

# HERITAGE IMPACT ASSESSMENT

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

FOR THE IDWALA MINING PERMIT, NEAR HARTEBEEFSFONTEIN IN THE NORTH WEST PROVINCE

**Type of development:**

Mining Permit

**Client:**

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Project Reference:

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Report date:

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## APPROVAL PAGE

<b>Project Name</b>	Idwala Mining Permit
<b>Report Title</b>	Heritage Impact Assessment for the Proposed Idwala Mining Permit, North West Province.
<b>Authority Reference Number</b>	TBC
<b>Report Status</b>	Draft Report
<b>Applicant Name</b>	Idwala Industrial Holdings Limited

	<b>Name</b>	<b>Qualifications and Certifications</b>	<b>Date</b>
<b>Archaeologist</b>	Jaco van der Walt	MA Archaeology ASAPA #159 APHP #114	March 2021

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**Amendments on Document**

Date	Report Reference Number	Description of Amendment
25 May 2021	2114	Technical revision based on comments from the client.

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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 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 and 7.1.
(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
(l) 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 <b>including identified alternatives on the environment</b> or activities;	Section 9
(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 6
(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	Section 13

**Executive Summary**

Idwala Industrial Holdings Limited appointed ZN Geo Services as the Environmental Assessment Practitioner (EAP) to conduct a Basic Assessment Report (BAR) process in order to obtain an Environmental Authorisation (EA) for the proposed Idwala Mining Permit. The study area is located  $\pm 16$  kilometres (km) southwest of the town of Hartbeesfontein and  $\pm 30$  km west of Klerksdorp in the North West Province. HCAC was appointed to conduct a Heritage Impact Assessment (HIA) for the project and the study area was assessed on desktop level and by a non-intrusive field survey. Key findings of the assessment include:


- The study area has been fallow for several years and after the high rainfall experienced in the area, grass cover is high limiting archaeological visibility.
- During the survey three observations points were recorded consisting of isolated and weathered Stone Age artefacts. The features attest to human presence in the area in antiquity but are out of context and scattered too sparsely to be of any significance apart from mentioning them in this report.
- Based on the SAHRA Palaeontological map the area is of insignificant sensitivity and no further studies are required for this aspect.

No significant heritage resources will be affected by the development and therefore the impact of the project on heritage resources are low and the project can commence based on the implementation of the recommendations in this report and the approval of SAHRA.

**Recommendations:**

- Implementation of a chance find procedure for the project.

**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 (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I:</p> <ul style="list-style-type: none"> <li>• I act as the 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 24F of the Act.</li> </ul>
<b>Signature</b>	
<b>Date</b>	13/04/2021

**a) Expertise of the specialist**

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia and Tanzania. Through this, he has a sound understanding of the 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
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact 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)

Early 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:

HCAC was appointed to conduct a HIA for the proposed mining permit for approximately 4,8 hectares on portion 19 of the farm Syferfontein (Figure 1-1 to 1-4). The report forms part of 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, isolated Stone Age artefacts were recorded. 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 phases of the project, i.e., preconstruction, 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

The project comprises the proposed mining development described in Table 2 and 3.

**Table 2: Project Description**

<b>Farm and portions</b>	Portion 19 of the farm Syferfontein
<b>Magisterial District</b>	The project is located within the Dr Kenneth Kaunda District Municipality and City of Matlosana Local Municipality
<b>Central co-ordinate of the development</b>	26°52'21.56"S and 26°19'27.66"E

**Table 3: Infrastructure and project activities**

<b>Type of development</b>	Mining Permit
<b>Size of development</b>	Less than 5 hectares
<b>Project Components</b>	<p>The proposed Idwala Pyrophyllite Mine will be an opencast mine. Some drilling and blasting may be required to remove the surrounding or overlying hard rock and reach the pyrophyllite (only when necessary). By means of an excavator or front end loader, the pyrophyllite is barred down from the exposed face. The derived rocks are loaded, by either an excavator or front-end loader, to the primary crusher. From the primary crusher, the pyrophyllite is sent through a vibrating screen where it is sorted in particle size. The pyrophyllite, once crushed, will be loaded onto trucks and transported to Idwala's Industrial Minerals branch located in Benoni, Gauteng for secondary processing and packaging. The typical primary mining fleet for this mining method consists of excavators, front-end loaders and articulated dump trucks. The typical ancillary fleet assisting the mining fleet for this mining method include: graders, water trucks and diesel bowzers.</p> <p>Idwala Industrial Holdings ("Idwala") will initially operate using diesel-powered generators to sustain the office facilities. Idwala will apply to Eskom for a connection to the grid for power to run the plant and all associated processes at the operation when required. Water supply requirements are estimated to be ±1000 litres per day. Water will initially be trucked in using a water truck and water storage tanks. The site has an unregistered borehole, the relevant registration and permits must be obtained before water can be extracted. The surface infrastructure of the mine includes the following:</p> <ul style="list-style-type: none"> <li>» Haul roads, mine and access road of the main road;</li> <li>» Stockpiles located in the plant area</li> <li>» Stores</li> <li>» Crushing Plant</li> <li>» Administration Offices</li> <li>» Ablutions</li> <li>» Trackless mobile machinery and light delivery vehicle parking bays</li> </ul>

## 1.3 Alternatives

No alternatives were provided to be assessed although the extent of the area assessed allows for siting of the development to minimise impacts to heritage resources.



