

# HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED RENEWABLE ENERGY GENERATION PROJECTS BY CARINA ENERGY (PTY) LTD (BUFFALO 1 SOLAR PARK) ON FARM BUFFELSJAGT 744-LQ WITH OVERHEAD POWERLINES TO THE ESKOM MEDUPI SUBSTATION, WITHIN THE LEPHALALE LOCAL MUNICIPALITY, WATERBERG DISTRICT MUNICIPALITY.

**Type of development:**

Photovoltaic (PV) Power Plant

**Client:**

Exigent Environmental

**Developer:**

Carina Energy (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](mailto:jaco@heritageconsultants.co.za)

Report Author:

Mr. J. van der Walt

Project Reference:

Project number 23030

Report date:

March 2023

## APPROVAL PAGE

<b>Project Name</b>	Buffalo 1 Solar Park Project
<b>Report Title</b>	Heritage Impact Assessment for the Proposed Renewable Energy Generation Projects by Carina Energy (Pty) Ltd (Buffalo 1 Solar Park) On Farm Buffelsjagt 744-LQ with Overhead Powerlines to the Eskom Medupi Substation within the Lephalale Local Municipality, Waterberg District Municipality.
<b>Authority Reference Number</b>	TBC
<b>Report Status</b>	Draft Report
<b>Applicant Name</b>	Carina Energy (Pty) Ltd

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

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Date	Report Reference Number	Description of Amendment

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## REPORT OUTLINE

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

**Table 1. Specialist Report Requirements.**

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

**Declaration of Independence**

<b>Specialist Name</b>	Jaco van der Walt
<b>Declaration of Independence</b>	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I:</p> <ul style="list-style-type: none"> <li>• I act as an independent specialist in this application;</li> <li>• 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;</li> <li>• I declare that there are no circumstances that may compromise my objectivity in performing such work;</li> <li>• 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;</li> <li>• I will comply with the Act, Regulations, and all other applicable legislation;</li> <li>• I have no, and will not engage in, conflicting interests in the undertaking of the activity;</li> <li>• 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;</li> <li>• All the particulars furnished by me in this form are true and correct; and</li> <li>• I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 49 A of the Act. of regulation 48 and is punishable in terms of section 24F of the Act.</li> </ul>
<b>Signature</b>	
<b>Date</b>	24/03/2023

**a) Expertise of the specialist**

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

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

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### **Executive Summary**

Exigent Environmental was appointed as the Environmental Assessment Practitioner (EAP) by Carina Energy (Pty) Ltd to undertake the required Environmental Authorisation Process for the proposed development of a Photovoltaic PV Power Plant (Buffalo 1 Solar Park) that will form part of the Buffalo Photovoltaic PV Cluster Development. Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the Project and the study area was assessed on a desktop level and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- The topography of the study area is flat with a few natural pans but no other focal points like rock outcrops or hills that would have attracted human occupation in antiquity;
- Multiple modern structures are scattered across the project area which were previously used for hunting camps and the project area is considered to be of low heritage significance;
- This was confirmed during the survey whereby no heritage resources were identified within the Project area;
- The palaeontological sensitivity of the study is very high, and an independent assessment was conducted for this reason (Bamford 2023).

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

### **Recommendations:**

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

## ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DFFE: Department of Fisheries, Forestry and Environment,
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EAP Environmental Assessment Practitioner
EMPr: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

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

## GLOSSARY

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

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

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

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

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

## 1 Introduction and Terms of Reference:

Beyond Heritage was appointed to conduct a HIA for the proposed development of the Buffalo Solar Park 1 on approximately 600 hectares that will form part of the Buffalo Photovoltaic PV Cluster Development. The project site is located 30km west of Lephalale within the Lephalale Local Municipality and the Waterberg District Municipality in the Limpopo Province. (Figure 1.1 to 1.3). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPr) for the development.

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial, and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey no archaeological artefacts or heritage sites were identified. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

### 1.1 Terms of Reference

#### Field study

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

#### Reporting

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

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

## 1.2 Project Description

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

**Table 2: Project Description**

<b>Project area</b>	The project site is on the Farm Buffelsjagt 744-LQ
<b>Magisterial District</b>	Lephalale Local Municipality
<b>Central co-ordinate of the development</b>	23° 43' 05" S 27° 27' 00" E
<b>Topographic Map Number</b>	2327CB

**Table 3: Infrastructure and project activities**

<b>Type of development</b>	Photovoltaic PV Power Plant
<b>Size of development</b>	600 hectares
<b>Capacity (MV)</b>	240
<b>Project Components</b>	The project consists of the development, construction and operation of a renewable energy generation facility (Photovoltaic Power Plants) and associated infrastructure, and structures.

