen. Legible dates include 1982 and 1988.	High Social Significance GP 3A
PF002	26°51'46.49"E	27° 4'2.31"S	Recent past structures	Large series of cement and brick foundations scattered across a wide area of 100 x 100 meters. The site is located near the main access route into the project area directly north of PF001 in the northern corner of the project area. The features are highly degraded and mostly broken down as well as overgrown with thick grasses. Most of the structures are almost completely overgrown with only the metal reinforcing still visible along with some scattered building rubble and cement.	Low Significance GP C



Figure 7.5. General view of the burial site PF001 - Image showing the extremely dense vegetation.



Figure 7.6. The graves at PF001 are difficult to define due to the dense grass and high amount of burrowing.

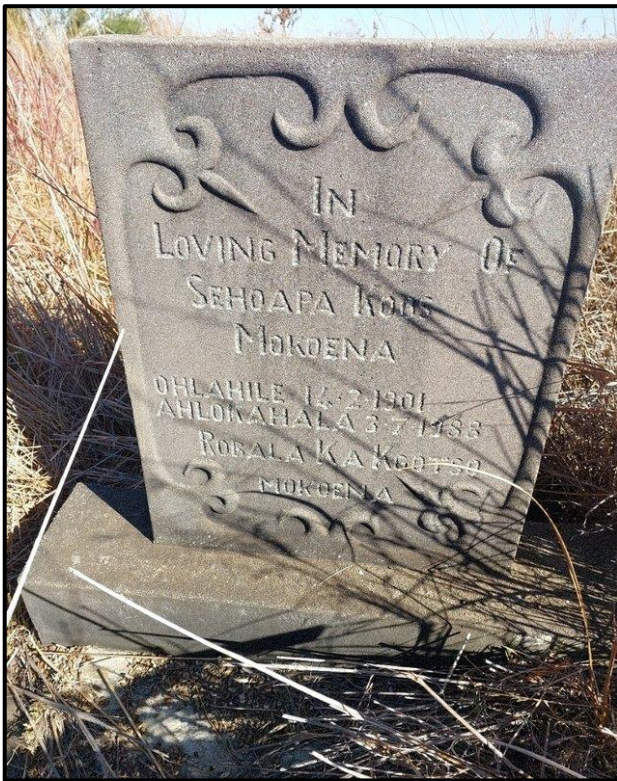


Figure 7.7. Grave of Sehoapa Koos Mokoena 1988 at PF001.



Figure 7.8. Grave at PF001.



Figure 7.9. Animal burrowing in the burial site PF001.



Figure 7.10. Image showing a collapsed grave at PF001 due to animal burrowing.



Figure 7.11. Grave of Mirriam Galebese at PF001.



Figure 7.12. General site conditions at PF001.



Figure 7.13. General site conditions showing overgrown grass at PF002.



Figure 7.14. Remains at PF002.



Figure 7.15. Foundation remains at PF002.



Figure 7.16. Structure remains at PF002.



Figure 7.17. Structure remains at PF002.



Figure 7.18. Structure remains at PF002.



Figure 7.19. Remains at PF002.



Figure 7.20. Structure at PF0002.

7.3. Cultural Landscape

The Project area rural in character and has been extensively cultivated.