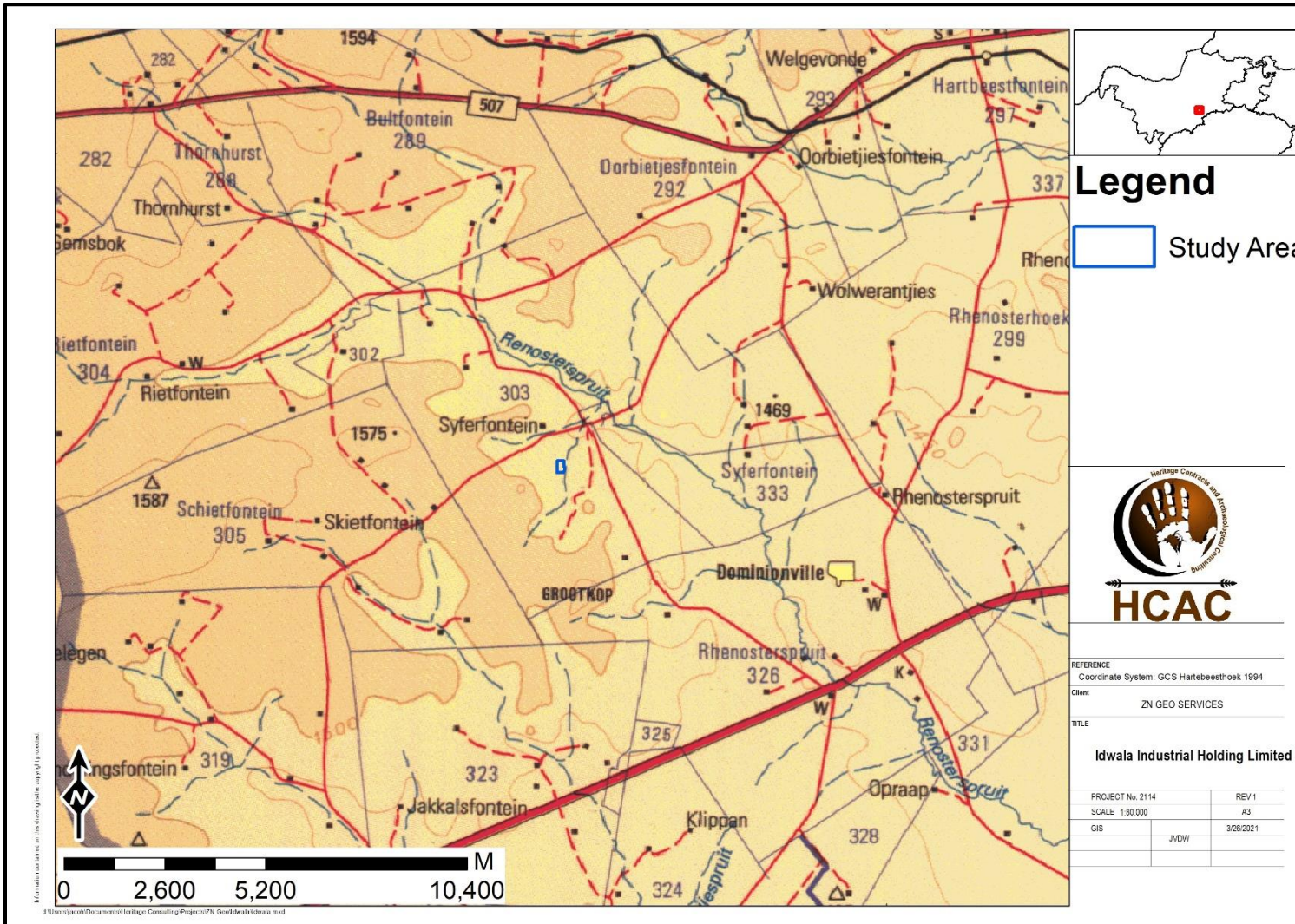


Figure 1-1. Regional setting (1: 250 000 topographical map).

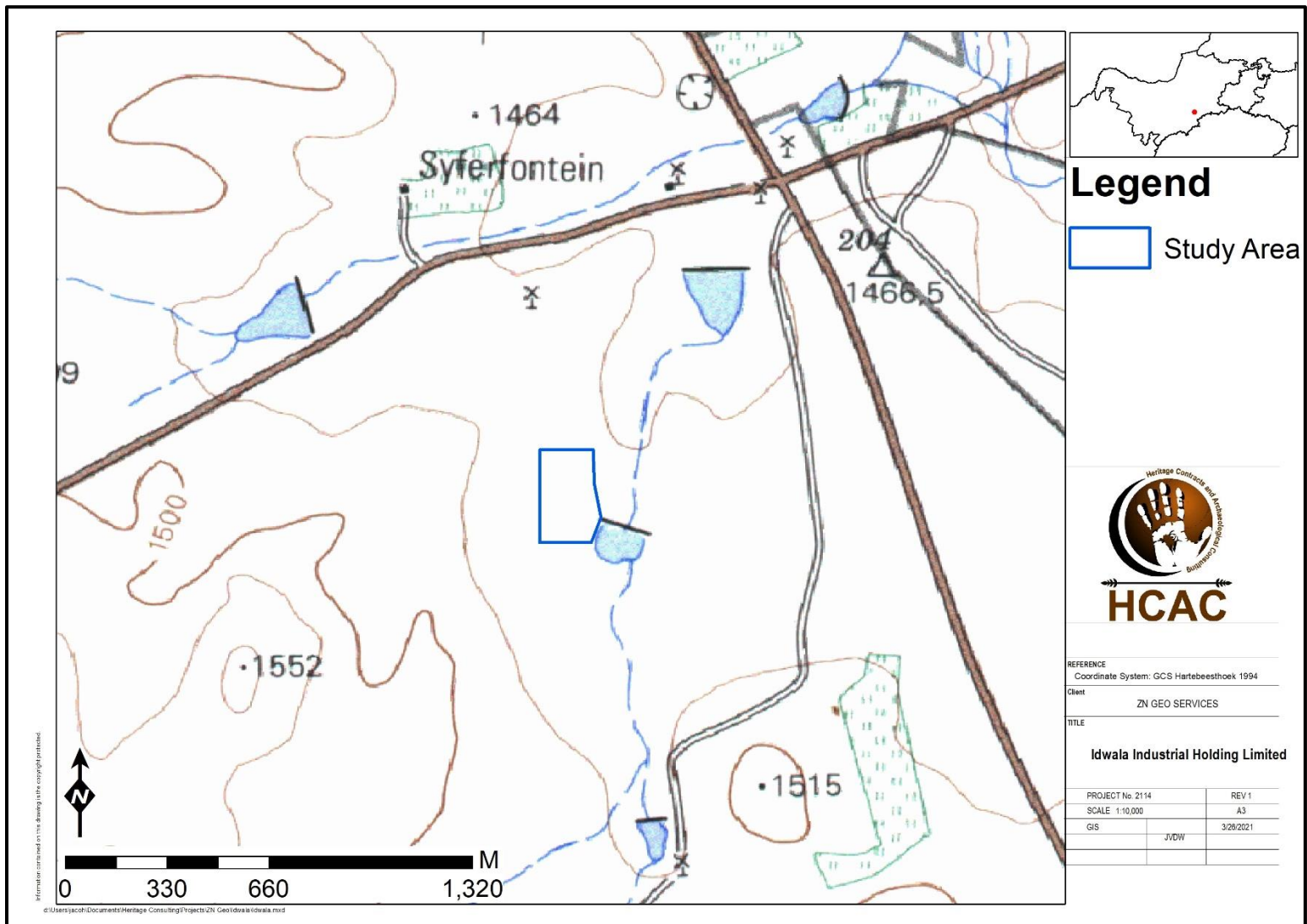


Figure 1-2: Local setting (1:50 000 topographical map).