## 1.3 Alternatives

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

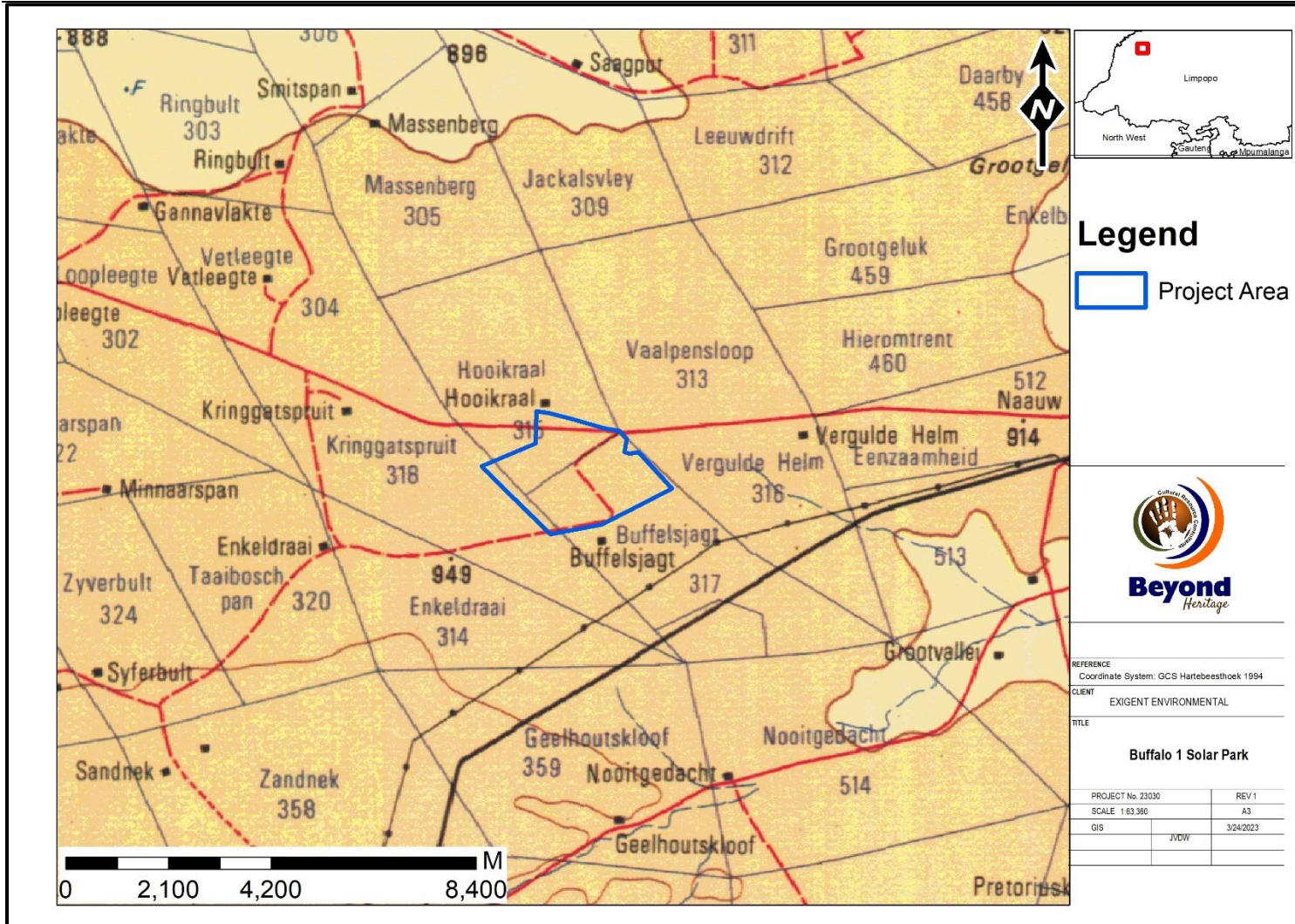


Figure 1.1. Regional setting of the Project (1: 250 000 topographical map).

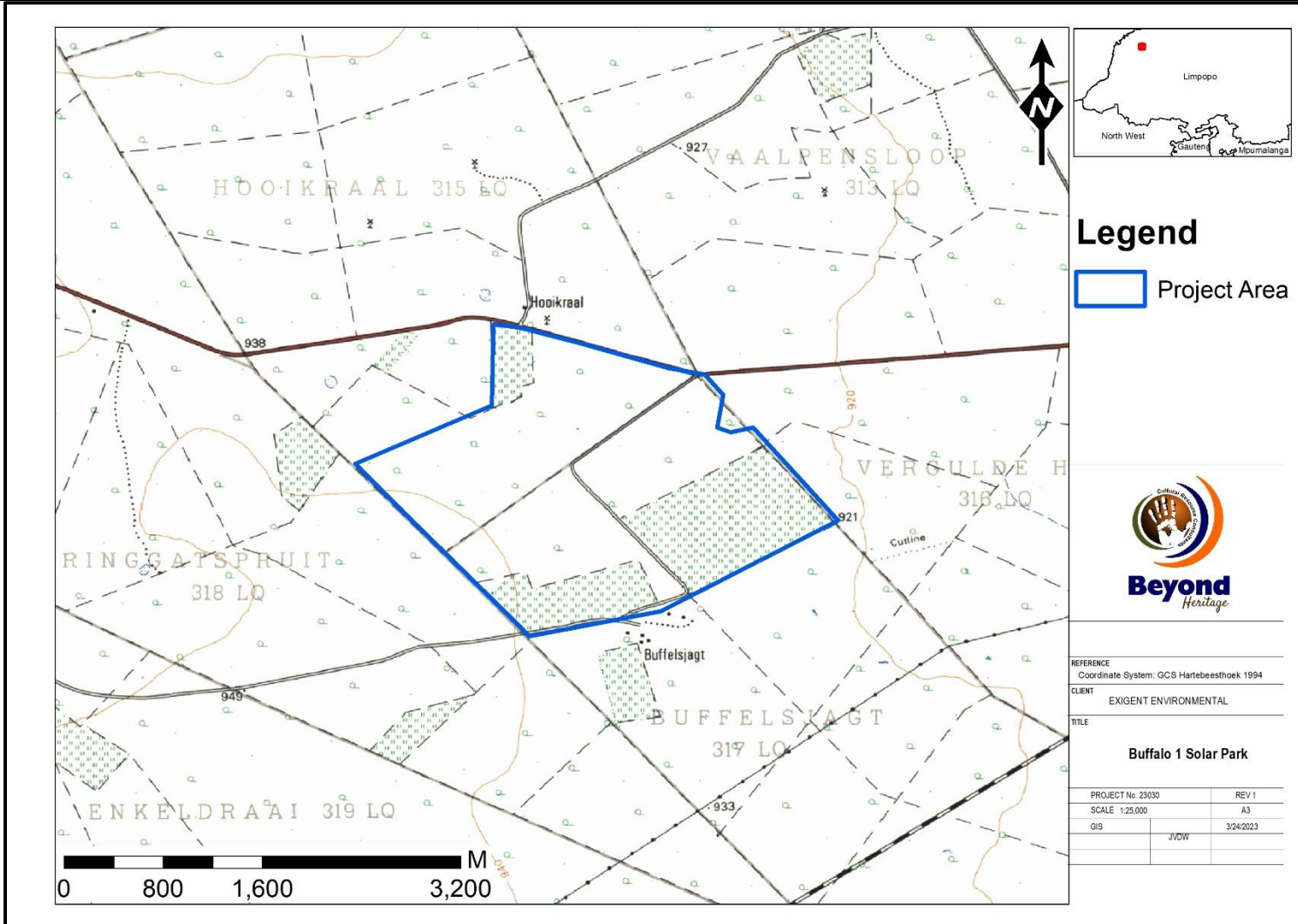


Figure 1.2. Local setting of the Project (1: 50 000 topographical map).

