HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED IMPROVEMENT OF NATIONAL ROAD R33 SECTION 13 FROM MODIMOLLE (KM 0.6) TO WITKLIP (KM 13.6), LIMPOPO PROVINCE.

Type of development:

Road Upgrade

Client:

Zitholele Consulting

Developer:

Report prepared by:

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April 2023
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APPROVAL PAGE

Project Name	R33 Upgrade Modimolle to Witklip Project.
Report Title	Heritage Impact Assessment For The Propsed Improvement of National Road R33 Section 13 from Modimolle (Km 0.6) to Witklip (Km 13.6), Limpopo Province
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	

Responsibility	Name	Qualifications and Certifications	Date
Fieldwork and reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	March 2023
Report Writing and Archaeological support	Lara Kraljević – Archaeologist	MA Archaeology	April 2023

DOCUMENT PROGRESS

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Amendments on Document

Date	Report Reference Number	Description of Amendment
9 May 2023	23033	Technical revision

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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

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	05/04/2023

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

LIST OF FIGURES

LIST OF TABLES

Executive Summary

Zitholele Consulting was appointed as the Environmental Assessment Practitioner (EAP) to undertake the required Environmental Authorisation Process for the proposed R33 Upgrade from Modimolle to Witklip. Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the Project and the study area was assessed on a desktop level and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- The Project is situated along the existing Provincial Route R33 from Modimolle to Witklip;
- The existing road servitude and associated construction activities of the national road would have impacted on surface evidence of heritage features if any ever existed in the servitude and the Project area is considered to be of low heritage significance;
- This was confirmed during the survey whereby no heritage resources were identified within the road servitude;
- The palaeontological sensitivity of the study is moderate with a small section of insignificant/zero, and an independent assessment was done for this aspect(Bamford 2023).

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

Recommendations:

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

ABBREVIATIONS

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

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

GLOSSARY

Archaeological site (remains of human activity over 100 years old)
Earlier Stone Age (~ 2.6 million to 250 000 years ago)
Middle Stone Age (~ 250 000 to 40-25 000 years ago)
Later Stone Age (~ 40-25 000, to recently, ~ 100 years ago)
The Iron Age (~ AD 400 to 1840)
Historic (~ AD 1840 to 1950)
Historic building (over 60 years old)

1 Introduction and Terms of Reference:

Beyond Heritage was appointed to conduct a HIA for the proposed upgrade of the R33, Section 13, between Modimolle (km0.6) to Witklip (km13.6). The project site is located within the Modimolle-Mookgopong Local Municipality and the Waterberg District Municipality in the Limpopo Province. (Figure 1.1 to 1.3). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPr) for the development.

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

During the survey no heritage sites 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) understand the heritage character of the study area; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

Reporting
Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of 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 proposed R33 road upgrade commences just outside Modimolle Town at km 0.6 and ends at km 13.6 at Witklip.
Magisterial District	Modimolle-Mookgopong District Municipality
Central co-ordinate of the development	24°37'43.63"S 28°19'25.52"E - Witklip extent 24°42'1.44"S 28°24'22.56"E – Modimolle extent
Topographic Map Number	2428CB

Table 3: Infrastructure and project activities

Type of development	Road Upgrade
Size of development	13 km road upgrade
Project Components	The project involves the upgrade of the R33, Section 13, between Modimolle (km0.6) to Witklip (km13.6), in Limpopo Province. The total length of the road upgrade is 13km. The road upgrade will entail the following: • Widening of the existing road to provide paved shoulders • Provide new pavement structure on widenings • Upgrading and strengthening of existing pavement layers • Surfacing of road constructed to new levels • Upgrading side drains • Continuous or selective vertical and/or horizontal realignment inclusive of new pavement layers including drainage. • Geometric/safety/capacity improvements at intersections. The R33 is currently a single carriageway road with 3.7m lanes and 0.3m to 0.5m surfaces shoulders. There is an existing climbing lane on the west bound (LHS) of the road from km5.6 to km6.2. The proposed upgrade requires two lanes per direction over a 30-year design period between km0.6 and km2.4. the following cross-sections for the R33 are proposed: • Km.0.6 to km2.4: Four (4)-lane undivided single carriageway • Km2.4 to km6.8: Two (2)-lane single carriageway with climbing / passing lanes • Km6.8 to km13.6: Two (2) lane single carriageway with climbing /passing lanes The following intersections will be upgraded: • Koro Creek Golf Estate at km1.445 • Kokanje Retirement Village at km2.425 • Weesgerus Holiday Resort at km3.135 • Road to Donkerpoort at km10.035 • Road to Alma at km12.075 There are approximately 21 culverts along the existing R33. Many culverts need to be upgraded to larger size pipes or box culverts, especially culverts smaller than 600mm. the drainage facilities need to conform to the requirements for a Class 2 Road. Al drainage structures will need to be lengthened to accommodate the proposed road width of 13.4km.

