HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED RESIDENTIAL DEVELOPMENT, HALCYON ESTATE, BROEDERSTROOM, NORTH WEST PROVINCE.

Type of development:

Township Development

Client:

Setala Environmental Consultants

Applicant:

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APPROVAL PAGE

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Report Title	Heritage Impact Assessment for the Proposed Residential Development, Halcyon Estate, Broederstroom, North West Province.
Authority Reference Number	TBC
Report Status	Final Report
Applicant Name	Halcyon (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
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Amendments on Document

Date	Report Reference Number	Description of Amendment

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REPORT OUTLINE

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

Table 1. Specialist Report Requirements.

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

Executive Summary

Setala Environmental Consultants was appointed as the Environmental Assessment Practitioner (EAP) by Halcyon (Pty) Ltd to undertake the required Environmental Authorisation Process for the proposed Halcyon Estate 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:

- Two structures were identified within the project area namely a large house (Hal001) which is partially demolished that is situated near the western boundary of the project area and seems to date to the 1960s and an overgrown cement foundation (Hal002) that seems to date to the 1990s;
- The palaeontological sensitivity of the study area is high with a small section of low sensitivity, and an independent assessment was done (Bamford 2023) that concluded the area lies on the potentially fossiliferous Silverton Formation that could preserve trace fossils such as stromatolites and microbialites although none have been recorded from this formation. There is a very small chance that trace fossils may occur below ground or in the sandstones of the Palaeoproterozoic Silverton Formation so a Fossil Chance Find Protocol should be added to the EMPr.

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:

- The partially demolished structure at Hal01 should be assessed and recorded by a conservation architect after which a destruction permit can be applied for;
- 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.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I: • I act as an independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations, and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 49 A of the Act.of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	07/06/2023

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

TABLE OF CONTENTS

REPORT OUTLINE 4

EXECUTIVE SUMMARY 5

DECLARATION OF INDEPENDENCE 6

A) EXPERTISE OF THE SPECIALIST 6

ABBREVIATIONS 10

GLOSSARY 10

1 INTRODUCTION AND TERMS OF REFERENCE: 11

1.1 TERMS OF REFERENCE 11
1.2 PROJECT DESCRIPTION 12
1.3 ALTERNATIVES 12

2 LEGISLATIVE REQUIREMENTS 16

3 METHODOLOGY 17

3.1 LITERATURE REVIEW 17
3.2 GENEALOGICAL SOCIETY AND GOOGLE EARTH MONUMENTS 17
3.3 PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT: 18
3.4 SITE INVESTIGATION 18
3.5 SITE SIGNIFICANCE AND FIELD RATING 20
3.6 IMPACT ASSESSMENT METHODOLOGY 22
3.7 LIMITATIONS AND CONSTRAINTS OF THE STUDY 23

4 DESCRIPTION OF SOCIO-ECONOMIC ENVIRONMENT 23

5 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT: 23

6 LITERATURE / BACKGROUND STUDY: 24

6.1 LITERATURE REVIEW (SAHRIS) 24
6.2 ARCHAEOLOGICAL BACKGROUND 25

7 DESCRIPTION OF THE PHYSICAL ENVIRONMENT 28

8 FINDINGS OF THE SURVEY ..... ERROR! BOOKMARK NOT DEFINED.

8.1 HERITAGE RESOURCES 30
8.2 CULTURAL LANDSCAPE 32
8.3 PALEONTOLOGICAL HERITAGE 35

9 POTENTIAL IMPACT 36

10 CONCLUSION AND RECOMMENDATIONS 37

10.1 RECOMMENDATIONS FOR CONDITION OF AUTHORISATION 37
10.2 CHANCE FIND PROCEDURES 37
10.3 REASONED OPINION 39
10.4 POTENTIAL RISK 39
10.5 MONITORING REQUIREMENTS 40
10.6 MANAGEMENT MEASURES FOR INCLUSION IN THE EMPR 42
11 REFERENCES 44

LIST OF FIGURES

FIGURE 1.1. REGIONAL SETTING OF THE PROJECT (1: 250 000 TOPOGRAPHICAL MAP). 13
FIGURE 1.2. LOCAL SETTING OF THE PROJECT (1: 50 000 TOPOGRAPHICAL MAP) 14
FIGURE 1.3. AERIAL IMAGE OF THE STUDY AREA. 15
FIGURE 3.1. TRACKLOG OF THE SURVEY PATH IN GREEN. 19
FIGURE 7.1. IMAGE SHOWING THE ROCKY TERRAIN ALONG THE EASTERN BOUNDARY OF THE PROJECT AREA. 29
FIGURE 7.2. GENERAL VIEW OF THE ENVIRONMENT - IMAGE SHOWING THE LARGE HILL TOWARDS THE SOUTH EASTERN CORNER OF THE PROJECT AREA. 29
FIGURE 7.3. GENERAL VIEW OF THE SURROUNDING ENVIRONMENT. 29
FIGURE 7.4. GENERAL VIEW OF THE R512 FORMING THE WESTERN BOUNDARY OF THE PROJECT AREA. 29
FIGURE 7.5. GENERAL VIEW OF THE OVERGROWN AREA ALONG THE NORTHERN BOUNDARY OF THE PROJECT AREA. 29
FIGURE 7.6. IMAGE SHOWING THE SLOPE GOING DOWN TOWARDS THE NORTHERN SECTION OF THE PROJECT AREA. 29
FIGURE 7.7. SEPARATE PROPERTY SITUATED ON THE NORTHERN BOUNDARY. 30
FIGURE 7.8. OVERGROWN VEGETATION ALONG THE NORTHERN BOUNDARY MADE ACCESS DIFFICULT IN THE NORTH-EASTERN CORNER OF THE PROJECT AREA. 30
FIGURE 8.1. OBSERVATION POINTS WITHIN THE STUDY AREA. 31
FIGURE 8.2. GENERAL SITE CONDITIONS - IMAGE SHOWING THE SOUTHERN ELEVATION OF HAL01. 32
FIGURE 8.3. ILLEGAL DUMPING TAKING PLACE SOUTH OF HAL01. 32
FIGURE 8.4. IMAGE SHOWING THE EASTERN ELEVATION OF HAL01. 32
FIGURE 8.5. CEMENT FOUNDATION (HAL02) THAT HAS BEEN COMPLETELY OVERGROWN. 32
FIGURE 8.6. 1943 TOPOGRAPHIC MAP INDICATING A HUT TO THE NORTH AND EAST BUT OUTSIDE OF THE PROJECT AREA. 33
FIGURE 8.7. 1969 TOPOGRAPHIC MAP INDICATING THE PARTIALLY DEMOLISHED HOUSE WITHIN THE STUDY AREA. MULTIPLE STRUCTURES ARE PRESENT OUTSIDE THE PROJECT AREA. 33
FIGURE 8.8. 1985 TOPOGRAPHIC MAP INDICATING NO NEW DEVELOPMENTS IN THE PROJECT AREA. FIGURE 8.9. 1996 TOPOGRAPHIC MAP INDICATING THREE STRUCTURES WITHIN THE PROJECT AREA, TWO OF WHICH WERE IDENTIFIED DURING THE SURVEY. 34
FIGURE 8.10. PALEONTOLOGICAL SENSITIVITY OF THE APPROXIMATE STUDY AREA (YELLOW POLYGON) AS INDICATED ON THE SAHRA PALAEONTOLOGICAL SENSITIVITY MAP. 35

LIST OF TABLES

TABLE 1. SPECIALIST REPORT REQUIREMENTS. 4
TABLE 2: PROJECT DESCRIPTION 12
TABLE 3: INFRASTRUCTURE AND PROJECT ACTIVITIES 12
TABLE 4: SITE INVESTIGATION DETAILS 18
TABLE 5: HERITAGE SIGNIFICANCE AND FIELD RATINGS 21
TABLE 6. CRM REPORTS CONSULTED FOR THE STUDY. 24
TABLE 7. IMPACT ASSESSMENT OF THE PROJECT AREA. 36
TABLE 8. MONITORING REQUIREMENTS FOR THE PROJECT 40
TABLE 9. HERITAGE MANAGEMENT PLAN FOR EMPR IMPLEMENTATION 42