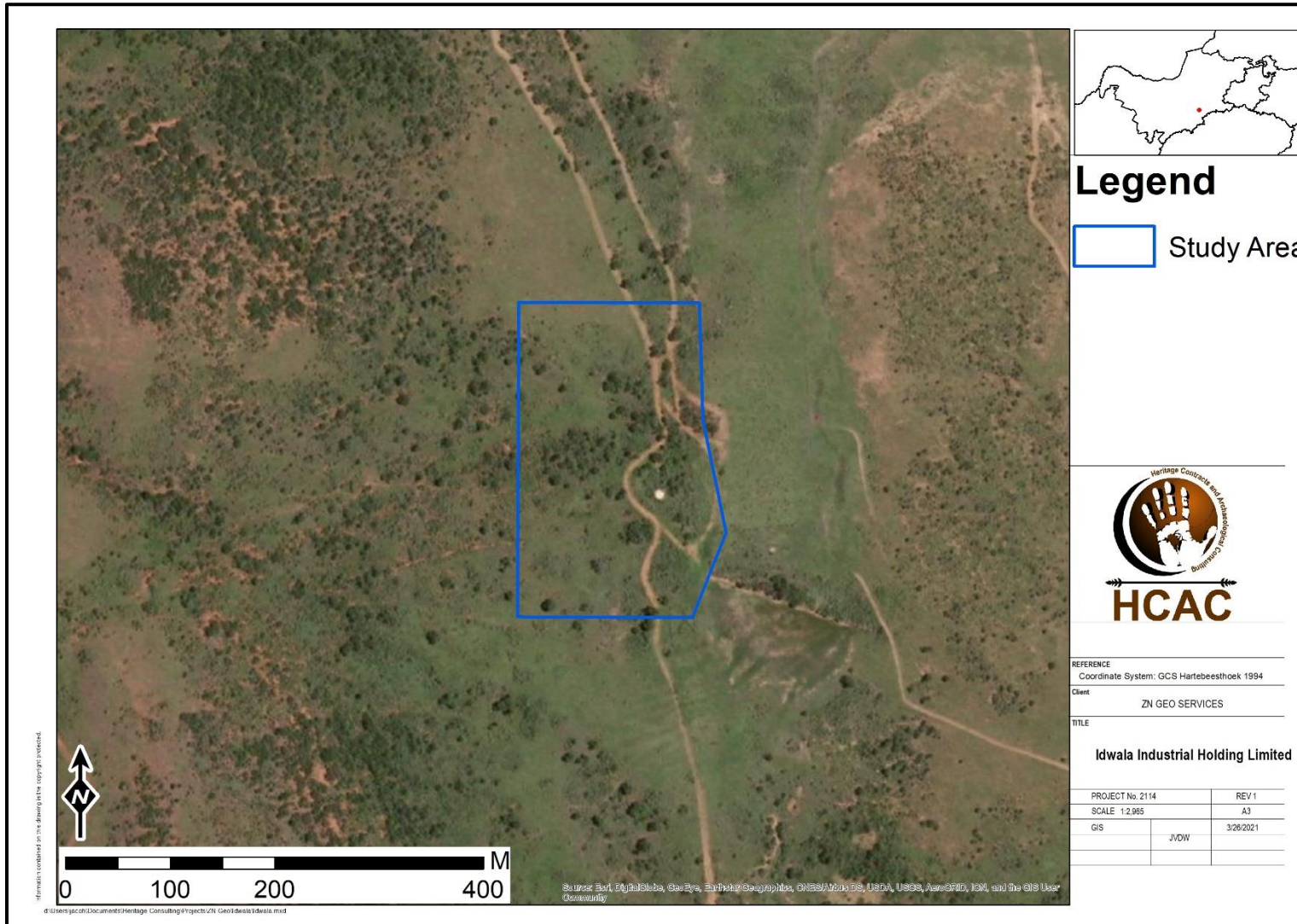


Figure 1-3. Aerial image of the development footprint.

## 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)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

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 of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province 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 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 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. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983) 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. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. 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 Section 24 of Act 65 of 1983 (Human Tissues Act).

### 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 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 to capture and address any issues raised by community members and other stakeholders.

#### 3.4 Site Investigation

The aim of the site survey was to:

- a) survey the proposed project area to 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 recorded in the project area.

**Table 4: Site Investigation Details**

	<b>Site Investigation</b>
Date	5 March 2021
Season	Summer- Archaeological visibility was low due to dense vegetation, but the area was sufficiently covered to understand the heritage character of the study area (Figure 3-1).



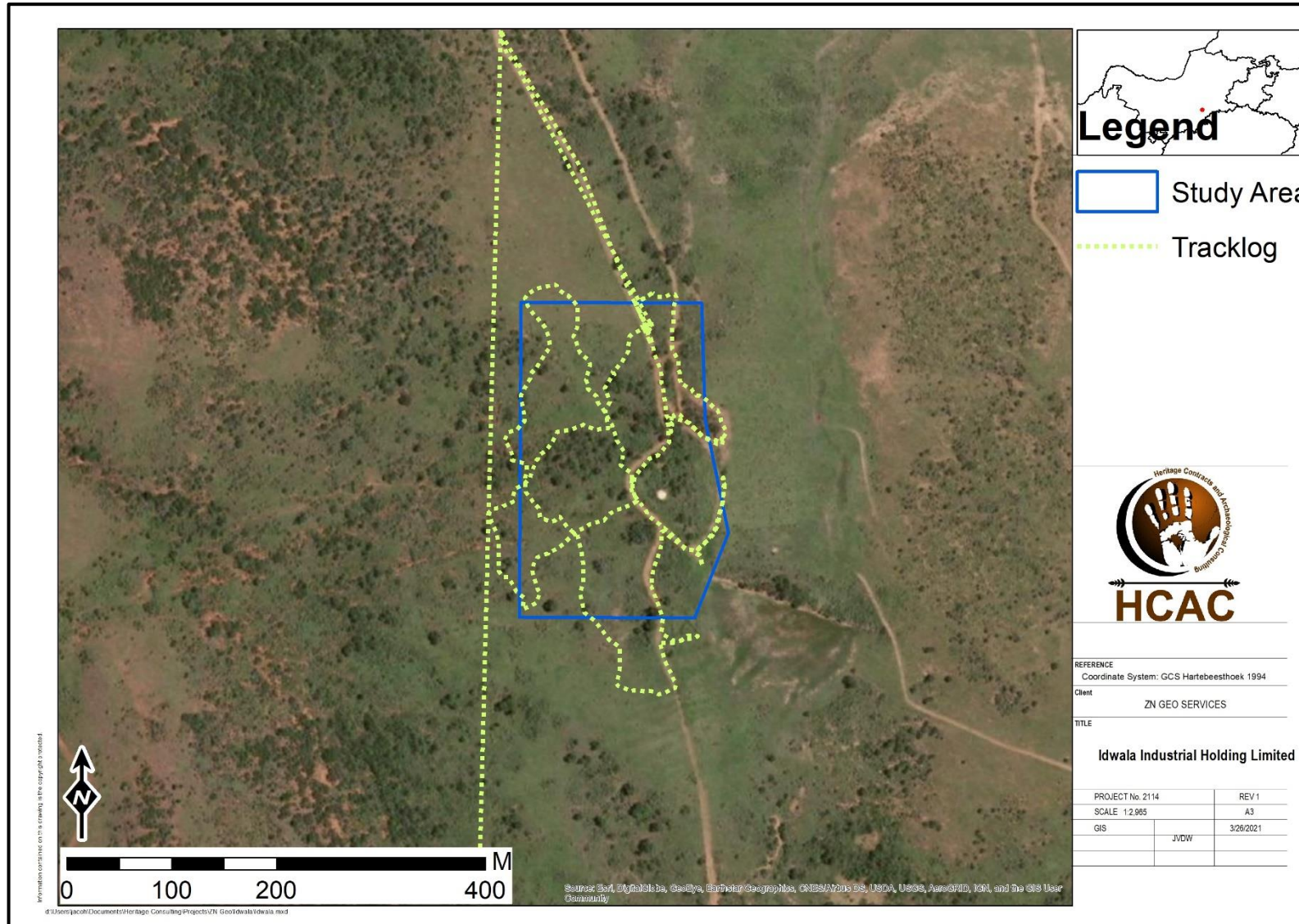


Figure 3-1: Tracklog of the survey in green.

### **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 (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 below was provided by the client.

#### **3.6.1 Assessment of Impacts**

Direct, indirect and cumulative impacts of the issues identified, as well as all other issues identified, in the Basic Assessment phase must be assessed. This methodology allows for the identified potential impacts to be analysed in a systematic manner, with significance rating (from insignificant to very high) assigned to each potential impact. The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria used to determine impact consequence include extent, intensity and duration of the impact and are presented in Table 6.

**Table 6: Criteria used to determine the consequence of the impact**

Rating	Definition of Rating	Score
<b>A. EXTENT – the area in which the impact will be experienced</b>		
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
Inter(national)	Nationally or beyond	3
<b>B. INTENSITY – the magnitude or size of the impact</b>		
Low	Site-specific and wider natural and / or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and / or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and / or social functions or processes are severely altered	3
<b>C. DURATION – the time frame for which the impact will be experienced</b>		
Short-term	For the duration of project activities / up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a consequence rating, as set out in Table 7 (Note that the lowest possible consequence score is 3).