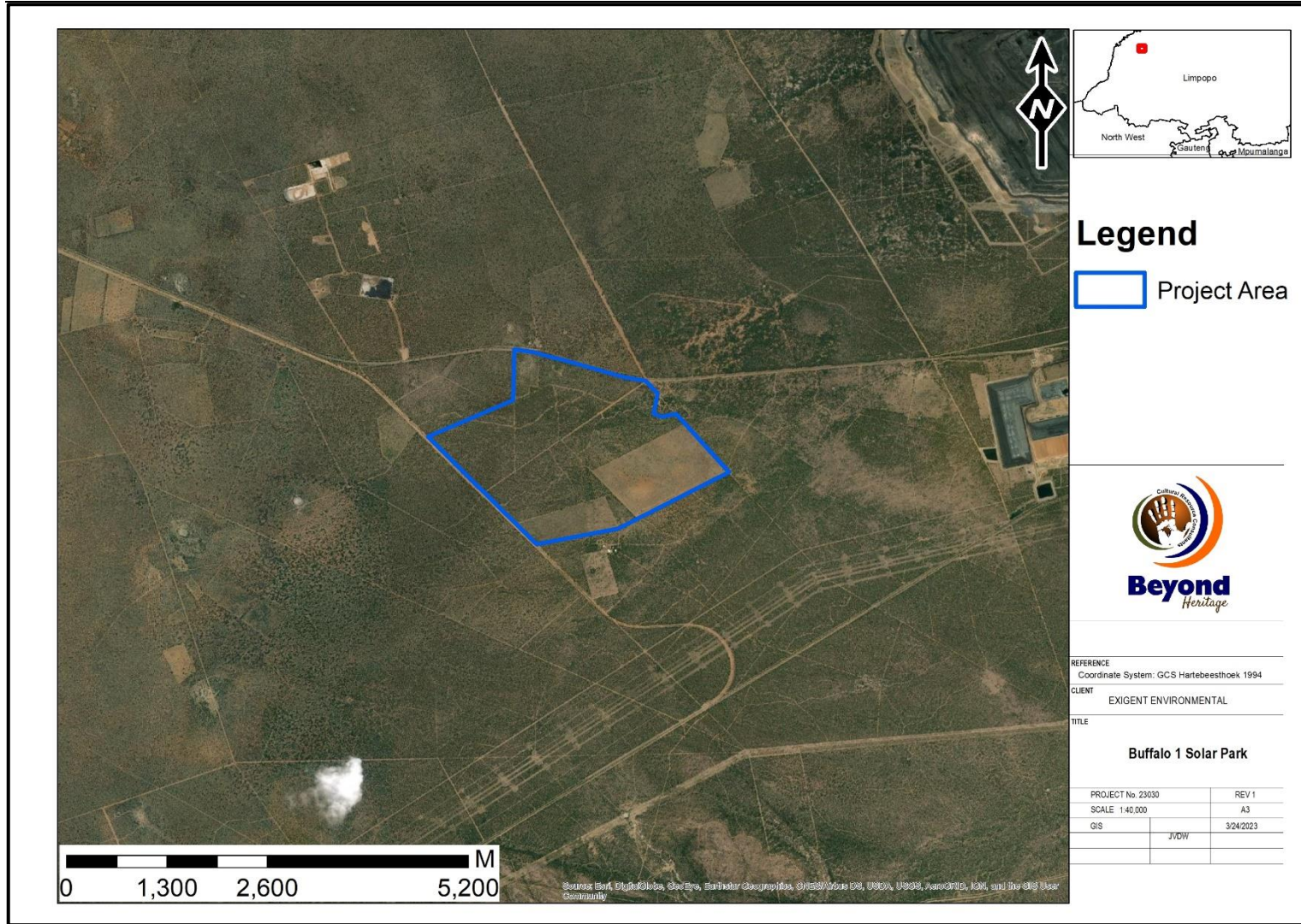


Figure 1.3. Aerial image of the study area and Project components.



## 2 Legislative Requirements

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

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

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

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

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

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the Southern African Development Community (SADC) region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

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

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

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

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

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

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36 and GNR 548 as well as the SAHRA BGG Policy 2020. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (NHRA), as well as the National Health Act of 2003 and are under the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925) re-instituted by Proclamation 109 of 17 June 1994 and implemented by CoGHSTA as well as the National Health Act of 2003 and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. . Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under the National Health Act of 2003.

### **3 METHODOLOGY**

#### **3.1 Literature Review**

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

#### **3.2 Genealogical Society and Google Earth Monuments**

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

### 3.3 Public Consultation and Stakeholder Engagement:

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

### 3.4 Site Investigation

The aim of the site visit was to:

- a) survey the proposed project area to understand the heritage character of the development footprint (focussing on the current layout);
- b) record GPS points of sites/areas identified as significant areas;
- c) determine the levels of significance of the various types of heritage resources recorded in the project area.

**Table 4: Site Investigation Details**

	Site Investigation
Date	13 March 2023
Season	Summer – The time of year did influence the survey as the vegetation was extremely overgrown and dense across the Project area due to high rainfall. The development footprint was however sufficiently covered to understand the heritage character of the area (Figure 3.1).