	The following roadside drainage elements will possibly be required for the newly widened cross-section: • Lined concrete open drains in deep cuttings (e.g. 2m Type F-drains); • Gabions or stone pitching at foot of fill sections • Use of kerbs, berms or type A-drains as per SANRAL typical drawing for high fills and cut-off drains on deep cuts, to mitigate the impact of embankment erosion; and Drainage outlets to prevent inundation of the drains/road shoulders before super-elevation rollovers. The existing Klein Nyl River Bridge (Bridge B1272) is the only major drainage structure along the R33 and is located at km1.12. the existing structure consist of two spans of 5.35m each (10.7m in total) and has a skew of approximately 30º. As part of the road upgrade, the existing bridge will be replaced with a new, larger structure. The proposed road geometry at the location of the bridge is based on an undivided 4-lane single carriageway. The proposed cross-section at the location of the bridge is as follows: • 2.5m raised sidewalk on LHS and RHS • 3.6m slow lane • 3.4m fast lane • 2.8m raised median The bridge cross section is therefore similar with a clear distance of 22.25m between the edges of the handrail coping which becomes 21.8m between the faces of the parapets, should there ever be a requirement to widen the road with one additional lane in each direction. The design allows for a further 3.5m lane if the sidewalks are removed. The proposed road geometry at the location of the bridge is based on an undivided 4-lane single carriageway. The proposed cross-section at the location of the bridge is as follows: • 2.5m raised sidewalk on LHS and RHS • 3.6m slow lane • 3.4m fast lane • 2.8m raised median The bridge cross section is therefore similar with a clear distance of 22.25m between the edges of the handrail coping which becomes 21.8m between the faces of the parapets, should there ever be a requirement to widen the road with one additional lane in each direction. The design allows for a further 3.5m lane if the sidewalks are removed.

	There will be closure/relocation of some access roads to comply with SANRAL and TRH, TMH and UTG design guidelines and standards, road safety improvement and access management policies. Alternate access will be provided for landowners on affected properties during the final design. Commercial material sources will be obtained for the proposed construction, therefore, there will be no application for any borrow pits.