**Table 7: Method used to determine the consequence score**

<b>Combined Score (A+B+C)</b>	3 - 4	5	6	7	8 - 9
<b>Consequence Rating</b>	Very Low	Low	Medium	High	Very High

Once the consequence is derived, the probability of the impact occurring is considered, using the probability classifications presented in Table 8.

**Table 8: Probability classification**

<b>Probability of impact – the likelihood of the impact occurring</b>	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring



The overall significance of impacts is determined by considering consequence and probability using the rating system prescribed in Table 9.

Table 9: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERYHIGH	VERY HIGH

Finally the impacts are considered in terms of their status (positive or negative) and the confidence in the ascribed impact significance rating is noted. The classification for considering the status of impacts and the confidence in assessment is laid out in Table 10.

Table 10: Impact Status and Confidence Classification

Status of Impact	
Indication whether the impact is adverse (negative) or beneficial (positive)	+ ve (positive – a 'benefit')
	- ve (negative – a 'cost')
	Neutral
The degree of confidence in predictions based on available information, the environmental consultant's judgment and / or specialist knowledge.	Low
	Medium
	High

Different types of impacts were also considered in the impact ratings, as listed in Table 11.

Table 11: Types of Impact

<b>Direct</b> – impacts that result from the direct interaction between a project activity and the receiving environment (e.g. dust generation which affects air quality).
<b>Indirect</b> – impacts that result from other (non-project) activities but which are facilitated as a result of the project or impacts that occur as a result of subsequent interaction of direct project impacts within the environment (e.g. reduced water supply that affects crop production and subsequently impacts on subsistence-based livelihoods).
<b>Cumulative</b> – impacts that act together with current or future potential impacts of other activities or proposed activities in the area / region that affect the same resources and / or receptors (e.g. combined effects of waste water discharges from more than one project into the same water resource, which may be acceptable individually, but cumulatively result in a reduction in water quality quality).

There is no statutory definition of 'significance' and its determination is therefore necessarily partially subjective. Criteria for assessing the significance of impacts arise from the following key elements:

Status of compliance with relevant local legislation, policies and plans, any relevant or industry policies, environmental standards or guidelines and internationally accepted best practice:

- » The consequence of the change to the biophysical or socio-economic environment (e.g. loss of habitats, decrease in water quality) expressed, wherever practicable, in quantitative terms. For socio-economic impacts, the consequence must be viewed from the perspective of those affected, by taking into account the likely perceived importance of the impact and the ability of people to manage and adapt to the change;
- » The nature of the impact receptor (physical, biological, or human). Where the receptor is physical (e.g. a water resource) its quality, sensitivity to change and importance must be considered. Where the receptor is biological, its importance (e.g. its local, regional, national or international importance) and its sensitivity to the impact must be considered. For a human receptor, the sensitivity of the household, community or wider societal group must be considered along with their ability to adapt to and manage the effects of the impact; and
- » The probability that the identified impact will occur. This is estimated based upon experience and / or evidence that such an outcome has previously occurred.

The impact significance rating also reflects the need for mitigation. While low significance impacts may not require specific mitigation measures, high significance negative impacts demand that adequate measures be put in place, to reduce the residual significance (impact significance rating, after mitigation), as described below in Table 12.

Table 12: Definitions of Impact Significance

<b>Insignificant:</b> the potential impact is negligible, and no mitigation measures or environmental management is required.
<b>Very Low &amp; Low:</b> no specific mitigation measures required, beyond normal environmental good practices.
<b>Medium - High:</b> specific mitigation measures should be devised, to reduce the impact significance to an acceptable level. If mitigation is not possible, compensation measures should be considered.
<b>Very High:</b> specific mitigation measures should be identified and implemented, to reduce the impact significance to an acceptable level. If such mitigation is not possible, very high significance negative impacts should be considered in the project's authorisation process.

*Note that impact significance will be rated in the prescribed way both without and with the effective implementation of the recommended mitigation measures.*

### **3.7 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 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. Similarly, the depth of cultural deposits and the extent of heritage sites cannot be accurately determined due its subsurface nature. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. 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. 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 the IDP for the City of Matlosana and estimates based on the population growth rate of SA Statistics (1.04%) and the Matlosana Socio- Economic Report, the City of Matlosana has a total population of 438 486 people, of whom 103 407 (92%) are urbanised and 35 079 (8%) are rural. (Mining villages form part of the urban areas). The largest population concentrations are in Jouberton (31%), Kanana, Khuma and Tigane, which represent 67% of the total urban population. The City of Matlosana has a population density of 123 persons per km<sup>2</sup> people of which 92% are urbanised and 8% rural.. Economic drivers in the area are mostly mining and agriculture.

## **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. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

## **6 Literature / Background Study:**

### **6.1 Literature Review (SAHRIS)**

The following CRM reports were consulted for this report as outlined in Table 13

Table 13. Studies consulted for the project

<b>Author</b>	<b>Year</b>	<b>Project</b>	<b>Findings</b>
Kusel, U.	2007	Cultural Heritage Resources Impact Assessment Of Portions 252, 413 & 449 Of The Farm Hartbeesfontein 297 Ip Matlosana Local Municipality North West Province	Iron Age
J.A. van Schalkwyk	2010	Heritage Impact Assessment For The Proposed Hermes/Dominion Reefs 132kv Power Line Development, Klerksdorp Magisterial District, North West Province	No sites
Van der Walt, J	2016	AIA Orkney Solar Farm, North West Province	Burial sites

### 6.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated in the study area.

## 6.2 Background to the general area

### 6.2.1 Archaeology of the area

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

#### 6.2.1.1 Stone Age

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

**Earlier Stone Age:** The period from  $\pm 2.5$  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.

Since there are no caves in the study area no Stone Age sites of significance are expected. The Matlwase LSA site is the only known LSA site in the area and is located close to Wolmaransstad (Bergh 1999). San Rock Engravings, Stone Age Implements and Structures are found close to the town of Ottosdal on farms such as Witpoort, Gestoptefontein, Driekuul and Korannafontein. Jeremy Hollman (2013) published a study on rock engravings at Gestoptefontein and Driekuul on Wonderstone which is a type of pyrophyllite.

#### 6.2.1.2 The 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 to the north west of the study area 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.

Some well-known examples 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). It is possible that sites 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 well-known rock art site of Bosworth that also included Later Stone Age artefacts (Mason 1962) is located to the north of the study area.

### **6.3 Historical Information**

The town of Ottosdal was established as a Dutch Reformed Church Parish on the farm Korannafontein in 1913 and named after its owner, GP Otto. Ottosdal is the only place in South Africa where the unique "Wonderstone" or Pyrophyllite, is found and mined. The annual agricultural show in Ottosdal is one of the oldest in the Province (<http://www.tourismnorthwest.co.za/ottosdal>).

The Town of Ottosdal is also home to a Garden of Remembrance that contains graves of soldiers killed during the Anglo-Boer War as well as an old Farmhouse, built in 1910 and that now houses a unique African collection. Lastly the Old Water Mill in town was built in 1860 and has been declared a national monument (<http://www.tourismnorthwest.co.za/ottosdal>).