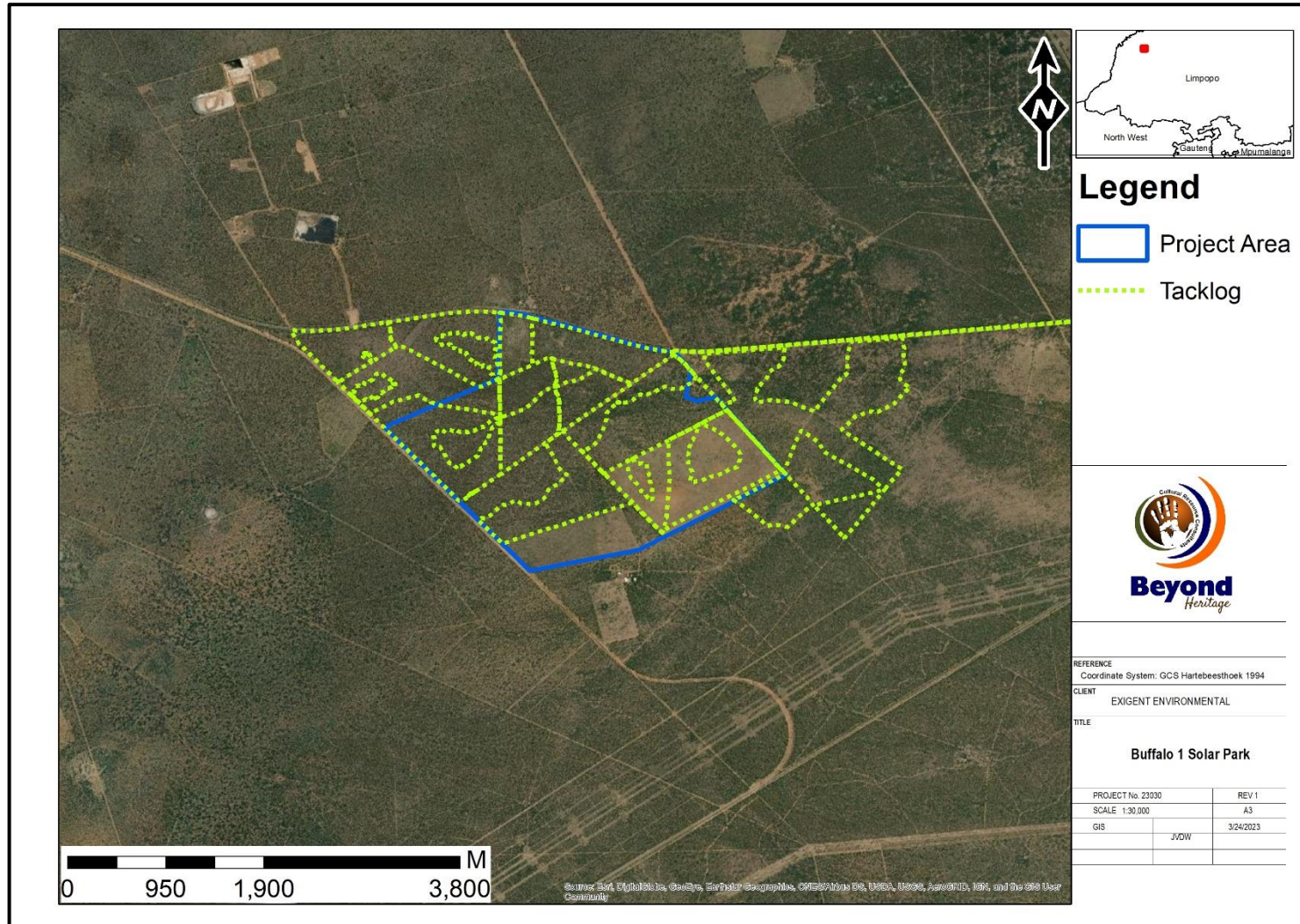


Figure 3.1. Tracklog of the survey path in green.

### 3.5 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as ‘part of the national estate’ if they have cultural significance or other special value. These criteria are:

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

The presence and distribution of heritage resources define a ‘heritage landscape’. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

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

In addition to this criteria field ratings prescribed by SAHRA (2007), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

**Table 5: Heritage significance and field ratings**

<b>FIELD RATING</b>	<b>GRADE</b>	<b>SIGNIFICANCE</b>	<b>RECOMMENDED MITIGATION</b>
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 Exigent Environmental.

Criteria by which impacts is to be assessed.

ASPECT	IMPACT RATING
Status of the impact: A statement of whether the impact is positive (a benefit), negative (a cost), or neutral.	
Direct impacts	Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity
Indirect impacts	Impacts of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.
Cumulative impacts	Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
Nature of the impact: The evaluation of the nature is impact specific. Most negative impacts will remain negative, however, after mitigation, significance should reduce: <ul style="list-style-type: none"> <li>□ Positive.</li> </ul>	
Extent: A description of whether the impact would occur on a scale limited to within the study area (local), limited to within 5 km of the study area (area); on a regional scale i.e. Local Municipality (region); or would occur at a national or international scale.	
Duration: A prediction of whether the duration of the impact would be Immediate and once-off (less than one month), more than once, but short term (less than one year), regular, medium term (1 to 5 years), Long term (6 to 15 years), Project life/permanent (> 15 years, with the impact ceasing after the operational life of the development or should be considered as permanent).	

ASPECT		IMPACT RATING
<b>Severity(extent +duration + intensity)</b>		
Intensity: This provides an order of magnitude of whether or not the intensity (magnitude/size/frequency) of the impact would be negligible, low, medium, high or very high.		
This is based on the following aspects:		
<ul style="list-style-type: none"> <li>□ an assessment of the reversibility of the impact (permanent loss of resources, or impact is reversible after project life);</li> <li>□ whether or not the aspect is controversial;</li> <li>□ an assessment of the irreplaceability of the resource loss caused by the activity (whether the project will destroy the resources which are easily replaceable, or the project will destroy resources which are irreplaceable and cannot be replaced);</li> <li>□ the level of alteration to the natural systems, processes or systems.</li> </ul>		
Negligible	The impact does not affect physical, biophysical or socio-economic functions and processes.	1
Low/potential harmful	The impact has limited impacts on physical, biophysical or socio-economic functions and processes.	2
Medium/slightly harmful	The impact has an effect on physical, biophysical and socio-economic functions and processes, but in such a way that these processes can still continue to function albeit in a modified fashion.	3
High/Harmful	Where the physical, bio-physical and socio-economic functions and processes are impacted on in such a way as to cause them to temporarily or permanently cease.	4
Very high/Disastrous	Where the physical, bio-physical and socio-economic functions and processes are highly impacted on in such a way as to cause them to permanently cease.	5
<b>Incidence (frequency + probability)</b>		
Frequency: This provides a description of any repetitive, continuous or time-linked characteristics of the impact: Once Off (occurring any time during construction or operation); Intermittent (occurring from time to time, without specific periodicity); Periodic (occurring at more or less regular intervals); Continuous (without interruption).		
Once Off	Once	1
Rare	1/5 to 1/10 years	2
Frequent	Once a year	3
Very frequent	Once a month	4
Continuous	≥ Once a day/ per shift	5



ASPECT		IMPACT RATING	
Probability of occurrence: A description of the chance that consequences of that selected level of severity could occur during the exposure.			
Highly unlikely	The probability of the impact occurring is highly unlikely due to its design or historic experience.		1
Improbable	The probability of the impact occurring is low due to its design or historic experience.		2
Probable	There is a distinct probability of the impact occurring		3
Almost certain	It is most likely that the impact will occur		4
Definite	The impact will occur regardless of any prevention measures		5
Risk rating	<p>The risk rating is calculated based on input from the above assessments. The incidence of occurrence is calculated by adding the Extent of the impact to the duration of the impact. The Severity of the impact is calculated based on input from the extent of the impact, the duration and the intensity.</p> <p>Risk = Severity (extent + duration + intensity) x Incidence (frequency + probability) Significance: The significance of the risk based on the identified impacts has been expressed qualitatively as follows:</p> <ul style="list-style-type: none"> <li>o low – the impact is of little importance/insignificant, but may/may not require minimal management</li> <li>o medium - the impact is important, management is required</li> </ul>		
	Low risk	0 – 50	
	Medium risk	51 – 100	
	High risk	101 – 150	
	Low positive	0 – 50	
	Medium positive	51 – 100	
	High positive	101 – 150	

### 3.7 Assumptions, Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. Dense and overgrown vegetation after recent rainfall affected ground visibility. There is also a thick layer of reddish sand across the project area which affected identification of heritage resources. This limitation is successfully mitigated with the implementation of a chance find procedure and monitoring of the study area by the ECO. This report only deals with the current layout of the proposed development and consisted of non-intrusive surface surveys that focussed on tangible resources. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant.

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

## 4 Description of Socio-Economic Environment

According to StasSA, Lephalale is the fastest growing town in the Waterberg district. There are 115 767 people in the district. 9 out of every 10 residents (90,1%) are black African, followed by whites at 7,9%, with other population groups making up the remaining 2%. Amongst those aged 20 years and older, 37% have secondary education, 23,5% have completed matric, 11,6% have some form of higher education, 17,8 completed/have some primary education. Of the 45 527 economically active (employed or unemployed but looking for work) people in the municipality, 22,2% are unemployed. 26,9% of the 26 368 economically active youth (15 – 34 years) in the municipality are unemployed. The building site of the Medupi Power Station and the operational Matimba Power Station are the largest sources of employment together with agricultural activities such as cattle, poultry, and game farming (statssa.gov.za).