1.3 Alternatives

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

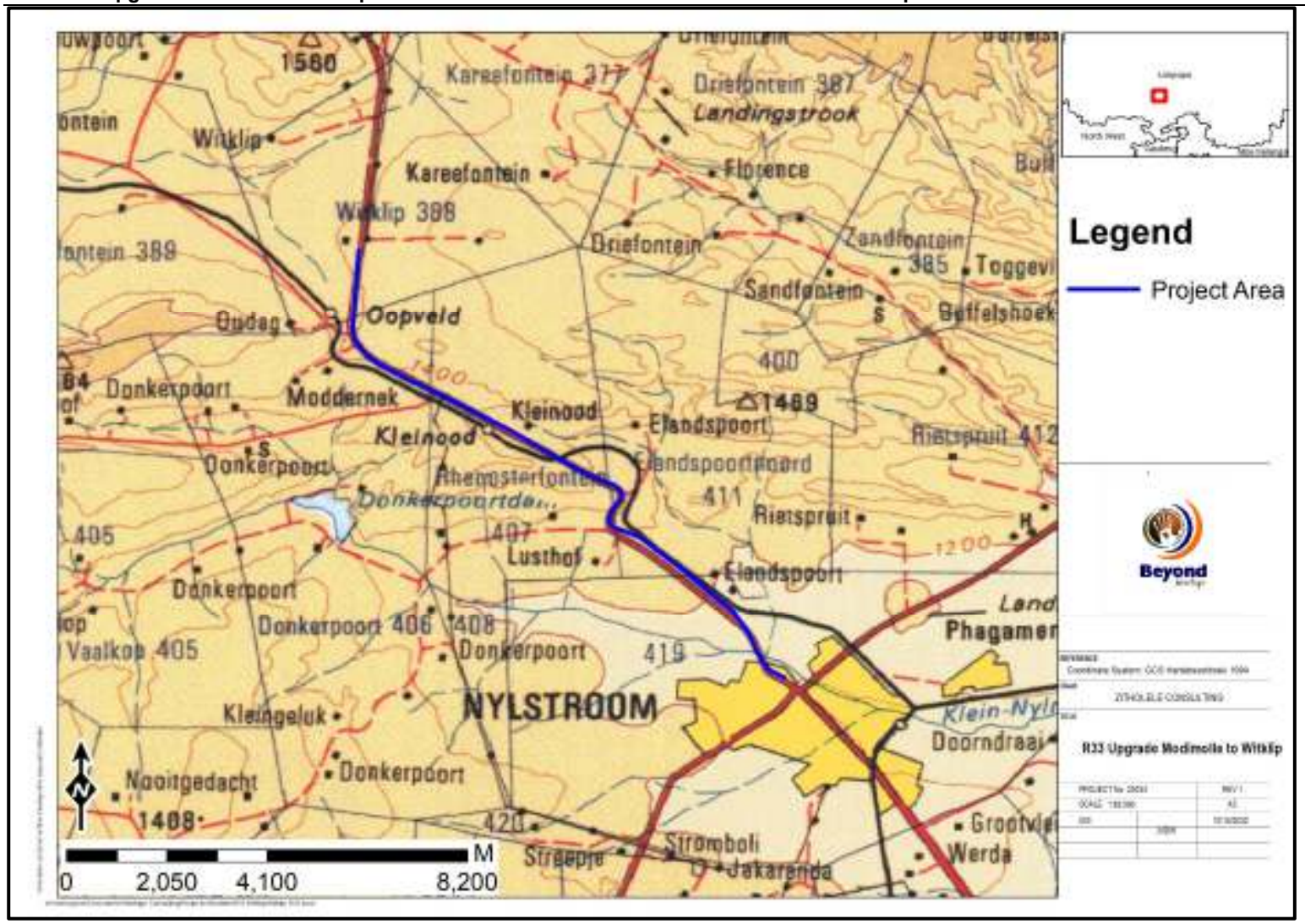

Figure 1-1. Regional setting of the Project (1: 250 000 topographical map).