#### **6.3.1 Anglo-Boer War**

During the Second Boer War (1899-1902), there were many battles in the area and the Klerksdorp area also housed a large concentration camp. The most famous battle in the Klerksdorp area is the Battle of Ysterspruit. The Boer General, Koos de la Rey, achieved a great victory and this battle is one of the most celebrated of the general's career. It was this battle in which the Boer soldiers pioneered the art of firing from horseback.

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.

Sites relating to the Anglo Boer War have been recorded and indicated by Meyer (1971), Breytenbach (1978), Van den Berg (1996) as well as Scheepers-Strydom (1970) for the greater study area. A British Fort as well as trenches and Cemeteries dating from the Anglo-Boer War, 1899 to 1902, are located close to the town of Ottosdal on the farms Gestoptefontein and Driekuul.

#### **6.3.2 Cultural Landscape**

Historical aerial photography of the area is available from the early 1960s, the area is rural in character used for agriculture and remained undeveloped until after 1992. This is illustrated by historical maps and aerial images of the study area (Figure 6-1 to 6-5). Developments are sparse and limited to infrastructure and roads.



Figure 6-1. 1963 Aerial image of the study area indicating no developments within the study area apart from a dam on the south eastern border.

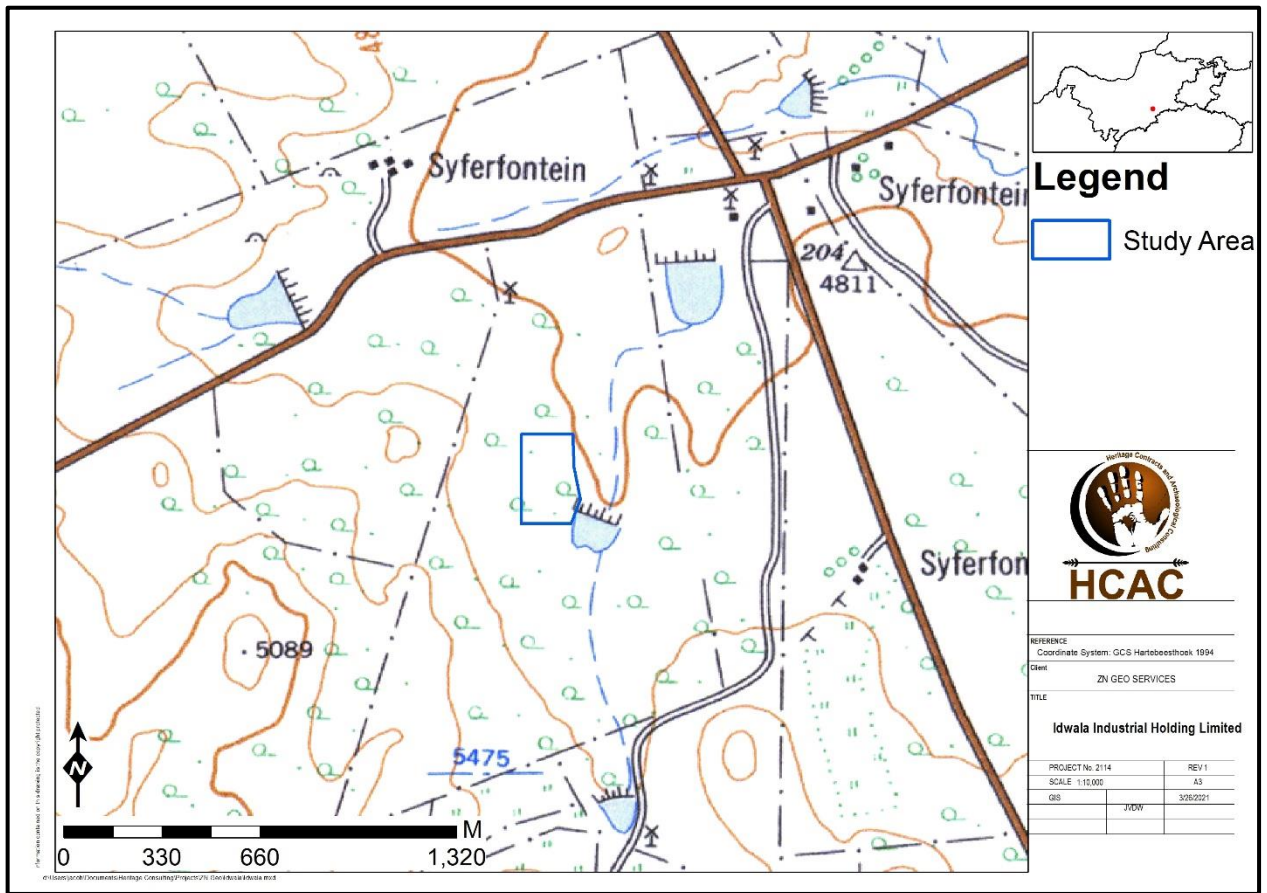


Figure 6-2. 1967 Topographic map indicating no developments in the area apart from a dam on the south eastern border.



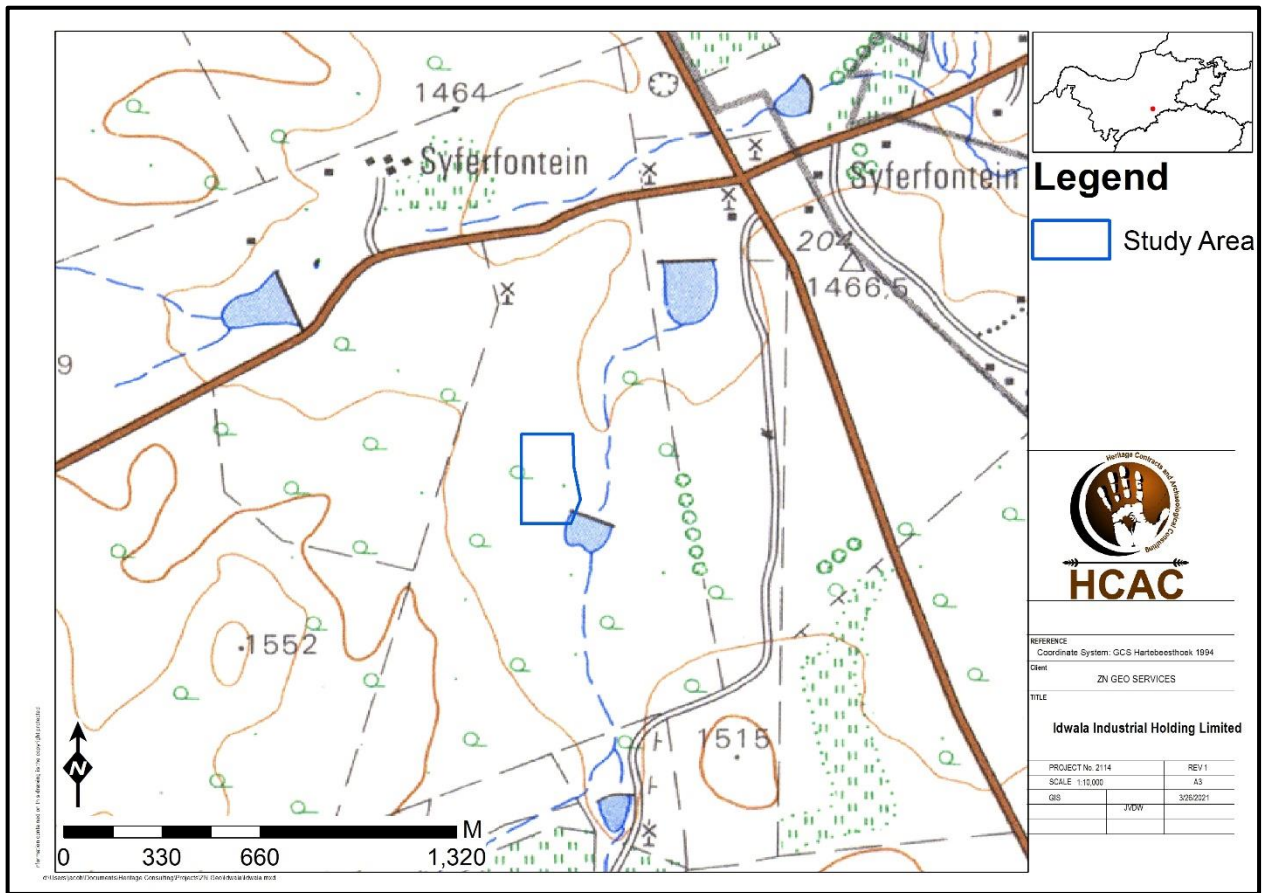


Figure 6-3. 1982 Topographic map indicating no developments within the study area although a dam is indicated outside the area to the south east.