## 5 Results of Public Consultation and Stakeholder Engagement:

### 5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process by the EAP. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

## 6 Contextualising the study area:

### 6.1 Literature Review (SAHRIS)

Few sites are known for the greater region and consist of Historic ruins, graves, stone walling, Iron Age pottery, and isolated stone tools. Some surveys in the immediate area found no heritage resources. The following Cultural Resource Management (CRM) assessments (Table 6) were conducted in the larger area and consulted for this report:

**Table 6. CRM reports consulted for the study.**

Author	Year	Project	Findings
Van der Walt, J.	2016	Archaeological Impact Assessment for the Proposed Tshivhaso Coal-Fired Power Plant, Limpopo Province.	No sites
Van der Walt, J.	2018	Heritage Impact Assessment for the proposed Hangklip Public Garage, Lephalale, Limpopo Province.	No sites
Van der Walt, J.	2022	Heritage Impact Assessment for the Vodacom Base Station: Lephalale Army Base, Limpopo Province.	No sites
Van Schalkwyk, J.A.	2005	Heritage Impact Scoping Report for the Proposed New Matimba B Power Station. Lephalale District, Limpopo Province.	Graves, Iron Age pottery, stone tool scatters, small stone walled enclosures, cupules, and engravings.
Van Schalkwyk, J.A.	2006	Report for the proposed establishment of a New Coal Fired Power Station in the Lephalale Area, Limpopo Province.	Iron Age pottery, graves.
Pistorius, J.C.C.	2007	A phase 1 HIA for Eskom's proposed 400 kV Power Line Route between Matimba B Power Station and the Marang Substation	Stone walling, graves, and ruins.
Pistorius, J.C.C.	2013	A Phase I Heritage Impact Assessment (HIA) Study for Eskom's Proposed Community Network Centre in Lephalale in the Limpopo Province.	No sites
Van Vollenhoven, A.	2008	A Report on a Cultural Heritage Impact Assessment for the Proposed Housing Development at Extension 89 Ellisras on the Farm Onverwacht 503 LQ, Lephalale, Limpopo Province.	Rectangular concrete structure, and remains of an old house.
Roodt, F.	2008	Phase 1 Heritage Impact Assessment (Scoping & Evaluation) Waterkloof Farm 502 LQ 141 & 142 Lephalale (Ellisras), Limpopo.	No sites
Anderson, G.	2021	Heritage Survey of the Proposed Lephalale Solar Project, Lephalale Local Municipality Waterberg District, Limpopo Province.	No sites

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

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

## 6.2 Archaeological Background

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

### 6.2.1 Stone Age

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

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

Early human occupation in the area dates back to the MSA with associated scatters being more commonly found. MSA artefacts have been found in the Oliboompoot Cave to the south of Lephalale (Mason 1962, van der Ryst 2006) and in the river gravels of the Limpopo (Pistorius, 2007). Bergh (1999), also noted MSA sites which were identified near the Lephalala River. MSA sites associated with this region of the Limpopo have been found to be largely associated with pans and ancient drainage systems (Huffman and van der Walt 2011, Mason 1962).

Research in the Waterberg plateau suggests that occupation from the MSA to the LSA was not continuous with a hiatus of human occupation occurring between occupation periods within the landscape (van der Ryst 1998). LSA rock art sites are abundantly found in the larger region (Bergh 1999). In addition to art, LSA sites also contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley 1987). Spear hunting probably continued, but LSA people also hunted small game with bows and poisoned arrows. Important LSA deposits have also been excavated in Oliboompoot Cave (Mason 1962) and other sites in the Waterberg region (Van der Ryst 1998). Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. A single kopje known as Nelsonskop on an otherwise featureless landscape has engravings on the southern face of the kopje with ephemeral stone walls on top of the hill.

### 6.2.2 Iron Age

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. 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 (EIA): Most of the first millennium AD.

- » The Middle Iron Age (MIA): 10th to 13th centuries AD.
- » The Late Iron Age (LSA): 14th century to colonial period.

The Limpopo Province is well known for being the point of entry into South Africa for the Bantu migration with evidence of widespread Iron Age occupation throughout the province. The LSA and EIA periods of occupation within the region surrounding the project area have been found to occur contemporaneously. Archaeologists have not yet resolved the role of a special pottery, known as Bambata, in the spread of pastoralism and mixed farming (Huffman 2007). Some believe that Bambata pottery represents the vanguard of the Early Iron Age, or alternatively, Khoe pastoralists, while others believe it was acquired by LSA people through trade. This pottery has been found at Oliboompoort in LSA deposits (Mason 1962, Van der Ryst 2006) and is thus believed to exist in the general region.

Some Iron Age settlements are on record for the general area, for instance alongside the Matlabas River (Aukema in Huffman 1990) and in Botswana (Biemond 2005) and south of the Limpopo close to Steenbokpan (Huffman and van der Walt, 2011). These sites are recognised by distinctive pottery known as the *Letsibogo* facies of Moloko (Huffman 2007). Upwards of 200 Iron Age sites have also been identified near the Lephhalala River region (Bergh 1999).

### 6.2.3. Historical Period

Voortrekkers crossed the Vaal River in 1836, and within a few years, began to spread north. Much of the Limpopo Province contained tsetse fly, and so early Boer farmers didn't settle immediately in the area. European settlement of the region began at the beginning of the last century. Some of the first settlers, D.P. van der Westhuizen and C. Ricks, both arrived in about 1901. The study area is close to the ox-cart route to Botswana that crossed the Limpopo a few kilometres upstream from the modern border post. Some of pans were used as outspans along the route. Because the area was not suitable for grain agriculture, African farmers did not live in the area, and labour had to come from far afield. Rather the area was used primarily for hunting.

The town of Ellisras was established in 1960 on the farm Waterkloof and was named after Patrick Ellis and Piet Erasmus who were the original farm owners. The discovery of coal led to the development of the Grootegeeluk Coal Mine in the early 1980s which led to the subsequent development by Eskom of the Matimba Power Station in close proximity of the coal mine. By 1986, Ellisras was granted municipal status. In 2002, the name of Ellisras was changed to Lephhalale, named after the river which runs through the area. The name comes from the Setswana term 'to flow'.

## 7 Description of the Physical Environment

The vegetation and landscape are described by Mucina and Rutherford (2006) as Limpopo Sweet Bushveld. The landscape and vegetation are described as plains, sometimes undulating or irregular, traversed by several tributaries of the Limpopo River. Short open woodland; in disturbed areas thickets of *Acacia erubescens*, *A. mellifera* and *Dichrostachys cinerea* are almost impenetrable.

The project area is situated about 30km west of Lephhalale along the road that runs along the northern edge of the Eskom Medupi power station. The project area is a large property that is completely fenced off with a game fence. The main activities within the project area are hunting related with various associated structures scattered throughout the landscape. These include built hides, water reservoirs, netted wildlife loading areas and various kraal structures. Existing infrastructure within the project area mainly consists of large powerline corridors that cross the landscape as well as various small gravel roads that subdivide the project area into smaller camps. The surrounding environment consists of dense wooded vegetation and extremely overgrown ground vegetation such as tall grasses and shrubs. General site conditions are illustrated in Figures 7.1 to 7.10.