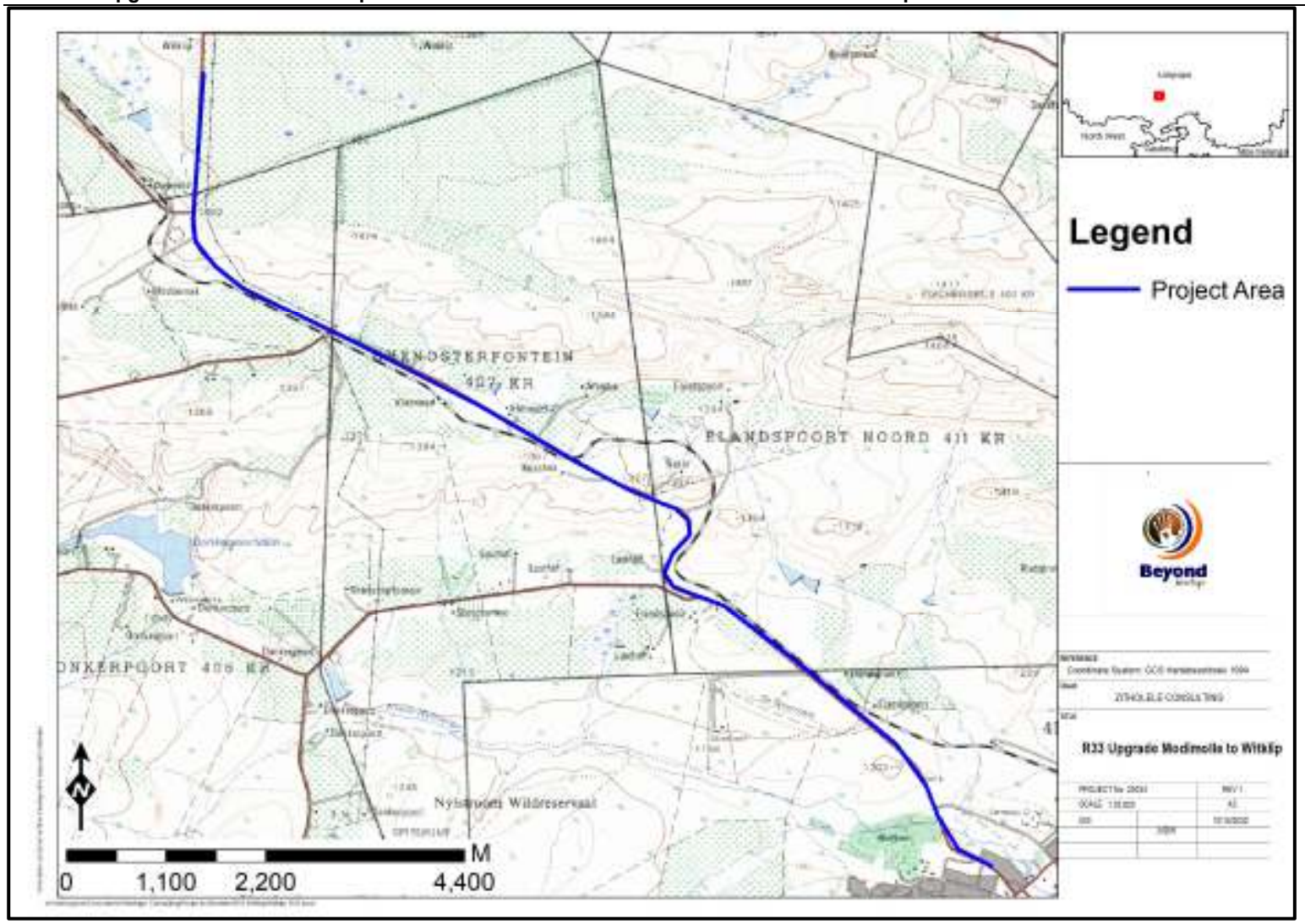

Figure 1-2. Local setting of the Project (1: 50 000 topographical map).