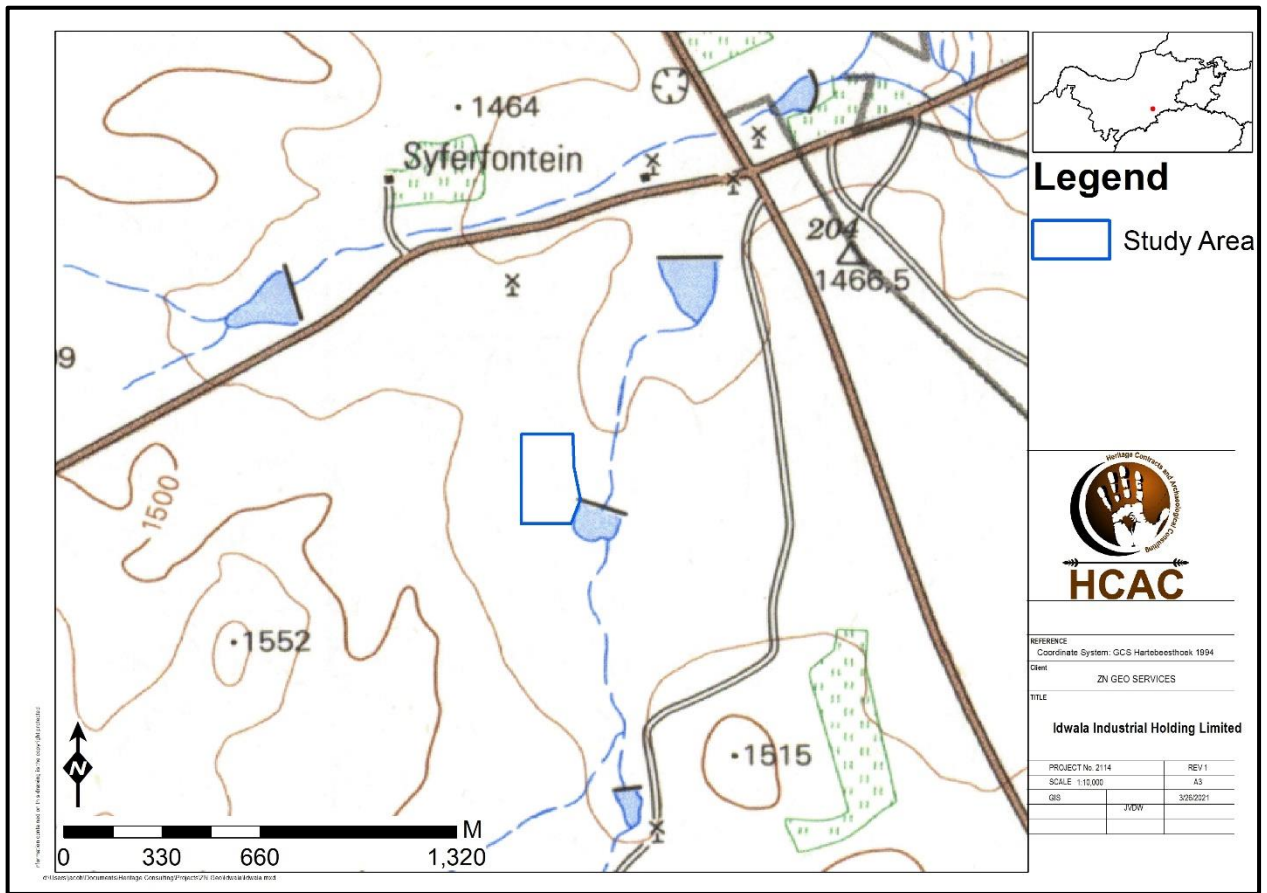


Figure 6-4. 1992 Topographic map of the study area indicating no significant changes in the last decade.