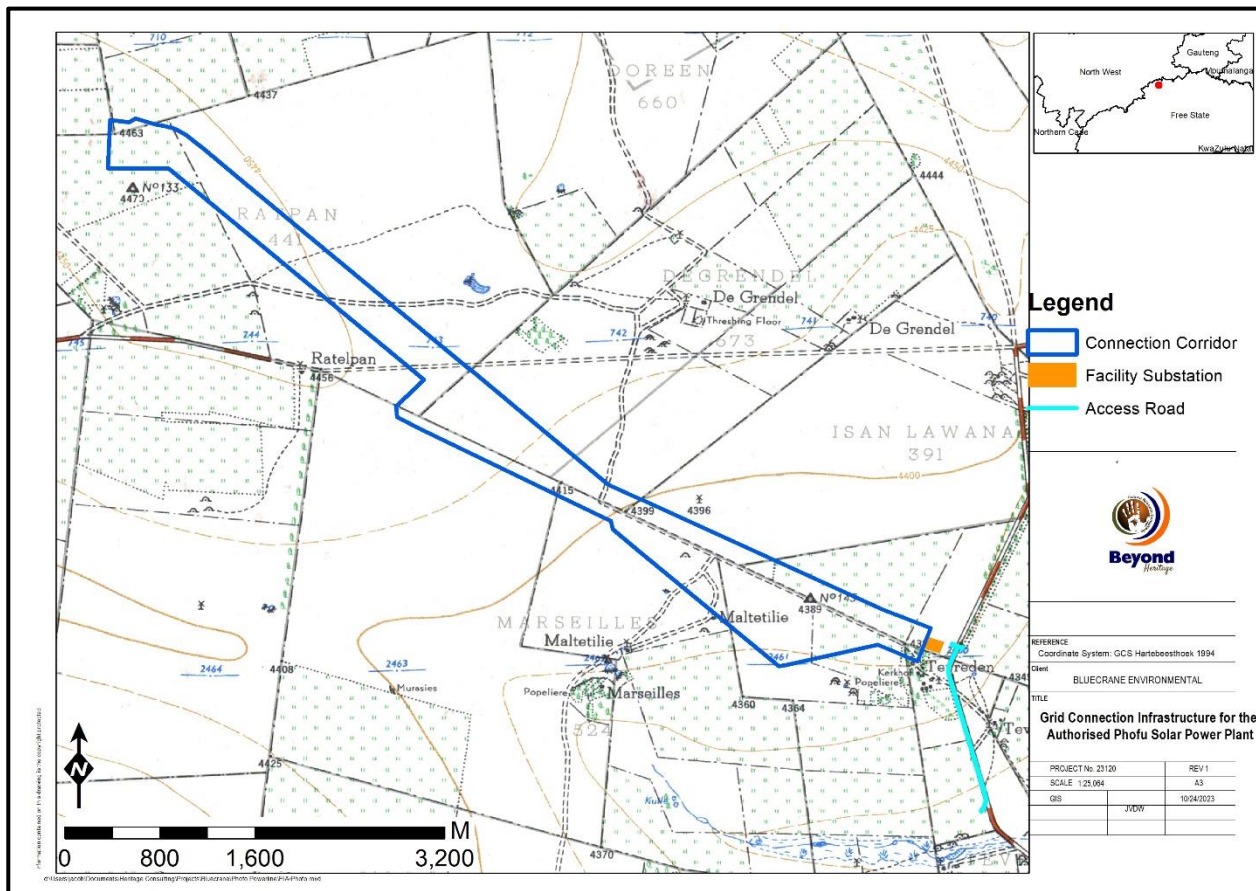


Figure 7.21. Extract of the 1946 Topographic map (1: 50 000) indicating some railways and tracks that traverse the connection corridor.