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)
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)
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 Heritage Impact Assessment (HIA) for the proposed Halcyon Estate development. Halcyon Estate will be located adjacent and to the east of the R512 Provincial Road, approximately 550m to the south of the Mountain Lake Shopping Centre. Another Estate, the Redstone Country Estate is located to the north-east of Halcyon Estate. The project is located on Portion 122 of the farm Broederstroom 481-JQ, Madibeng Local Municipality, North West 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 heritage sites or features of significance were identified. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study

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

Reporting

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

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

1.2 Project Description

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

Table 2: Project Description

Project area	The project site is situated on the Remaining Portion of Portion 122 of the Farm Broederstroom 481-JQ
Magisterial District	Madibeng Local Municipality
Central co-ordinate of the development	25°46'52.36"S; 27°51'22.77" E
Topographic Map Number	2527DD

Table 3: Infrastructure and project activities

Type of development	Township Development
Size of development	8.3751 hectares
Project Components	The proposed development represents vegetation clearance and residential development (proposed Halcyon Estate) consisting of the following on Portion 122 of the farm Broederstroom 481-JQ: • 63 X "Residential 1" erven (5.2071 ha); • 1 X "Private Open Space" erf (0.8212 ha); • 1 X "Special" erf for club house & offices (0.2566 ha); • 1 X "Special" erf for engineering services and waste removal (0.0982 ha); • 1 X "Private Road" erf (1.4078 ha); and • Existing Public Road (0.5842 ha).

1.3 Alternatives

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

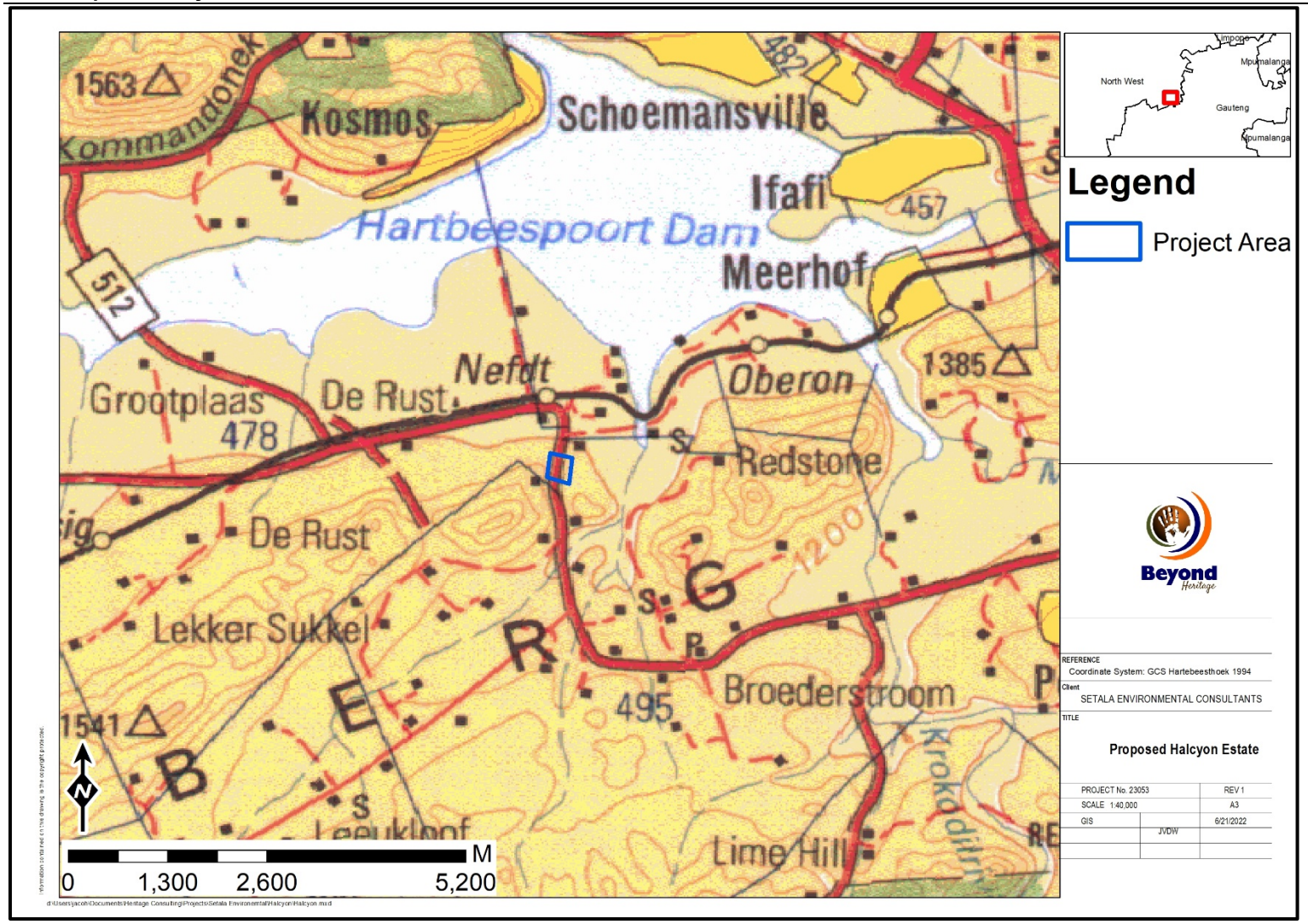

Figure 1.1. Regional setting of the project (1: 250 000 topographical map).