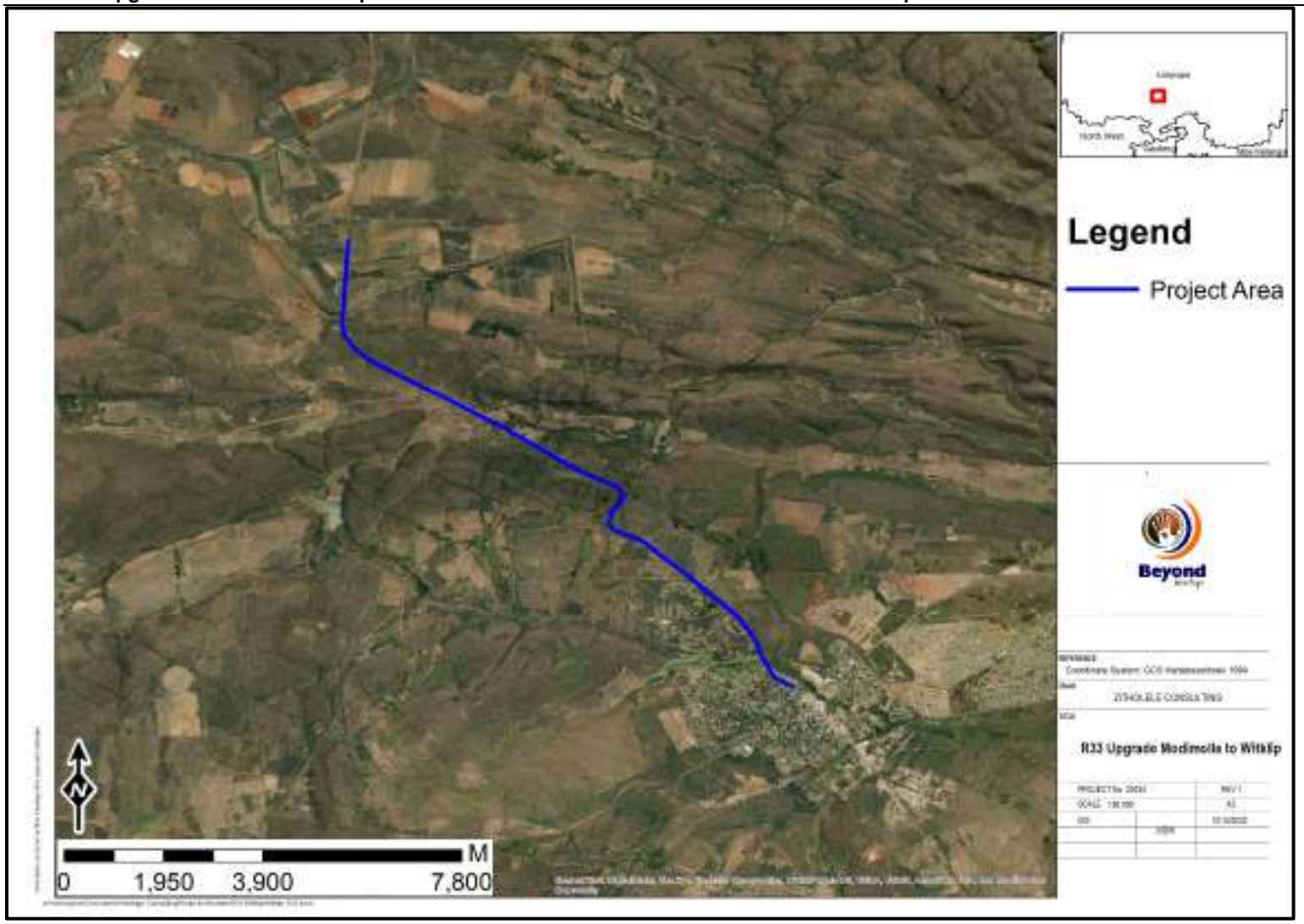

Figure 1-3. Aerial image of the study area and Project components.

2 Legislative Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

3 METHODOLOGY

3.1 Literature Review

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

3.2 Genealogical Society and Google Earth Monuments

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

3.3 Public Consultation and Stakeholder Engagement:

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

3.4 Site Investigation

The aim of the site visit was to:

a) survey the proposed project area to understand the heritage character of the development footprint (focussing on the current layout);

b) record GPS points of sites/areas identified as significant areas;

c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Table 4: Site Investigation Details

	Site Investigation
Date	23 March 2023
Season	Summer – The time of year did influence the survey as the ground vegetation was densely overgrown along the existing roadside. The development footprint was however sufficiently covered to understand the heritage character of the area (Figure 3.1).