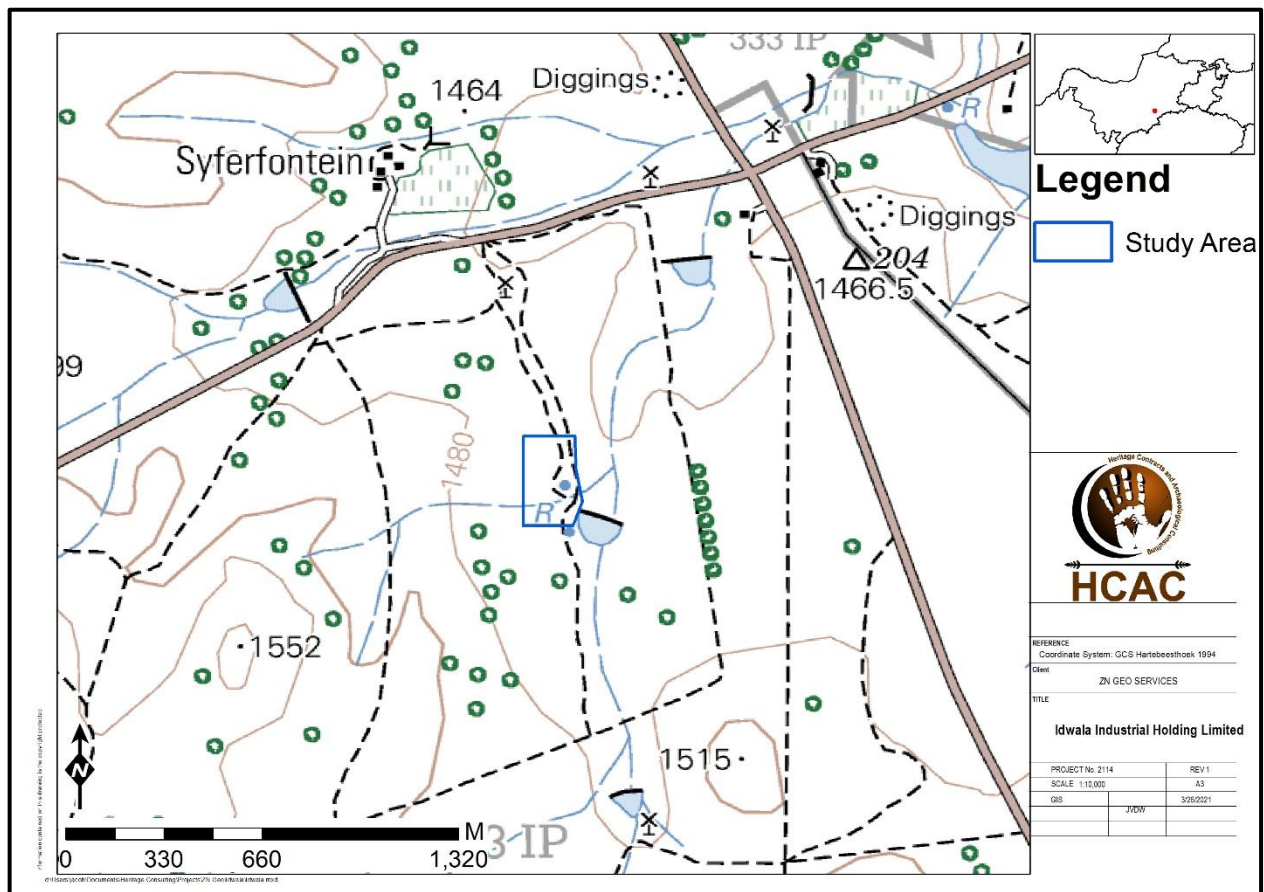


Figure 6-5. 2005 Topographic map of the study area. Indicating a reservoir and roads in the study area.

#### 6.4 Graves and Burial Sites

Graves and cemeteries are widely distributed across the landscape and can be expected anywhere. The Ottosdal Cemetery located 60 km to the west of the study area justifies further comment and includes graves from the battles of Boschpan, Brakspruit, De Klip Drift, and Korrannafontein. 11 km to the west of the study area the Rietfontein 304 cemetery is indicated on the eGSSA database and includes 6 graves but no graves are indicated close to the study area.

### 7 Description of the Physical Environment

The study area is in a rural area that is sparsely developed and mostly used for grazing purposes. The area is covered with dense knee-high vegetation obscuring visibility with no major focal points like rocky outcrops or pans. Some focal points that would have attracted occupation in antiquity occur **outside** of the study area, these being a low ridge to the west that contain LIA stone walled settlements and a small stream to the east. The study area is fallow with some agricultural elements and electrical infrastructure noted during the survey. Based on historical maps these elements were added to the landscape after 1992 (Figure 6-4 and 6-5).





Figure 7-1. General site conditions with high vegetation cover.



Figure 7-2. General site conditions with high vegetation cover.



Figure 7-3. General site conditions with high vegetation cover.



Figure 7-4. Electrical infrastructure leading to a pump house.



Figure 7-5. Agricultural infrastructure in the study area.



## 8 Findings of the Survey

It is important to note that only the development footprint of the project was surveyed over 1 day. The study area is characterised by high vegetation cover after the recent rains, limiting archaeological visibility. During the survey three Stone Age observations points were recorded and mapped with the abbreviation "OP" and spatially illustrated in Figure 8-1. These finds were made mostly within existing roads where erosion exposed them. These observation points do not constitute archaeological sites but rather a "find spot". These observation points consist of isolated and highly weather Stone Age artefacts dating to the MSA and possibly LSA. These finds are scattered too sparsely to be of significance apart from mentioning them in this report and is classified as background scatter (Orton 2006) and are generally of low significance. The artefacts do however attest to human presence in the area and landscape use where the ridges to the west of the study area and the stream to the east would have been focal points. The recorded artefacts are described in Table 14 and Figure 8-1 to 8-3.

**Table 14. Recorded artefacts**

Label	Longitude	Latitude	Description	Elevation
OP 1	26° 19' 27.9229" E	26° 52' 22.1989" S	Broken blade, possibly LSA on metamorphic rock	1347,298
OP 2	26° 19' 28.3297" E	26° 52' 17.3603" S	Broken MSA flake on Quartzite	1424,721
OP 3	26° 19' 28.5059" E	26° 52' 25.4568" S	Core on Quartzite	1372,275

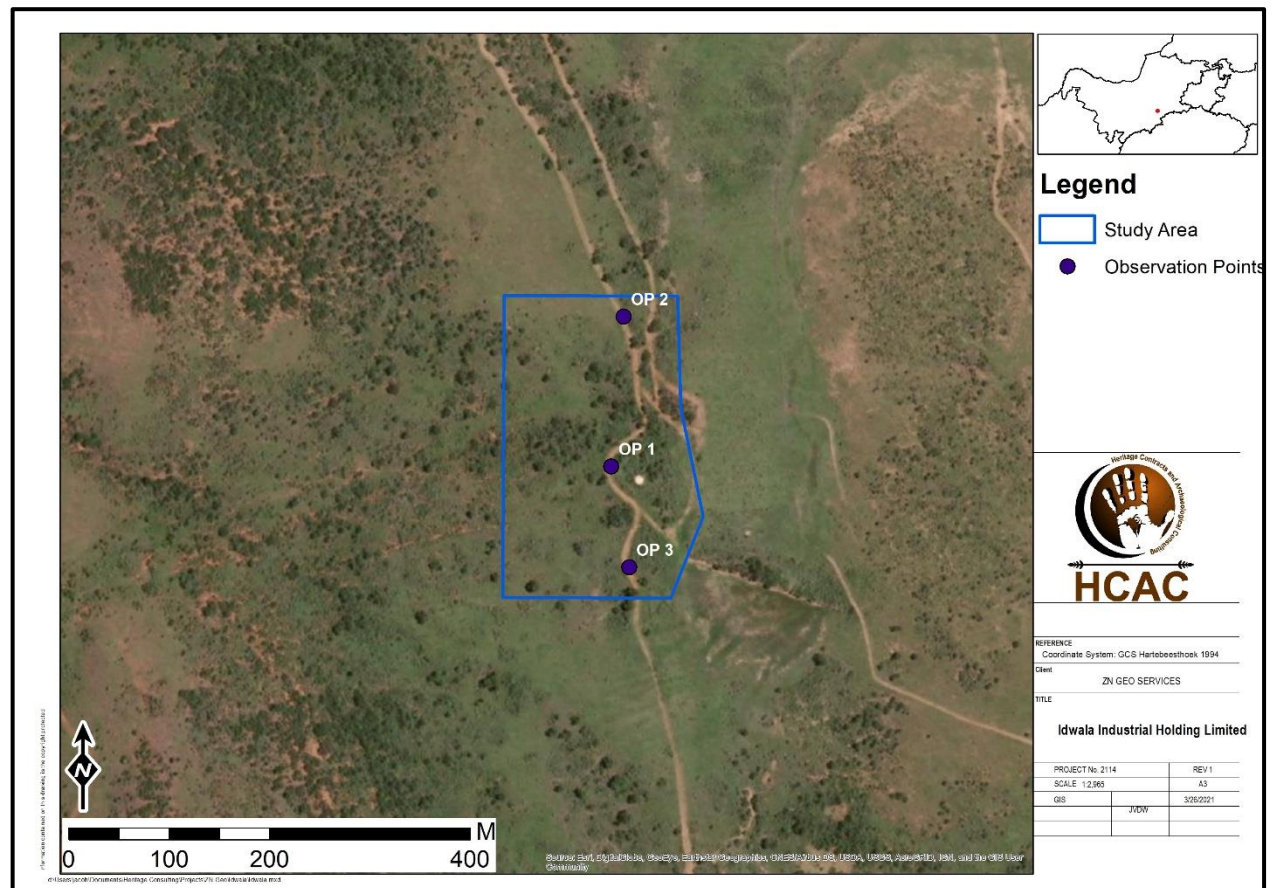


Figure 8-1. Distribution of observation points.



Figure 8-2. Ventral view of broken blade at OP1.