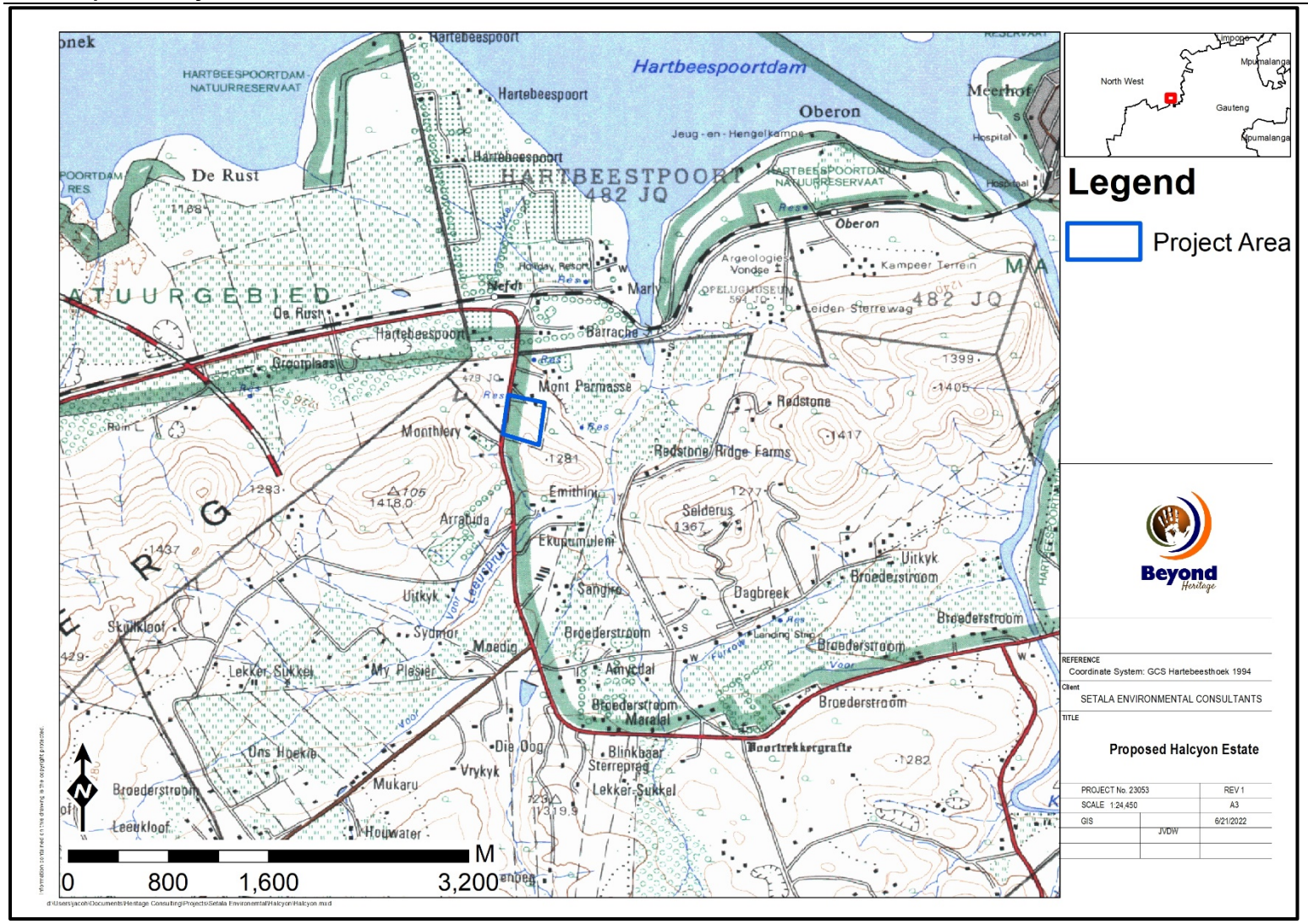

Figure 1.2. Local setting of the project (1: 50 000 topographical map).

Figure 1.3. Aerial image of the study area.

2 Legislative Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

3 METHODOLOGY

3.1 Literature Review

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

3.2 Genealogical Society and Google Earth Monuments

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

3.3 Public Consultation and Stakeholder Engagement:

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

3.4 Site Investigation

The aim of the site visit was to:

a) survey the proposed project area to understand the heritage character of the development footprint;

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	26 April 2023
Season	Summer – The time of year did influence the survey as the vegetation was extremely dense in the north and north eastern section of the project area limiting heritage visibility. The development footprint was however sufficiently covered to understand the heritage character of the area (Figure 3.1).

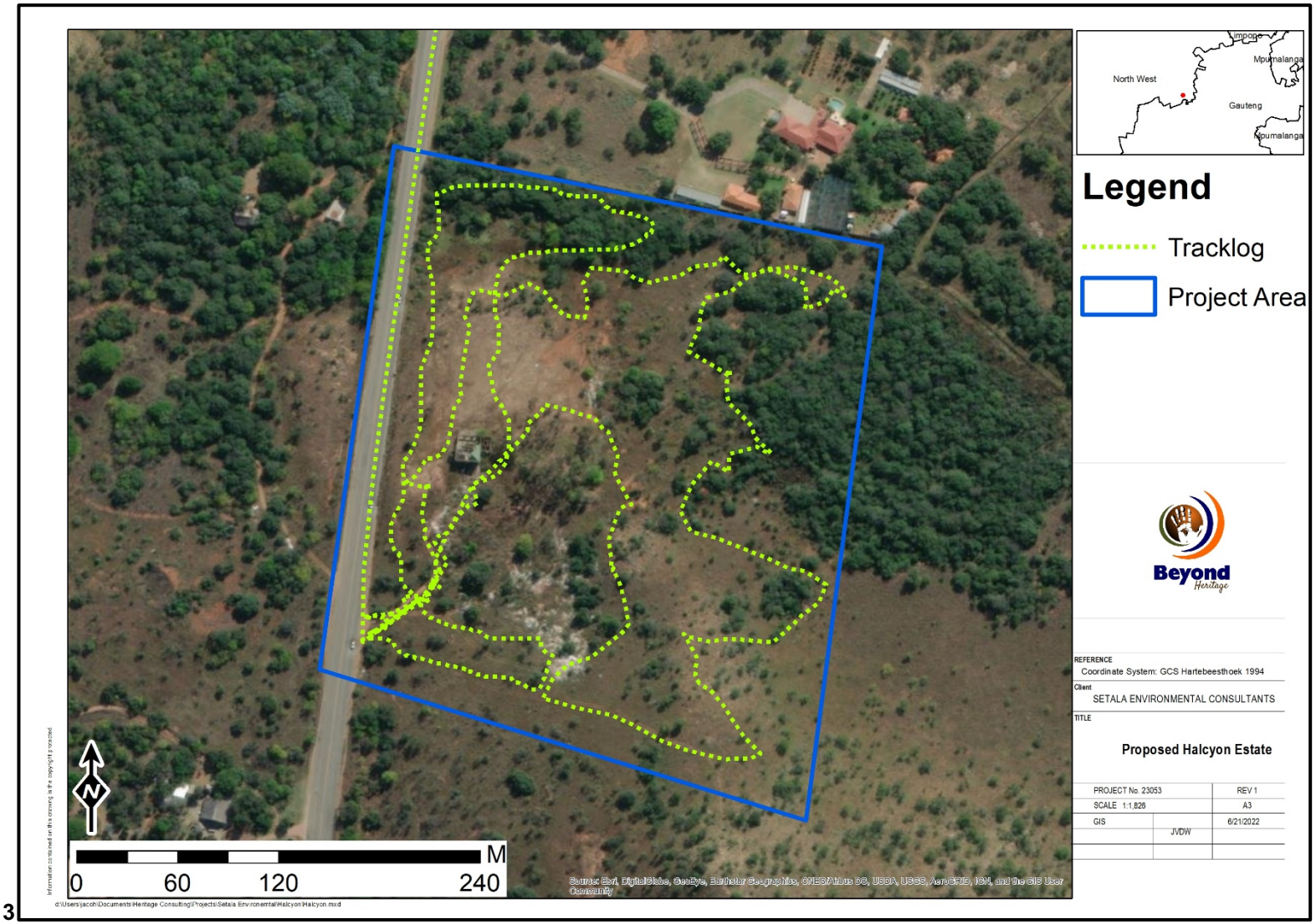

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Figure 3.1. Tracklog of the survey path in green.

3.5 Site Significance and Field Rating

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

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

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

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

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

Table 5: Heritage significance and field ratings

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

3.6 Impact Assessment Methodology

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

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
  - medium-term (5-15 years), assigned a score of 3;
  - long term (> 15 years), assigned a score of 4; or
  - permanent, assigned a score of 5;
  - The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
  - The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
  - The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
  - the **status**, which will be described as either positive, negative or neutral.
  - the degree to which the impact can be reversed.
  - the degree to which the impact may cause irreplaceable loss of resources.
  - the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:
S=(E+D+M) P
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

3.7 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. The northern and north eastern sections of the project area overgrown and was difficult to access. 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 focused 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 StatsSA, the Local Municipality of Madibeng has a total population of 477 381. It is highly rural, with 57% of its population residing in rural areas (tribal or traditional areas), about 28% residing in urban areas and about 15% residing in farming areas. Black Africans are the majority, with an 89% share of the Madibeng Municipality's population. The most commonly spoken language is Setswana. More than half of the population is male (53%), with 47% constituting females. At age 85 and older, there were more than twice as many women as men. People under 20 years of age made up over a quarter of the population (33,5%), and people aged 65 and older made up 5% of the population. The municipality is characterised by high levels of unemployment. In Madibeng, the unemployment rate for those aged 15 to 24 is 38,2%, which is almost 10% more than the overall unemployment rate (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. No heritage concerns have been raised thus far.