Figure 7.1. Various gravel roads traverses the project area and were used to access the portions of the project.



Figure 7.2. Existing workers housing situated near the northern boundary of the project area.



Figure 7.3. Northern boundary of the project area along the main fence next to the main tar road.



Figure 7.4. Western boundary of the project area along the boundary fence.



Figure 7.5. General view of the surrounding landscape - Image showing a small pan covered in a thick layer of grass near the western edge of the project area.



Figure 7.6. Image showing degraded farm infrastructure used for water holes.



Figure 7.7. Image showing the dense vegetation across the project area.



Figure 7.8. Existing kraal structures within the project area.

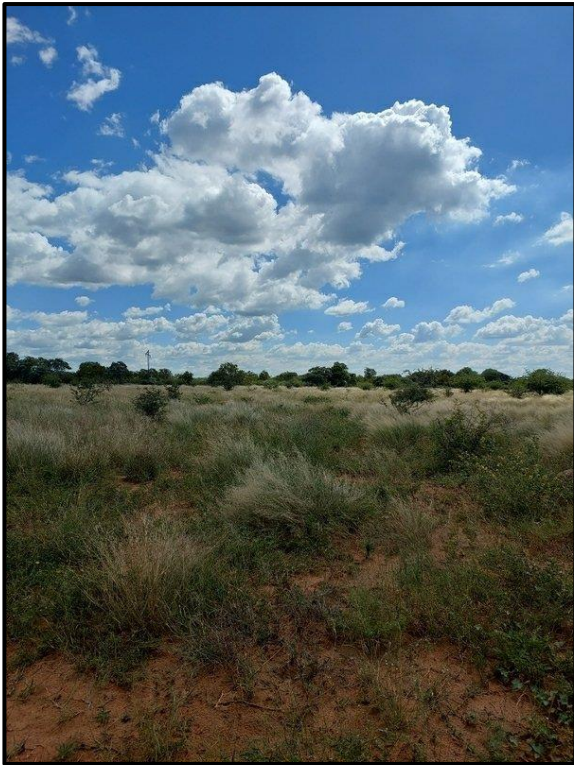


Figure 7.9. General site conditions near the southern boundary of the project area.



Figure 7.10. General site conditions around the central sections of the project area showing the dense vegetation across the project area.

## 8 Findings of the Survey

### 8.1 Heritage Resources

The project area is generally flat and has a natural pan in the northwest section of the project area but lack any other focal points that would have attracted human occupation in antiquity. During the survey no heritage sites of significance were identified within the project area.

### 8.2 Cultural Landscape

The landscape is flat with a natural pan present within the study area. The project area had varying areas of cultivation since 1969. The project area is largely undeveloped apart from hunting related structures. There are no structures present within the project area which are older than 60 years.



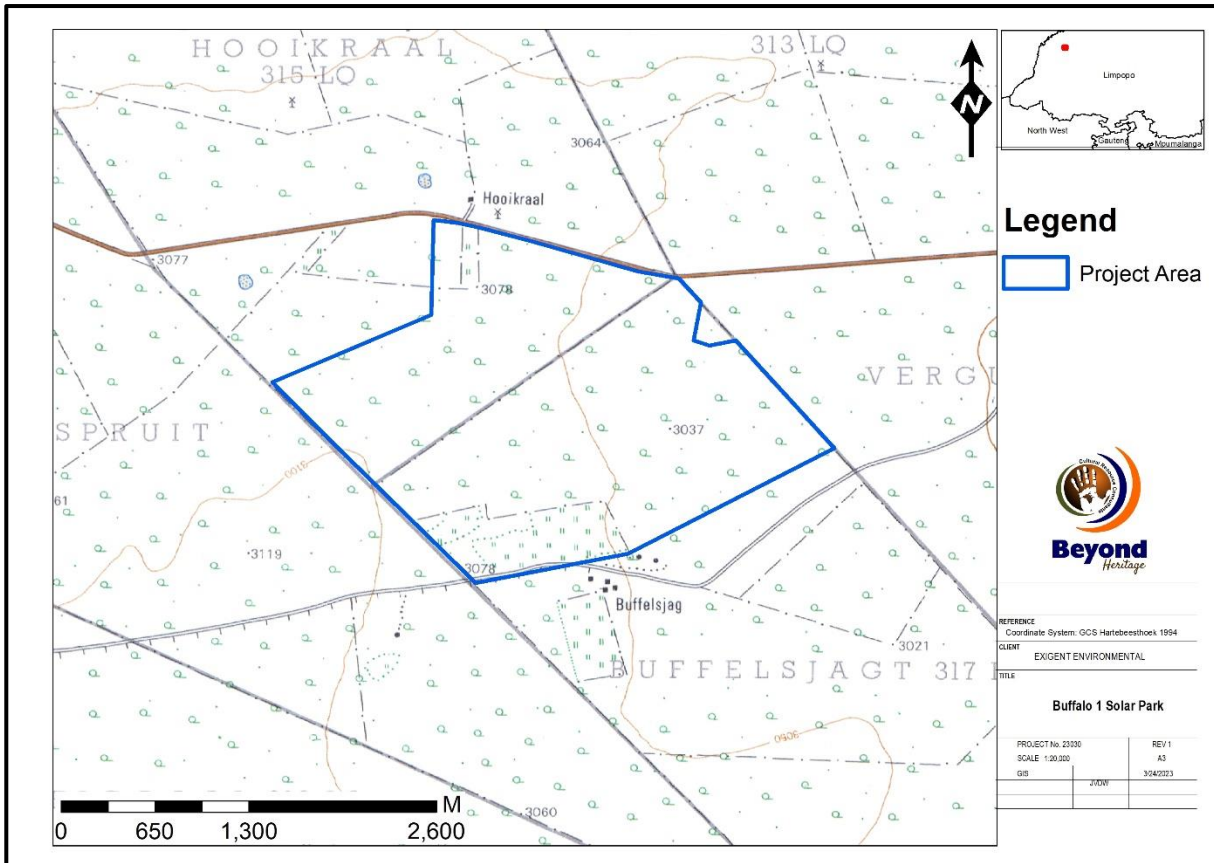


Figure 8.1. 1969 Topographic map indicating no developments in the project area.