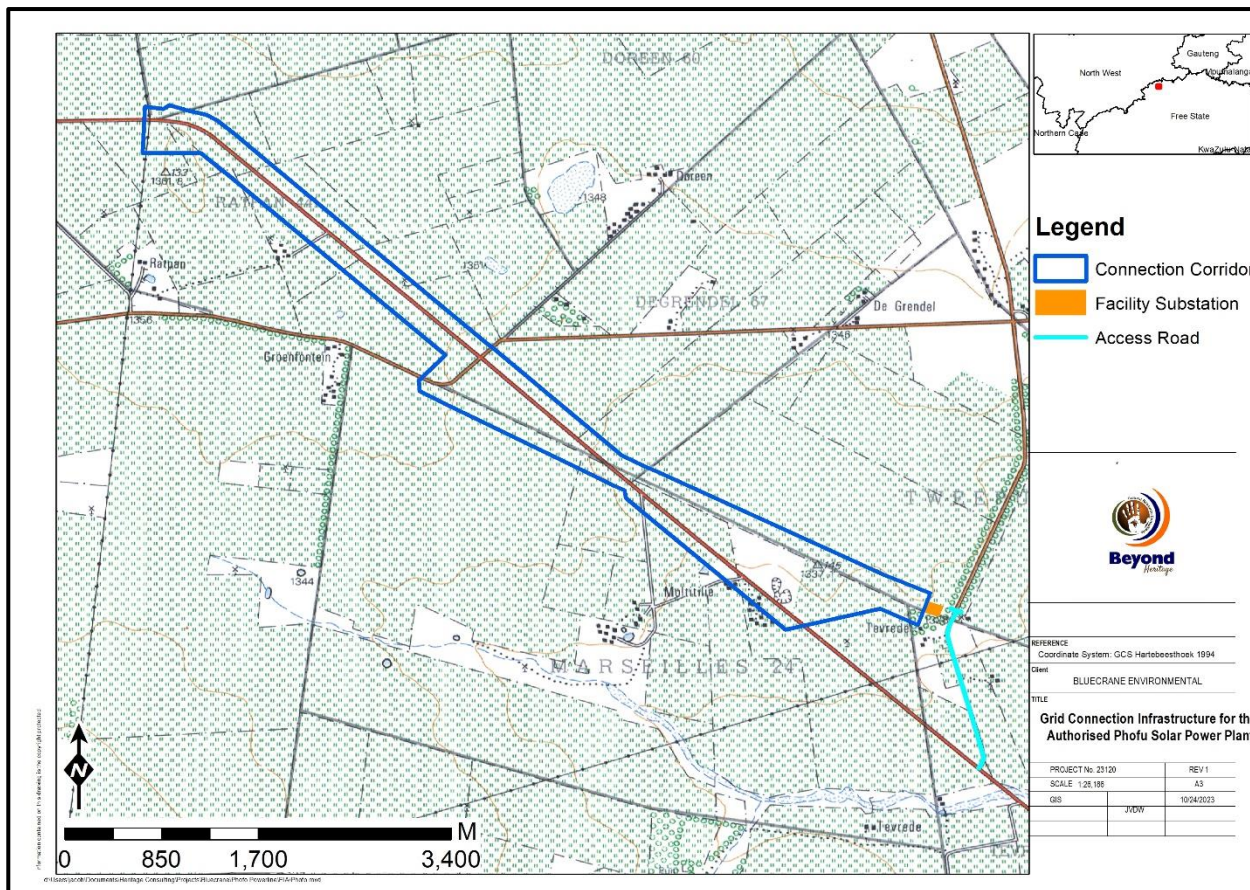


Figure 7.22. Extract of the 1975 Topographic map (1: 50 000) indicating extensive cultivation in the Project Area.