6 Literature / Background Study:

6.1 Literature Review (SAHRIS)

Few sites are known for the greater region and consist of Stone Age scatters, Iron Age stone walling and artefacts, an old water furrow system, a Voortrekker graveyard, graveyards, Historic ruins, and modern building ruins. The following Cultural Resource Management (CRM) assessments (Table 6) were conducted in the area and consulted for this report:

Table 6. CRM reports consulted for the study.

Author	Year	Project	Findings
Van der Walt, J.	2007	Archaeological Impact Assessment: Remainder of Portion 25 of the Farm Welgegund 491 JQ, Hartbeespoort, Gauteng Province.	No sites
Van Vollenhoven, A.C., Pelser, A.J.	2008	A Report on a Cultural Heritage Impact Assessment for the Proposed Development of a Lodge on the Farm Broederstroom 481 JQ, Northwest Province	A Voortrekker graveyard consisting of fifteen graves and two monuments, a cemetery, an old water furrow system, sleuss and dam, an old building serving as an antique shop, historical cattle kraal, stone walls with historical artefacts and possible grave.
Van Schalkwyk, J.A.	1997	A Survey of Cultural Resources in the Proposed De Rust Development Area, Northwest Province.	MSA and LSA scatters, Iron Age stone walling, potsherds, grinding stones.
Van Schalkwyk, J.A.	1998	A Survey of Cultural Resources for the Lomond/Scheerpoort Powerline, Broederstroom Area, West of Pretoria.	ESA tools, informal graveyard
Van Schalkwyk, J.A.	2003	Heritage Impact Assessment for the Kosmos Villas Development, Kosmos, Brits District, North West Province	Ruin of Historical structures
Van Schalkwyk, J.A.	2007	Heritage Survey Report for the Proposed Development on a Portion of the Farm Zandfontein 447JQ, to be known as Magalies Crossing, in the Brits Magisterial District, North West Province.	Ruins of recent buildings
Küsel, U.	2007a	Cultural Heritage Resources Impact Assessment of Portion 92 De Rust 478 JQ Madibeng North West Province.	No sites
Küsel, U.	2007b	Cultural Heritage Resources Impact Assessment of Portions 259, 260, 266 and 267 of the Farm Rietfontein 485 JQ Madibeng North West Province.	No sites
Munyai, R., Roodt. F.	2007	Phase 1 Heritage Impact Assessment. Proposed Construction of Residential Stands and Business Properties at Portion of the Farm Rietfontein in Hartebeespoort, Madibeng Local Municipality of North West Province.	Two Historic farm buildings, and two graves.
Pistorius, J.C.C.	2004	A Heritage Impact Assessment (HIA) Study for a Proposed New Residential Development on the Remainder of Plot 4 of the Melodie Agricultural Holdings near the Hartebeestpoort Dam in the North-West Province of South Africa.	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 can be divided in three main periods namely 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.

The Sterkfontein Valley landscape, situated around 18km southwest of the project area, is also called the Cradle of Humankind because it includes remains of hominids from about 2 to 3.3 million years ago. Cultural layering in this area consists of ESA to LSA, Late Iron-Age and recent times. Thousands of fossils that show human evolution over the past 3.5 million years have been found since 1936 (see Hilton-Barber & Berger 2004, Broom 1949, Broom & Robinson 1950). UNESCO declared the area a World Heritage Site in 1999. This area includes archaeological sites at Sterkfontein, Kromdraai, Swartkrans cave, Coopers B, Wonder Cave, Drimolen, Gladysvale, Gondolin, Plover's Lake, Haasgat, Bolt's Farm and Minnaar's caves. The Sterkfontein caves first became known because Professor Raymond Dart found the skull of an adult *Australopithecus africanus* there in 1947.

The ESA is represented in the larger area by the Wonderboom site on the southern slopes of the Magaliesberg north of Pretoria. This site is characterised by numerous cleavers, hand axes, cores and flakes (Mason 1958). The nearby Jubilee shelter has been excavated and provides a record from the Late Pleistocene to the 7th Century AD (Turner 1986), an extended cultural sequence with assemblages' characteristic of the Middle Stone Age, Early Later Stone Age and Later Stone Age including assemblages from the Oakhurst and Wilton industries (Wadley 1986). The Jubilee shelter provides evidence of hunter–gatherer occupation during three phases of agro pastoralist contact, beginning in 225 AD and characterised by cooperative contact, prior to the hunter-gatherers being either assimilated or dispersed to other areas (Wadley 1996). Extensive research has also been conducted on LSA sites situated along the Magaliesberg Mountains with many Stone Age scatters being identified throughout the mountain range (Carruthers 2007).

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 greater region saw expansive Iron Age occupation as early as AD150 at Jubilee Shelter where Bambata ceramics were identified with the ceramics facies dating to around AD150 to AD750 (Wadley 1996). Another EIA site situated only 2km northeast of the project area, Broederstroom was identified as an EIA site with Mzonjani ceramics found at the site. The site dates to around AD450 to AD750 (Huffman 2007). The Broederstroom Iron Age site was declared a Provincial Heritage Site in 1980 as it was the one of the earliest known Iron Age sites south of the Limpopo and consists of around 250 years of occupation by iron and copper producers (Mason 1981).

Originating near the junction of the Marico and Crocodile Rivers in Limpopo, the Bakwena ba Mogôpa settled there around AD1600. Around AD1650 the Bakwena ba Mogôpa moved into the larger region and settled north-east of present day Brits. Their influence stretched across parts of the Crocodile, Apies, Pienaars, and Hennops Rivers. Around AD1750, they then moved east of the Apies River, only to return a few years later (Breutz 1953). Around this time, the Bapo ba Mogale also entered and settled within the larger region and this period is marked by great wealth and large cattle herds for them.

Between AD1817 to AD1823, the Pedi, under the rule of Maleleku were invading and attacking settlements around the Magaliesberg Mountains. The Pedi went on to attack the Bapo ba Mogale after they were unsuccessful in their attack of the Bakwena ba Mogôpa near the Apies River (Breutz 1953). The Pedi had been defeated in both attacks but did claim large herds of cattle as well as women and children from both groups. During the battle, Mogale Mogale, the heir to the Bapo throne was hidden in a kloof as he was only a child. The origins of the name of the Magaliesberg Mountains are believed to have originated to Mogale Mogale (Carruthers 2007).

6.2.3. Historical Period

The Difaqane (Sotho), or Mfekane (“the crushing” in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820’s until the late 1830’s. (Bergh 1999: 10). It came about in response to heightened competition for land and trade and caused population groups like gun-carrying Griquas and Shaka’s Zulus to attack other tribes. (Bergh: 14; 116-119). The Matabele led by Mzilikazi left their settlements along the Vaal River in the late 1820s and entered the region surrounding the study area. They went on to attack the Bakwena ba Mogôpa around present day Zilkaatsnek, approximately 9km northeast of the project area. Three separate battles took place which ended with the surrendering of the Bakwena ba Mogôpa whereby they were forced to join the Matabele and those that refused were slaughtered (Carruthers 2007). Mzilikazi then went on to attack the Bapo ba Mogale in present day Wolhuterskop, approximately 16km northwest of the project area, and west of Zilkaatsnek. Their attack was successful and Mzilikazi and his Matabele then established three royal residencies across the northern foot of the Magaliesberg Mountains at Kungwini, Hlahlandlela, and Dinaneni. They would then remain settled along the Magaliesberg for five years. The remaining Bakwena ba Mogôpa and Bapo ba Mogale who survived the attacks managed to flee and disperse across the greater landscape. Around 1850, both groups then moved and settled in present day Lesotho (Carruthers 2007).

After the Matabele were driven out of the Magaliesberg Mountains by the Voortrekkers, the first Voortrekker to settle in the larger region, Albert Venter settled on the farm De Kroon in 1840, near present day Brits. Another Voortrekker, P.J Fourie also settled in the area. This period was also marked by the first contact between the white and black settlers. The initial interactions were agreeable but later tensions rose in the region around Rustenburg between the Bafokeng and the Voortrekkers as they were removed from their farms which were previously laid out for the ownership of the Bafokeng. This led to the establishment of individual farms and farmsteads.