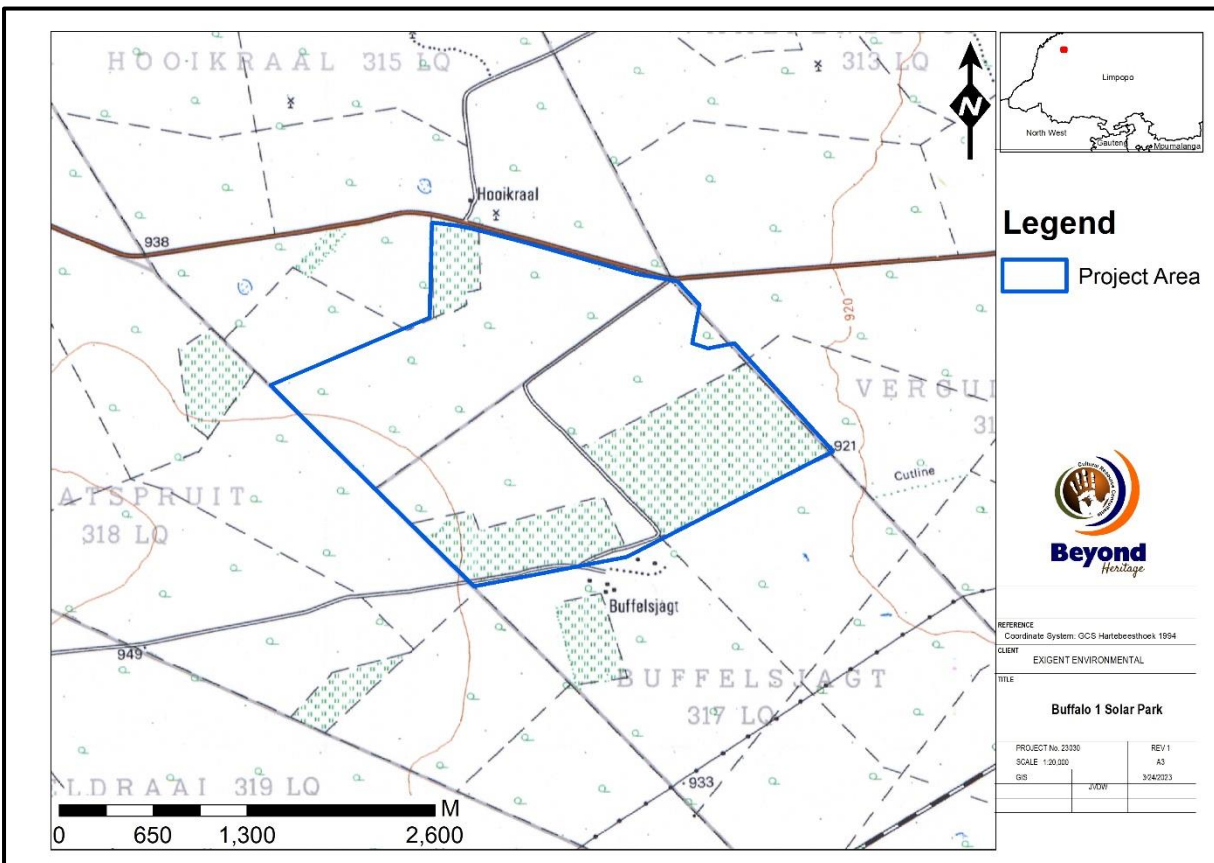


Figure 8.2. 1980 Topographic map indicating areas of cultivation and informal roads within the project area and development of a powerline south of the project area.

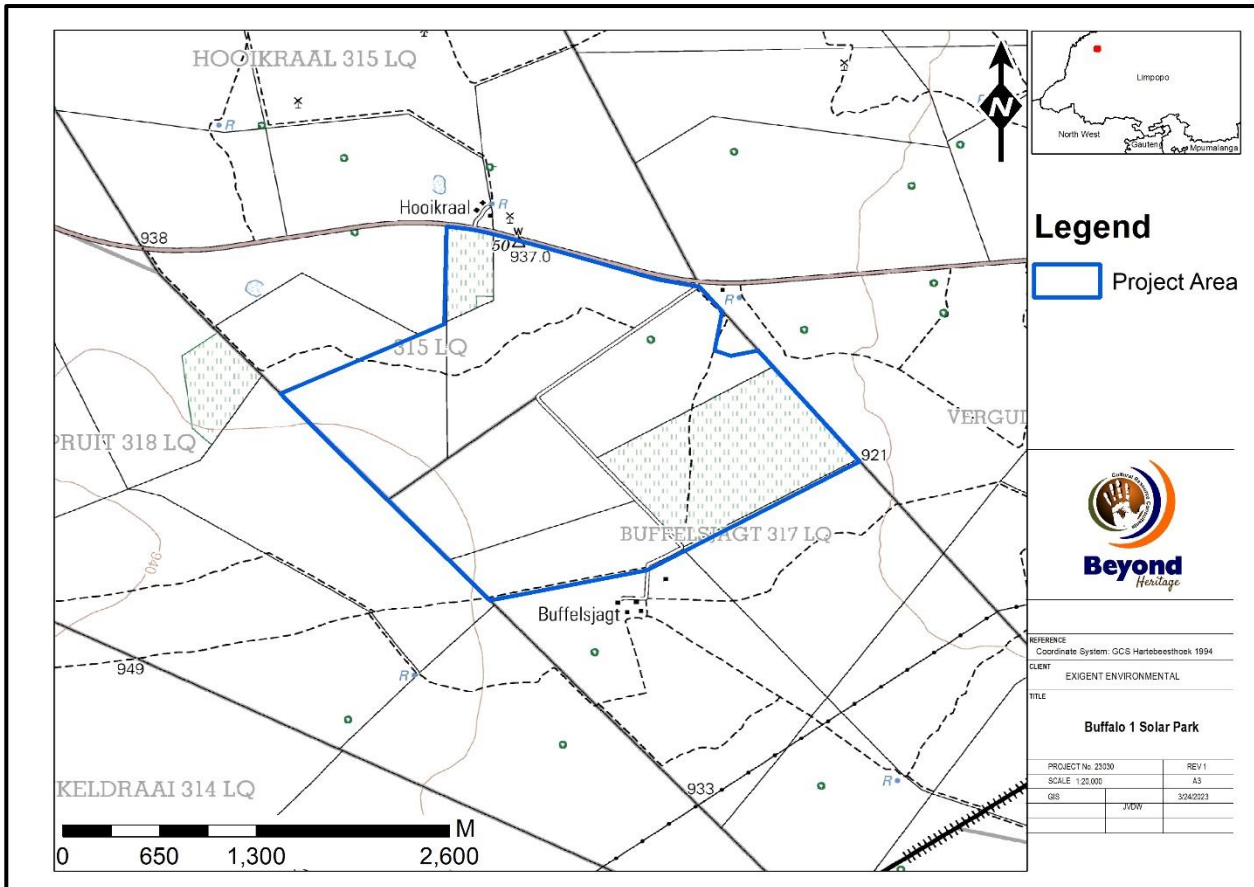
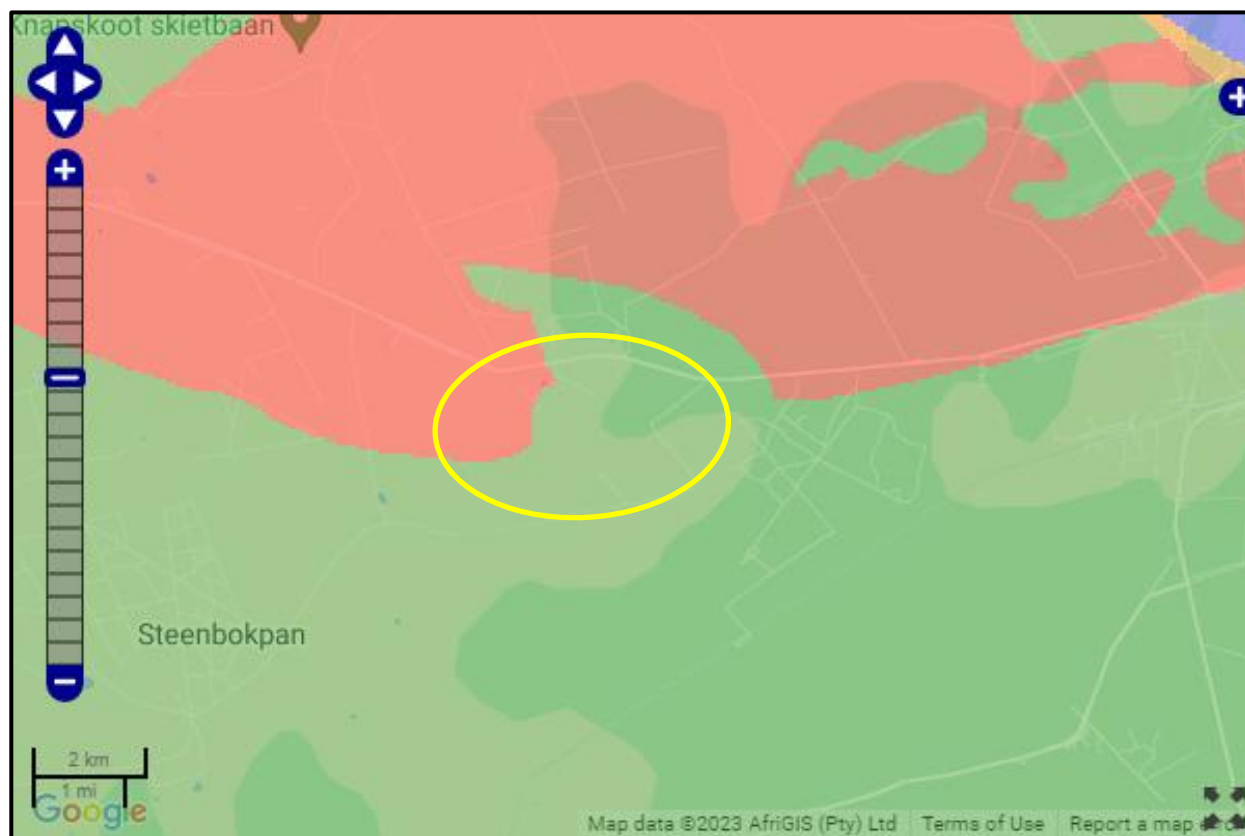