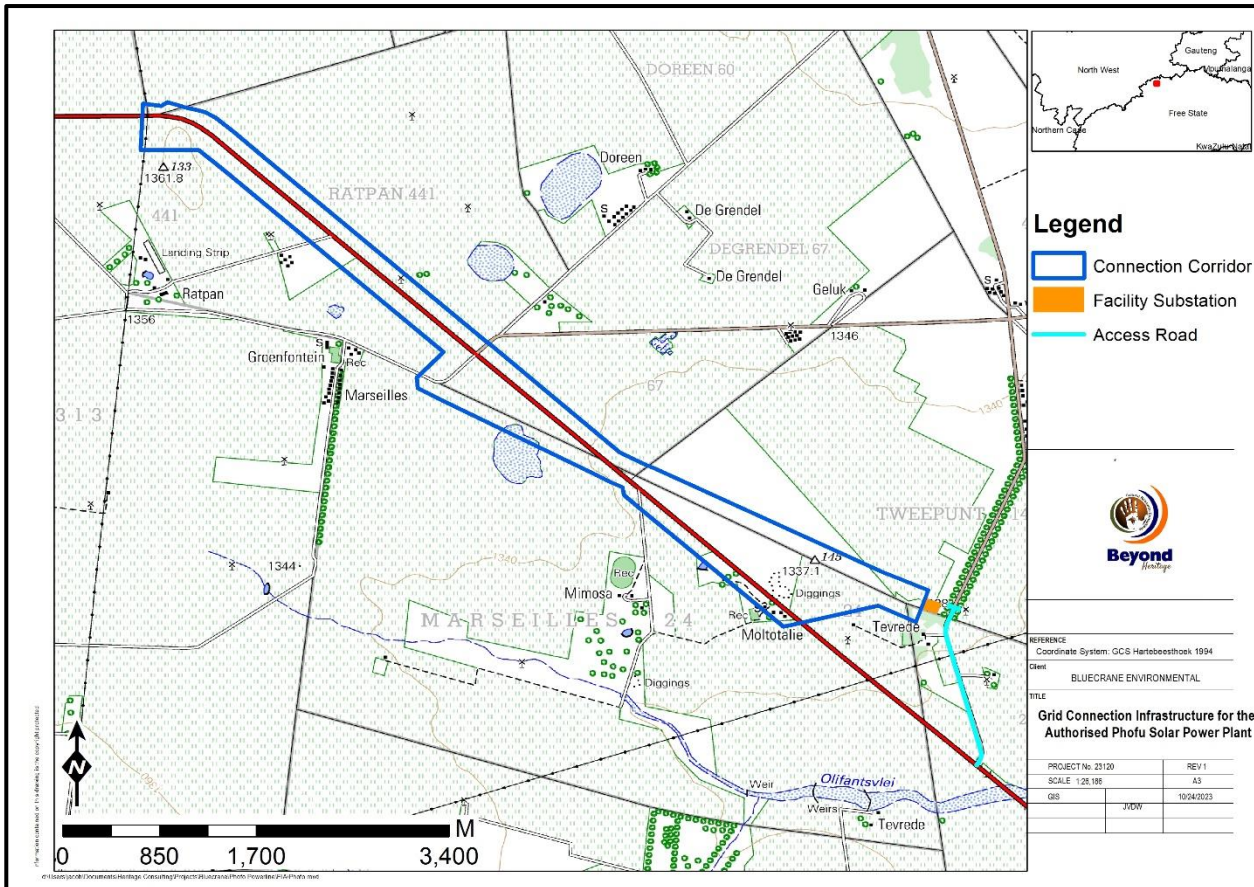


Figure 7.23. Extract of the 1997 Topographic map (1: 50 000) indicating cultivation in most of the connection corridor.