Broederstroom was founded in 1903 with the opening of a trading post in the area. The history of this area is mainly nestled in farming and commercial activities, and this is emphasised by important 19th and early 20th century farm and store buildings located in this area. The name It is said to derive from the Dutch word 'broeder', after H.P.N Pretorius and H.A Pretorius, brothers of General Andries Pretorius who lived there (Raper 2004).

The project area is also situated 5km northwest of Preller House. The house was occupied by Gustav Preller, a well-known journalist and historian who championed the cause of the Afrikaans language from 1935 until his death. Many of his later historical works were completed here. It was declared a National Monument on 2 March 1973. At the same time, but as part of a separate Government Notice, three stone rondavels built by Preller in Pelindaba in 1920, and initially used by the family as a weekend residence, were also proclaimed. The Rondavels were placed at the disposal of a number of Afrikaans writers and artists, including Eugene Marais - one of the most innovative Afrikaans writers, but also a journalist, lawyer, scientist, and poet., who spent the last years of his life there (sahistory.org.za/place/house-preller-hartebeesport).

6.2.4. Anglo-Boer War

After the British forces took control of Pretoria in June 1900, multiple battles took place along the Magaliesberg to further expand their territory.
The first Battle of Silkaatsnek took place on 11 July 1900 when 600 Boers led by General De la Rey attacked the 240 British led by Colonel H.R Roberts who had been camping at Silkaatsnek. The Boers were attacking from the top of the Magaliesberg and were too high for the British to defend themselves and the British had surrendered by nightfall. The Second Battle of Silkaatsnek took place on 2 August 1900 whereby the British troops led by General Ian Hamilton was successful in forcing the Boers out of Silkaatsnek.
Another battle, the Battle of Dwarsvlei occurred in the larger region on 11 July 1900 when General Sarel Oosthuizen led the Boer troop to ambush the British troop led by General Horace Smith-Dorrien who were on route to Rustenburg. The Boers had killed many of the British and by sunset, General Oosthuizen led a charge which would fatally wound him and lead to his death in the following weeks.

Below the Nooitgedacht cliffs, the British troop of 1500 men led by Major-General Ralph Clements were camping on the 8th December 1900. Early on the 13th December, 2500 Boers led by Generals De la Rey, Smuts, and Beyers attacked the British troops. With General Beyers situated on the Magaliesberg summit and General De la Rey at the base, the Boers were able to overtake the British troops in what is now called the Battle of Nooitgedacht and this was a significant win for the Boers (magaliesbergheritage.co.za).

7 Description of the Physical Environment

The vegetation and landscape are described by Mucina and Rutherford (2006) as Gold Reef Mountain Bushveld. The Gold Reef Mountain Bushveld is described as rocky hills and ridges often west-east trending with more dense woody vegetation often on the south-facing slopes associated with distinct floristic differences (e.g., preponderance of *Acacia caffra* on the southern slopes). Tree cover elsewhere is variable. Tree and shrub layers are often continuous. Herbaceous layer is dominated by grasses.

The R512 borders the western boundary of the project area. The eastern and southern boundary of the project area are marked by open veld. A large hill is located towards the south-eastern boundary of the project area with the slope of the hill extending down through the project area towards the northern boundary. General site conditions are illustrated in Figure 7.1 to 7.8.

Figure 7.1. Image showing the rocky terrain along the eastern boundary of the project area.

Figure 7.2. General view of the environment - Image showing the large hill towards the south eastern corner of the project area.

Figure 7.3. General view of the surrounding environment.

Figure 7.4. General view of the R512 forming the western boundary of the project area.

Figure 7.5. General view of the overgrown area along the northern boundary of the project area.

Figure 7.6. Image showing the slope going down towards the northern section of the project area.

Figure 7.7. Separate property situated on the northern boundary.

Figure 7.8. Overgrown vegetation along the northern boundary made access difficult in the north-eastern corner of the project area.

8 Heritage Baseline

8.1 Heritage Resources

The project area is a small 8ha property situated on rocky terrain next to the R512 just south of Pecanwood Estate. The property has been fallow and a large, partially demolished house was recorded near the western boundary of the project area as Hal01 (25°46'50.94"S and 27°51'24.71"E). Based on Topographic maps (Figure 8.6 and 8.7) the structure was constructed between 1943 and 1969 and it could be older than 60 years. The structures' potential to contribute to aesthetic, historic, scientific and social aspects are non-existent, and it is therefore of low heritage significance (GP C), but it is protected on account of its age.

Illegal dumping takes place just south of the partially demolished house within the project area. The rest of the environment within the project area is natural and mostly untouched. The northern section is overgrown and difficult to access. An overgrown cement foundation was identified here and recorded as Hal02 (25°46'49.21"S and 27°51'29.71"E). Based on Topographic maps this feature was constructed between 1985 and 1996 and is therefore of no heritage significance. The recorded features are indicated in relation to the project area in Figure 8.1 with general site conditions illustrated in Figure 8.2 – 8.6.

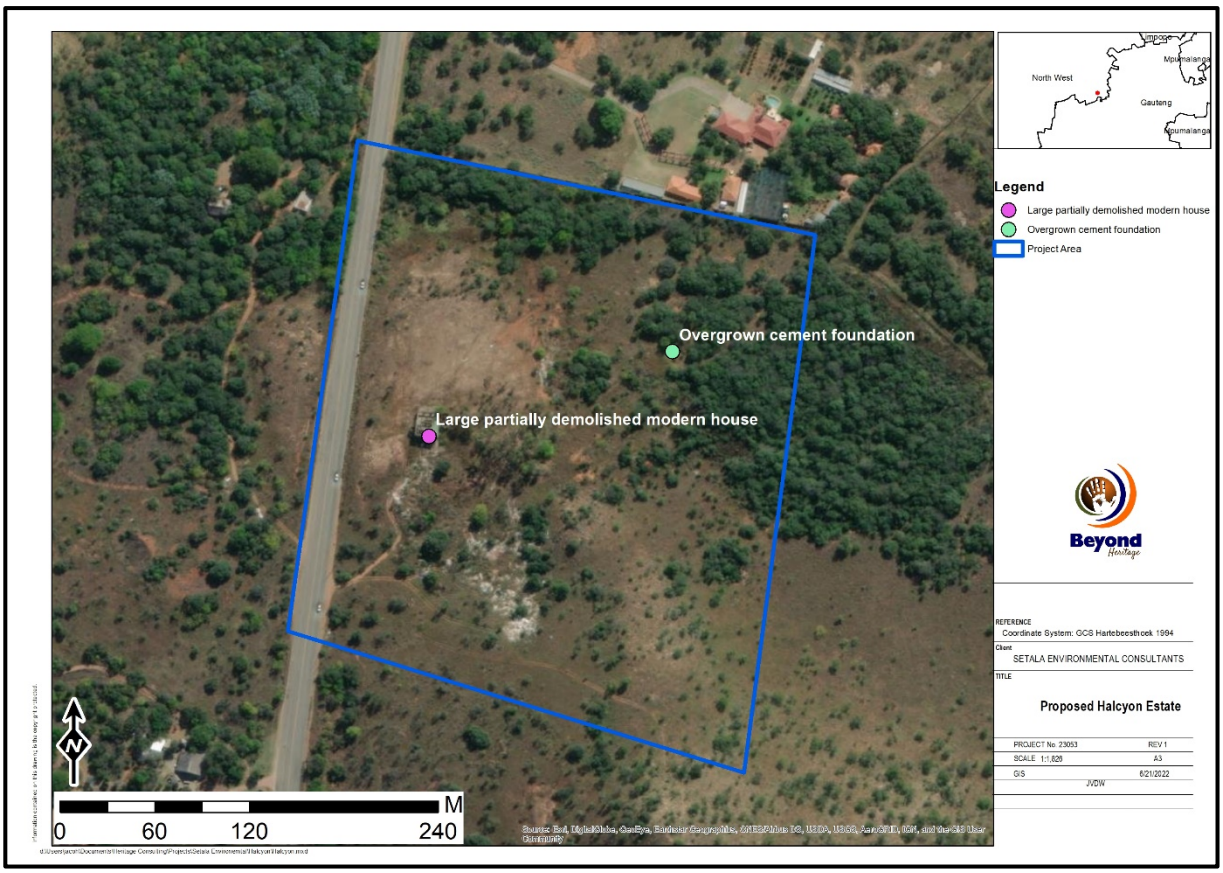


Figure 8.1. Observation points within the study area.