Figure 8.3. 2008 Topographic map indicating no new developments within the project area.

### 8.3 Paleontological Heritage

The study area is indicated as of moderate and very high palaeontological significance on the SAHRA Paleontological map (Figure 8.4) and an independent study was conducted for this aspect (Bamford 2023). Bamford concluded that based on the field work and site visit that it is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. Most of the site is on Quaternary sands that have a lower sensitivity and might have fragmented transported fossils. NO fossils of any kind were seen on the surface. There is a very small chance that fossils may occur in below the ground surface in the shales of the Swartrand Formation (fossil plants of the *Glossopteris flora*) so a Fossil Chance Find Protocol should be added to the EMPr.



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

Figure 8.4. Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

## 9 Potential Impact

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

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

- Establishment of new roads and upgrade of existing roads;
- Earthworks for temporary infrastructure including laydown areas;
- Visual impact of the PV Facility 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 that impact on heritage sites;
- Excavations during construction of the sub stations.

### 9.1.1 Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

### 9.1.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

### 9.1.3 Operation Phase

No impacts are expected during the operation phase.

### 9.1.4 Impact Assessment for the Project

**Table 7. Impact assessment on the Project area during the pre-construction and construction phase.**

Aspect	Pre-Mitigation	Post-Mitigation
Phase	Pre-Construction And Construction	
Status if impact	Direct	Direct
Nature of impact	Negative	Negative
Extent	1	1
Duration	1	1
Intensity	1	1
Severity (E + D + Int)	1 + 1 + 1 = 3	1 + 1 + 1 = 3
Probability	2	1
Frequency	1	1
Incidence (F + P)	1 + 2 = 3	1 + 1 = 2
Risk (S x I)	3 x 3 = 9 LOW RISK	3 x 2 = 6 = LOW RISK

## 10 Conclusion and recommendations

The study area is generally flat and undeveloped apart from multiple modern structures relating to hunting activities. None of these structures are older than 60 years and are therefore not considered as heritage resources. The palaeontological sensitivity of the study is moderate and very high, and an independent assessment was done (Bamford 2023) whereby NO fossils were found within the project area, and it is recommended that a Fossil Chance Find Protocol should be added to the EMPr. No other types of heritage resources of significance were noted during the survey.

It is recommended that the project can commence on the condition that the following recommendations (Section 10) are implemented as part of the EMPr and based on approval from SAHRA.

### 10.1 Recommendations for condition of authorisation

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

#### Recommendations:

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

### 10.2 Chance Find Procedures

#### 10.2.1 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 10.5.

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

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

•

### 10.2.2 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 (plants, insects, bone or trace fossils) 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 trace fossils such as stromatolites in the dolomites or the Quaternary bones, rhizoliths, traces. 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.

### 10.3 Reasoned Opinion

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

### 10.4 Potential risk

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

**10.5 Monitoring Requirements**

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

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

**Table 8.** Monitoring requirements for the project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Resources Chance Finds	Entire project area	ECO	Weekly (Pre construction and construction phase)	Proactively	<ul style="list-style-type: none"> <li>• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented:                             <ol style="list-style-type: none"> <li>1. Cease all works immediately;</li> <li>2. Report incident to the Sustainability Manager;</li> <li>3. Contact an archaeologist/ palaeontologist to inspect the site;</li> <li>4. Report incident to the competent authority; and</li> <li>5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities.</li> </ol> </li> </ul>

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
					<ul style="list-style-type: none"> <li>Only recommence operations once impacts have been mitigated.</li> </ul>

**10.6 Management Measures for inclusion in the EMPr**

Table 9. Heritage Management Plan for EMPr implementation

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



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