Figure 8-3. Ventral view of broken MSA flake at OP 2.

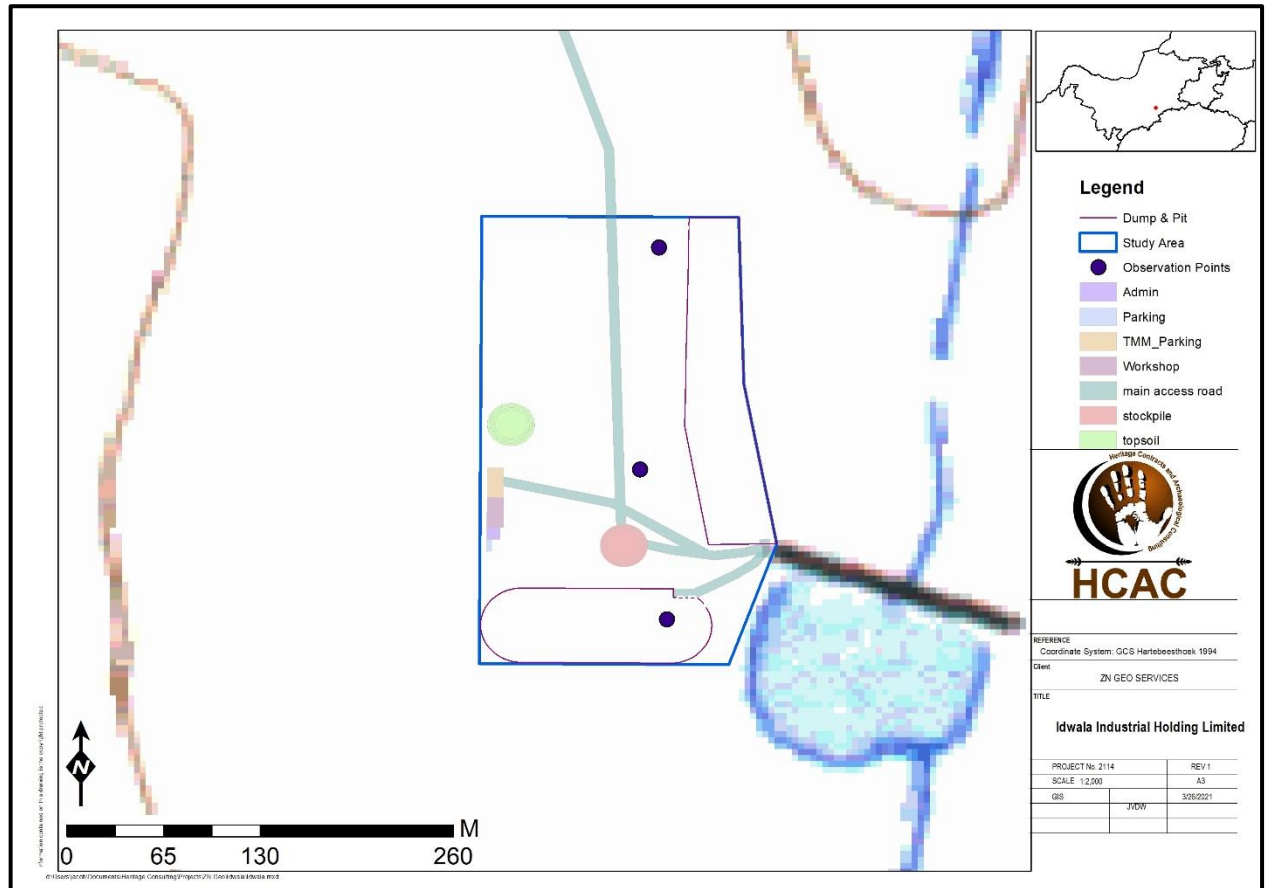


Figure 8-4. Stone Age core at OP3.

Based on the SAHRA Paleontological map the area is of insignificant paleontological sensitivity and no further studies are required for this aspect.

## 9 Potential Impact

Based on the current lay-out and the findings of the assessment no impact is expected on significant heritage resources (Figure 9-1 & Table 15).



### 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 needed for the construction phase. 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:**

Table 15. Impact assessment of the proposed project.

NAME OF ACTIVITY  (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, etc.)  (E.g. For mining,-excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)	POTENTIAL IMPACT  (Including the potential impacts for cumulative impacts)  (E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution, etc.)	ASPECTS AFFECTED	PHASE  In which impact is anticipated (E.g. Construction, commissioning, operational, Decommissioning, closure, post-closure)	SIGNIFICANCE  if not mitigated					MITIGATION TYPE  (modify, remedy, control, or stop) through (E.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) (E.g. Modify through alternative method. Control through noise control. Control through management and monitoring through rehabilitation)	SIGNIFICANCE  if mitigated				
				EXTENT	INTENSITY	DURATION	PROBABILITY	RATING		EXTENT	INTENSITY	DURATION	PROBABILITY	RATING
Mining activities – excavation and construction	Accidental damage or destruction to heritage resources	Heritage resources and graves	Pre Construction and Construction	1	1	3	Possible	Very Low	▪ Implementation of a Chance Find Procedure	1	1	3	Not Probable	Very Low



## **10 Conclusion and recommendations**

The study area is characterised by high vegetation cover after the recent rains, limiting archaeological visibility. During the survey three Stone Age observations points were recorded mostly within existing roads where erosion exposed them. These observation points do not constitute archaeological sites but rather a “find spot”. These observation points consist of isolated and highly weather Stone Age artefacts dating to the MSA and possibly LSA. These finds are scattered too sparsely to be of significance apart from mentioning them in this report and is classified as background scatter (Orton 2016), generally of low significance. The artefacts do however attest to human presence in the area and landscape use where the ridges to the west of the study area and the stream to the east would have been focal points in antiquity.

No significant heritage resources will be affected by the development and therefore the impact of the project on heritage resources are low and the project can commence based on the implementation of the recommendations in this report and the approval of 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:

- Implementation of a chance find procedure for the project (as outlined below).

### **10.2. Chance Find Procedures**

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.

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 decommissioning 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 EO of the chance find and its immediate impact on operations. The EO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

### **10.3. Reasoned Opinion**

The overall impact of the project is considered acceptable based on the adherence to the recommendations in this report and approval from SAHRA prior to development. 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 and unrecorded cultural resources (of which graves are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation, and possible layout changes.

### 10.5 Monitoring Requirements

Ideally, site monitoring should be conducted by an experienced archaeologist or heritage specialist. Day to day monitoring can be conducted by the Environmental Officers (EO). The EO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should be made aware of 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 the initial soil removal and subsequent earthworks during construction. The EO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 16. Monitoring requirements for the project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Clearing activities and Excavations	Entire project area	EO	Weekly – during 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 Quarry Manager;</li> <li>3. Contact an archaeologist 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> <li>• Only recommence operations once impacts have been mitigated.</li> </ul>

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

**Table 17. Management measure for inclusion in the EMPr.**

ACTIVITIES (	PHASE	SIZE AND SCALE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Construction and Excavation Activities	Pre Construction and Construction	Entire site	Chance Find Procedure	Heritage Act NHRA Act 25 of 1999	Throughout the project

## **10.7 Knowledge Gaps**

Due to the subsurface nature of heritage resources and limited archaeological visibility due to high vegetation cover, the possibility of discovery of heritage resources during the construction phase cannot be excluded. This limitation is successfully mitigated with the implementation of a chance find procedure.

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