Figure 8.2. General site conditions - Image showing the southern elevation of Hal01.

Figure 8.3. Illegal dumping taking place south of Hal01.

Figure 8.4. Image showing the eastern elevation of Hal01.

Figure 8.5. Cement foundation (Hal02) that has been completely overgrown.

8.2 Cultural Landscape

The project area is part of a rich, diverse and layered cultural landscape ranging from the Stone Age, the Iron Age and historic structures and battlefields, evidenced by numerous sites in the Magaliesberg region and the Hartbeespoort Dam (celebrating its centenary in 2023). The larger area is also characterized by scenic beauty and unique natural features with the Magaliesberg Biosphere nominated for Unesco's 'Man and the Biosphere' programme in 2015. The cultural landscape in this area is truly remarkable as an eclectic synergy of various geological and historic elements that together with modern landscapes attest to a longstanding and symbiotic relationship between the area and its inhabitants. It is expected that the development will be in line with modern elements in the surrounding area and that the development will not negatively impact the cultural landscape.

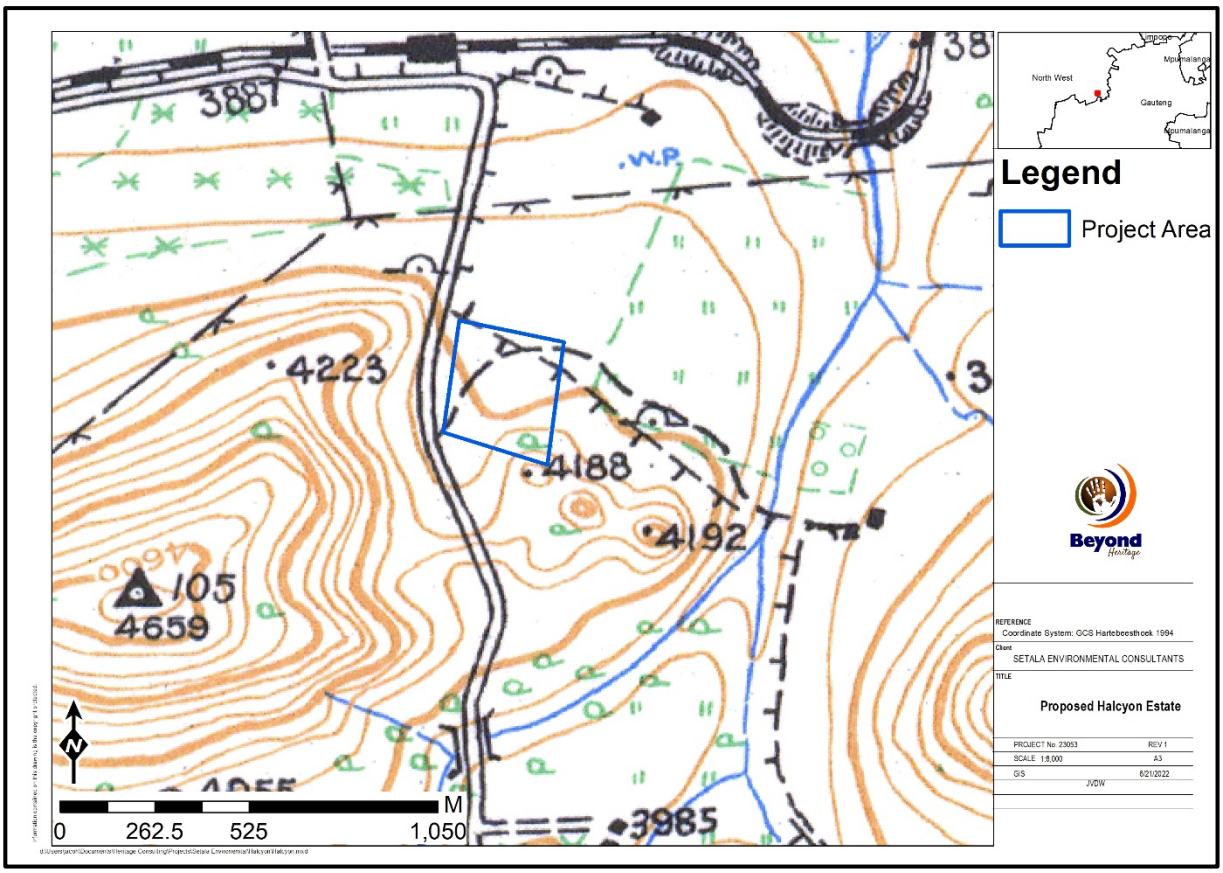


Figure 8.6. 1943 Topographic map indicating a hut to the north and east but outside of the project area.