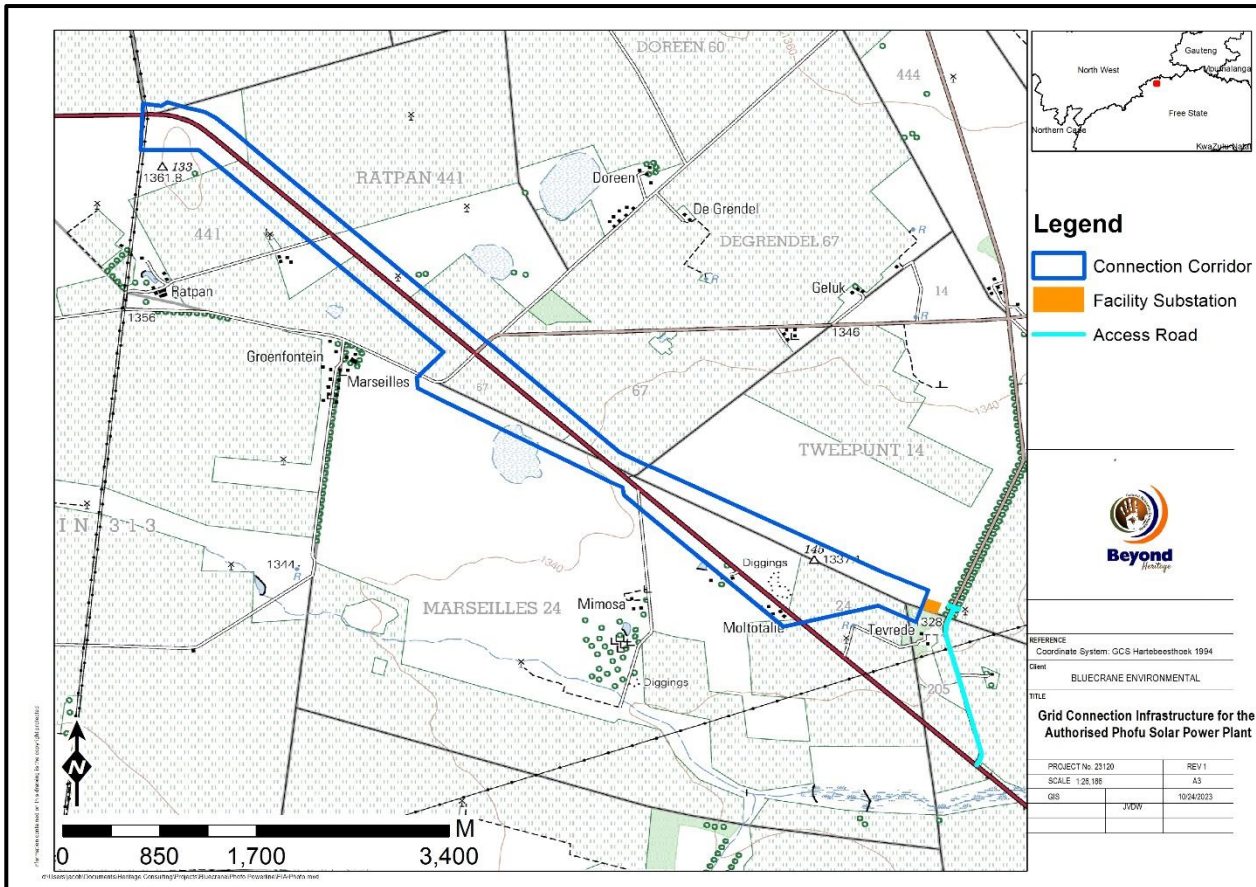


Figure 7.24. Extract of the 2008 Topographic map (1: 50 000) indicating structures and large areas of cultivation along the line.

7.4. Paleontological Heritage

According to the South African Heritage Resource Authority (SAHRA) Paleontological sensitivity map the study area is moderate sensitivity and an independent study was commissioned for the project. A protocol for finds is included in this report (Figure 7.36).



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 7.25. 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.

The burial site PF001 is of high significance and the site must be avoided with a 30-meter buffer zone. The foundations present at PF002 date to the recent past and are not older than 60 years and are therefore not protected by the NHRA.

Both sites are located more than 200 meters away from the proposed Project Area and no impact is expected.

8.1.1. Cumulative impacts

The impacts of the Klerksdorp Renewable Energy Development Zone are growing but the Project will not add to the cumulative impacts as no heritage resources will be impacted on.

8.2. Impact Assessment Tables

Table 8. 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 to burial site PF001	Before mitigation	Negative	1	1	2	2	4	1	2	22	Medium (29-50)	Yes	Yes	- The burial site must be avoided with a 30m buffer zone - Implementation of a chance find procedure
	After mitigation	Negative	1	1	1	1	4	1	2	18	Low (6-28)			

Table 9. Impact assessment for the operational 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 to burial site PF001	Before mitigation	Negative	1	1	2	2	4	1	2	22	Medium (29-50)	Yes	Yes	- The burial site must be avoided with a 30m buffer zone - implementation of a chance find procedure
	After mitigation	Negative	1	1	1	1	4	1	2	18	Low (6-28)			

Table 10. Impact assessment for the decommissioning 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 to burial site PF001	Before mitigation	Negative	1	1	2	2	4	1	2	22	Medium (29-50)	Yes	Yes	- The burial site must be avoided with a 30m buffer zone - Implementation of a

	After mitigation	Negative	1	1	1	1	4	1	2	18	Low (6-28)		chance find procedure
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Table 11. Impact assessment for the cumulative impacts 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
	Before mitigation	Negative												
Impacts to burial site PF001	Before mitigation	Negative	1	1	2	2	4	1	2	22	Medium (29-50)	Yes	Yes	The burial site must be avoided with a 30m buffer zone - implementation of a chance find procedure Final pylon positions must be assessed prior to construction;
	After mitigation	Negative	1	1	1	1	4	1	2	18	Low (6-28)			

9. Conclusion and recommendations

The project area is in landscape which is marked by agricultural activities. During the survey, a burial site, and cement and brick foundations of modern structures were identified.

The burial site PF001 is overgrown, and it was difficult to define all the graves. The site is of high social significance and the site must be avoided with a 30m buffer zone. The cement and brick foundations at PF002 date to the recent past and as they are not older than 60 years, the site is not protected by the NHRA and impact to the site is low.