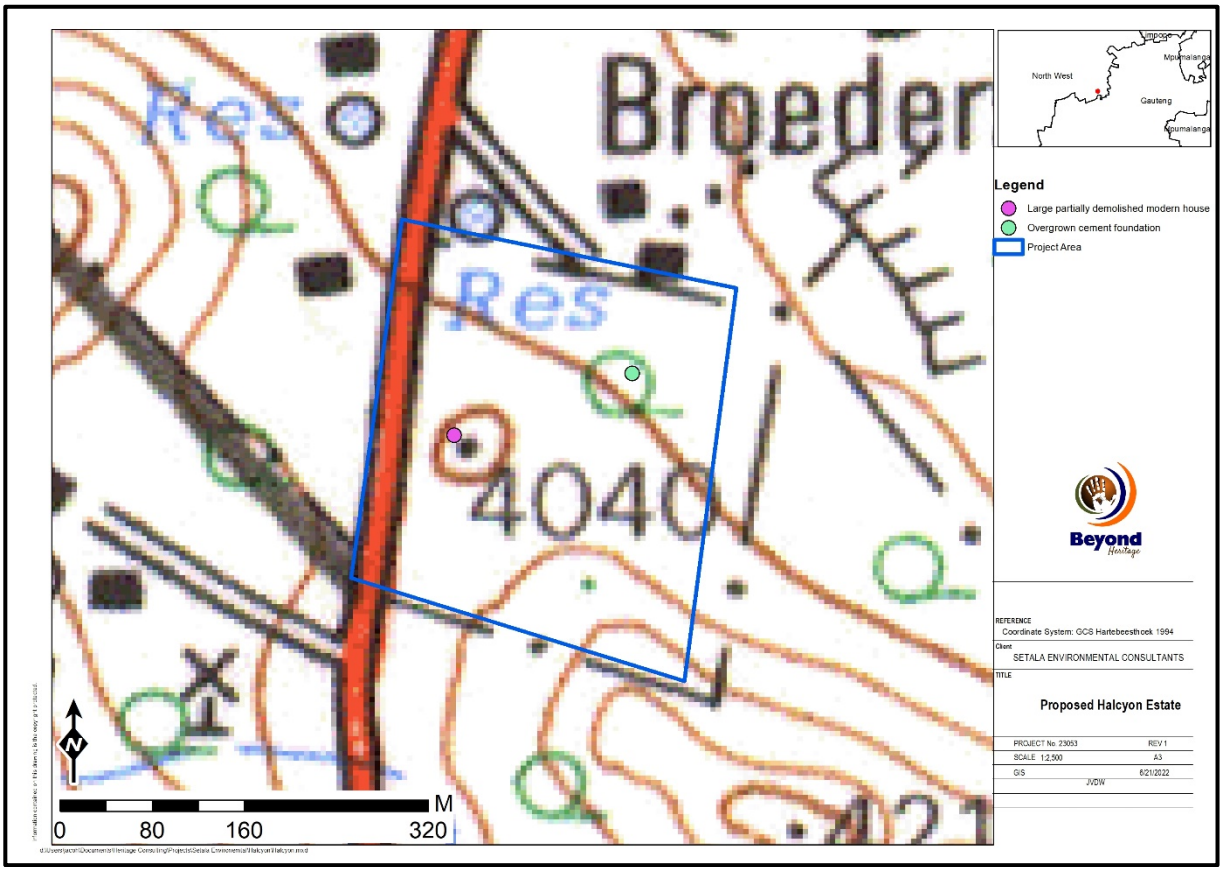


Figure 8.7. 1969 Topographic map indicating the partially demolished house within the study area. Multiple structures are present outside the project area.

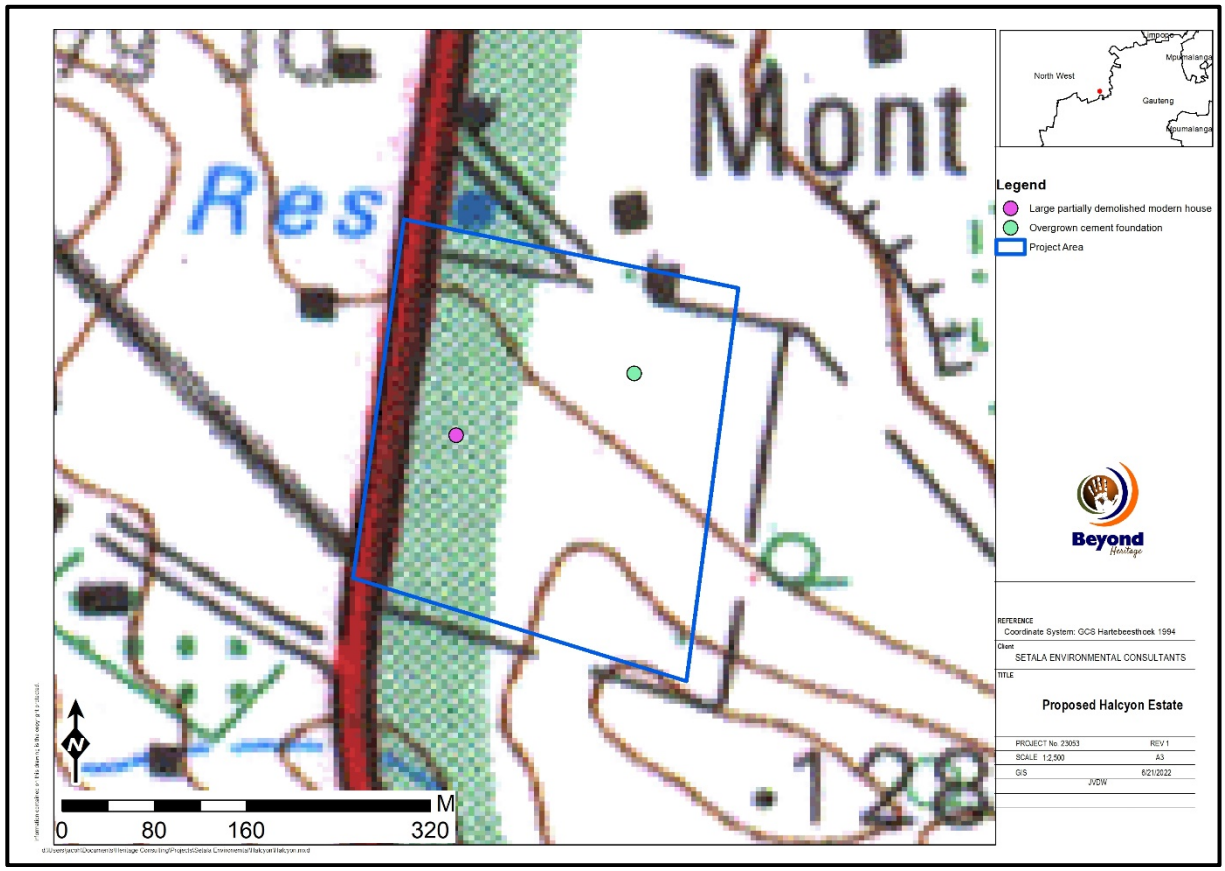


Figure 8.8. 1985 Topographic map indicating no new developments in the project area.

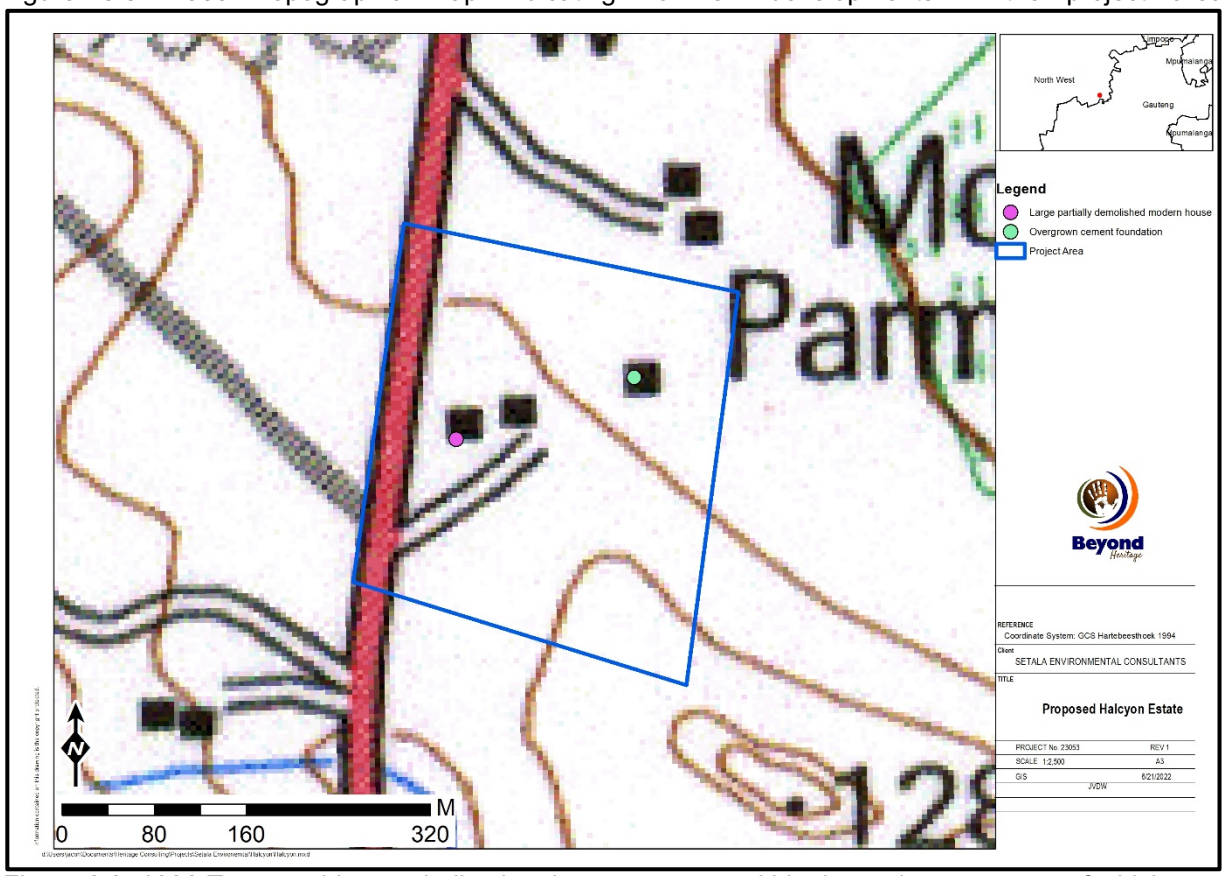
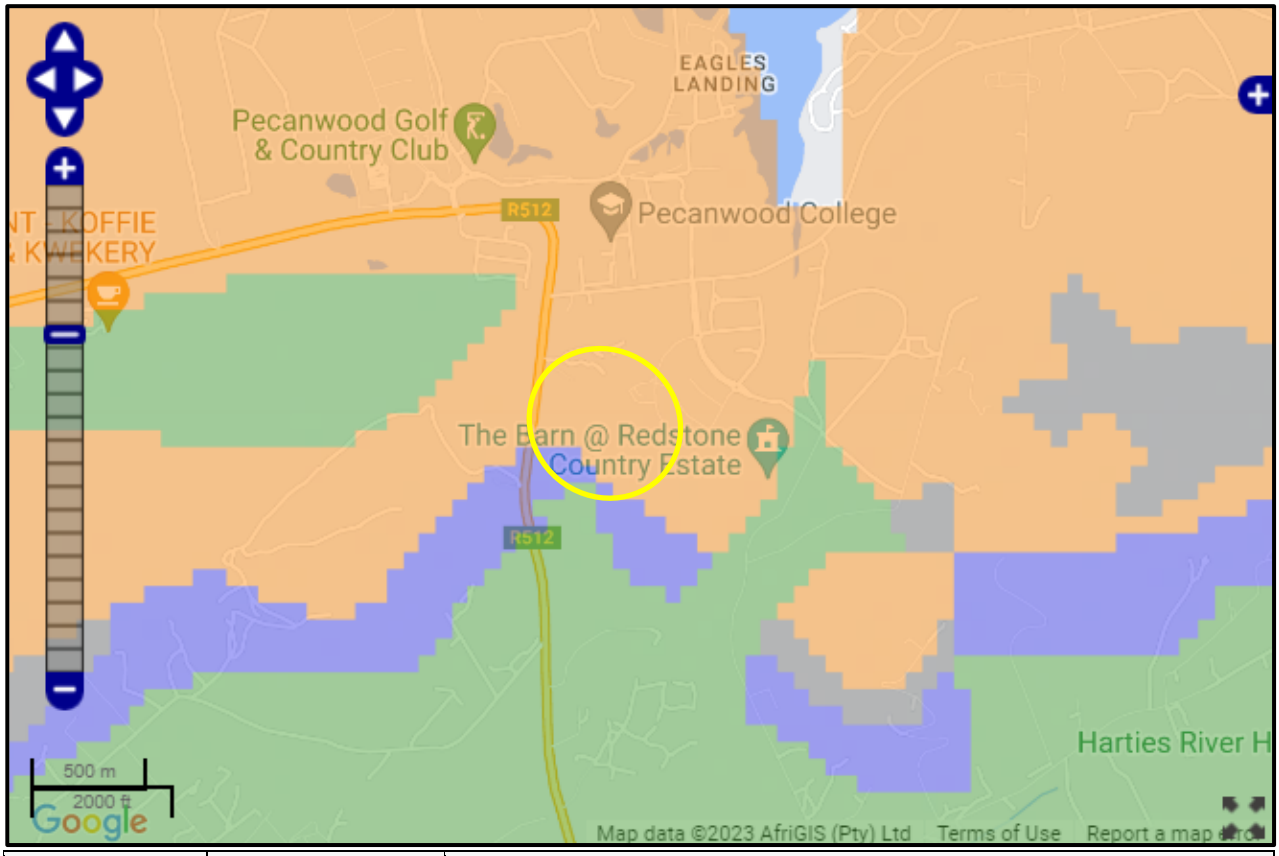


Figure 8.9. 1996 Topographic map indicating three structures within the project area, two of which were identified during the survey.

8.3 Paleontological Heritage

The study area is indicated as of mostly high paleontological sensitivity with the southern boundary being of low sensitivity on the SAHRA Paleontological map (Figure 8.6) and an independent study was conducted for this purposed and (Bamford 2023), concluded that the proposed site lies on the potentially fossiliferous Silverton Formation (indicated in orange) that could preserve trace fossils such as stromatolites and microbialites although none have been recorded from this formation. Furthermore, the material to be excavated is soil and this does not preserve fossils. There is a very small chance that trace fossils may occur below ground or in the sandstones of the Palaeoproterozoic Silverton Formation so a Fossil Chance Find Protocol should be added to the EMPr. Taking account of the defined criteria, the potential impact to fossil heritage resources is very low.



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 8.10. 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 heritage 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 infrastructure;
- Visual impact of The Project on the landscape and sense of place;
- Excavation and levelling of the development footprint;

The structures at Hal01 and Hal02 will be directly impacted on. Although Hal01 is of low significance the feature is protected under the NHRA based on its age. The impact is moderate. Hal02 is of no heritage significance and the impact is of very low significance.

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures as recommended in this report should be implemented during all phases of the project. Impacts of the project on heritage resources is expected to be low during all phases of the development.

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 for the project

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Highly Probable (4)	Probable (3)

Significance	**44 (Medium)**	**27 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA
Mitigation: • Hal01 should be assessed and recorded by a conservation architect after which a destruction permit can be applied for; • Implementation of a Chance Find Procedure for the project.		
Cumulative impacts: With the recommended mitigation measures, the proposed project will have a low cumulative impact.		
Residual Impacts: Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

10 Conclusion and recommendations

The project area is a small 8ha property situated on rocky terrain next to the R512 just south of Pecanwood Estate. The property has been fallow and a large, partially demolished house was recorded near the western boundary of the project area as Hal01 (25°46'50.94"S and 27°51'24.71"E). Based on Topographic maps (Figure 8.6 and 8.7) the structure was constructed between 1943 and 1969 and it could be older than 60 years. The structures' potential to contribute to aesthetic, historic, scientific and social aspects are non-existent, and it is therefore of low heritage significance, but it is protected on account of its age.
The palaeontological sensitivity of the study area is high with a small section of low sensitivity, and an independent assessment was done (Bamford 2023) that concluded the area lies on the potentially fossiliferous Silverton Formation that could preserve trace fossils such as stromatolites and microbialites although none have been recorded from this formation. There is a very small chance that trace fossils may occur below ground or in the sandstones of the Palaeoproterozoic Silverton Formation so a Fossil Chance Find Protocol should be added to the EMPr.

The impact to heritage resources is low with the mitigation measures applied 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 and on the condition that the following recommendations (Section 10) are implemented as part of the EMPr.

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:

- Hal01 should be assessed and recorded by a conservation architect after which a destruction permit can be applied for;
- 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.

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 therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below and monitoring guidelines applicable to the Chance Find procedure is discussed below and monitoring guidelines for this procedure are provided in Section 10.5.

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

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

10.2.2 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, sub surface cultural material and unrecorded burial sites. This can cause delays during construction, as well as additional costs involved in mitigation, as well as possible layout changes.

10.5 Monitoring Requirements

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

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

Table 8. Monitoring requirements for the project

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

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
					• Only recommence operations once impacts have been mitigated.

10.6 Management Measures for inclusion in the EMPr

Table 9. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
Hal01	Hal01 should be assessed and recorded by a conservation architect after which a destruction permit can be applied for	Pre Construction	Pre Construction	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	Destruction permit adhering to all legal requirements.
General project area	Implement chance find procedures in case possible heritage finds are uncovered	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
General Project area	Regular monitoring of the development footprint by the ECO	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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