According to the South African Heritage Resource Authority (SAHRA) Paleontological sensitivity map the study area is moderate sensitivity and an independent study was commissioned for the project. A protocol for finds is included in this report.

The impact to heritage resources can be mitigated to low 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:

- Burial site PF001 must be avoided with a 30m buffer zone;
- Final pylon positions must be assessed prior to construction;
- Monitoring of the Project area by the ECO during pre-construction and construction phases for heritage and paleontological 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 therefore 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 (Protocol for finds) – 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 12. 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	<p>If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented:</p> <ol style="list-style-type: none"> 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. <p>Only recommence operations once impacts have been mitigated.</p>

9.6. Management Measures for inclusion in the EMPr

Table 13. 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 34, 35, 36 and 38 of NHRA	ECO Checklist/Report
PF001	The burial site must be avoided with a 30m buffer zone.	Pre-Construction & Construction & Operation	Throughout the project	Applicant Construction Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
Final Pylon Positions	Final pylon positions must be assessed prior to construction	Pre-Construction	Throughout the project	Applicant Construction Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

10. References

- Bergh, J.S. 1999. Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies. Pretoria: J.L. van Schaik.
- Breutz, P.L. 1953. The Tribes of the Rustenburg and Pilansberg districts. Department of Native Affairs, Ethnological Publications No.28. Pretoria: Government Printer.
- Breutz, P.L. 1954. The Tribes of Marico District. Department of Native Affairs, Ethnological Publications No.30. Pretoria: Government Printer.
- Dreyer, C. 2005. Archaeological and Historical Investigation of the Proposed Residential Developments on Subdivision 13 of the Farm Pretoriuskraal 53, Viljoenskroon, Free State.
- Huffman, T.N. 2005. Archaeological Assessment of the Mispah Tailings Dam Extension. A Phase 1 Report prepared for AngloGold Ashanti.
- Huffman, T.N. 2007. Handbook to the Iron Age. University of KwaZulu-Natal Press, Scottsville.
- Lavin, J. 2022. Heritage Impact Assessment in terms of Section 38(8) of the NHRA for the Proposed development of the 100MW Harmony Moab Khotsong Solar PV Facility, Vierfontein, Free State Province.
- Lavin, J., Presnyakova, D. 2022. Heritage Impact Assessment in terms of Section 38(8) of the NHRA for the development of various PV Facilities and their associated grid connections associated with Harmony Gold Mining activities throughout the Free State Province and in the North West Province.
- Maggs, T.M. 1976. Iron Age Communities of the Southern Highveld. Pietermaritzburg: Natal Museum.
- Mason, R.J. 1962. The Prehistory of the Transvaal. Witwatersrand University Press, Johannesburg.
- National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)
- Mucina, L. & Rutherford, M.C. 2006. The vegetation map of South Africa, Lesotho and Swaziland. SANBI, Pretoria.
- Pistorius, J.C.C. 1992. Molokwane – An Iron Age Bakwena Village. Perskor, Johannesburg.
- Raper, P.E. 2004. *Dictionary of Southern African place names*. Jonathan Ball Publishers.
- Sahra Report Mapping Project Version 1.0, 2009
- Seliane, M. 2011. Phase I Cultural Heritage Impact Assessment of a proposed replacement of a 88KV Powerline between Viljoenskroon and Vierfontein in the Free State Province, South Africa.
- Van Schalkwyk, J.A. 2021. Phase 1 Cultural Heritage Impact Assessment: the Proposed Ngwedi Solar Power Plant near Viljoenskroon, Free State Province.
- Van Schalkwyk, J.A. 2022. Phase 1 Cultural Heritage Impact Assessment: the Proposed Nyarhi Solar Power Plant near Viljoenskroon, Free State Province.
- Wells, L.H. 1933. A report on the stone structures of the Platberg near Klerksdorp. South African Journal of Science 30:582-584.
- White, D.A. 1977. The Excavation of an Iron Age Site at Palmietfontein near Klerksdorp. The South African Archaeological Bulletin, 32(125): 89-92.

Electronic sources:

www.statssa.gov.za Cited October 2023

www.samilitaryhistory.org Cited October 2023