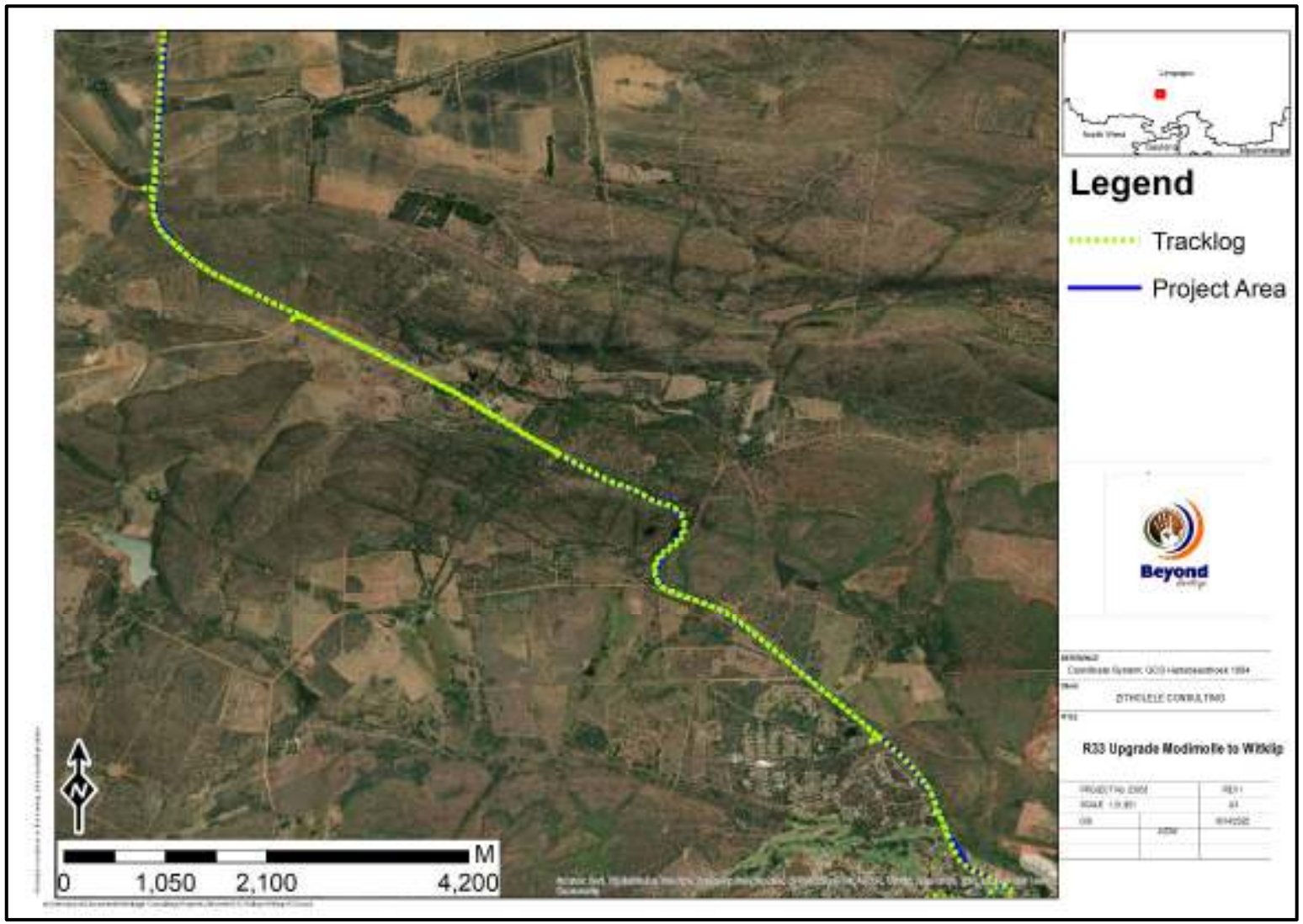

Figure 3-1. Tracklog of the survey path in green.

3.5 Site Significance and Field Rating

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

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

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

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

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

Table 5: Heritage significance and field ratings

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 Assumptions, Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. Any limitations are successfully mitigated with the implementation of a chance find procedure and monitoring of the study area by the ECO. This report only deals with the current layout of the proposed development and consisted of non-intrusive surface surveys that focussed on tangible resources. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant.

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

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4 Description of Socio-Economic Environment

According to Census 2011, Modimolle Local Municipality has a total population of 68 513 people. The majority of the population (88,1%) is black African, followed by whites at 10,8%. The other population groups make up the remaining 1,1%. Amongst those aged 20 years and older, 23,9 completed/have some primary education, 34,7 have secondary education, 22,0% have completed matric, 8,7% have some form of higher education. Of the 25 353 economically active (employed or unemployed and looking for work) people in the municipality, 22,2% are unemployed. 28,9% of the 11 094 economically active youth (15 – 34 years) in the area are unemployed (statssa.gov.za).

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

Adjacent landowners and the public at large will be informed of the proposed activity as part of the BA process by the EAP. Site notices and advertisements notifying interested and affected parties will be placed at strategic points and in local newspapers as part of the process. Matters related to heritage concerns will be further addressed in the EIA (if any).

6 Contextualising the study area:

6.1 Literature Review (SAHRIS)

Few sites are known for the greater region and consist of a Iron Age site, and Historic structures. Many surveys in the surrounding area found no heritage resources. The following Cultural Resource Management (CRM) assessments (Table 6) were conducted in the larger area and consulted for this report:

Table 6. CRM reports consulted for the study.

Author	Year	Project	Findings
Van der Walt, J.	2021	Heritage Impact Assessment for the SANRAL R101 Road Upgrade Section 8 From Bela Bela to Modimolle, Limpopo Province.	Isolated Stone tool, Iron Age site, old bridges, historical foundations
Küser, U.	2005	Cultural Heritage Resources Impact Assessment of Portion 5 of Donkerpoort 406 KR Modimolle.	Farm workers houses, cemetery, and a small farmhouse
Küser, U.	2019	Phase I Cultural Heritage Resources Impact Assessment for Section 102 Portion 61 and 62 of the Farm Cyferfontein 457 KR, Modimolle Local Municipality, Limpopo Province.	No Sites
Stegmann, L., Roodt, F.E.	2008	Phase 1 Heritage Resources Scoping Report Substation Extension and Powerline Upgrade, Modimolle, Limpopo.	No Sites
Muroyi, R.	2016	Heritage Impact Assessment Study for the Proposed Modimolle Bilk Water Supply and Storage Reservoir, Modimolle, Limpopo Province.	No Sites
Gaigher, S.	2017	Heritage Impact Assessment for the Mining Rights Application located on Portion 11 and Portion 34 of the Farm Cyferfontein 457-KR in the Waterberg District Municipality of the Limpopo Province.	No Sites
Birkholtz, P.	2022	Heritage Impact Assessment for the SANRAL R33 Road Upgrade Project located along the R33 between the N1 Highway and the town of Modimolle, Modimolle-Mookgopong Local Municipality, Waterberg District Municipality, Limpopo Province	Old bridges and historic buildings
Muroyi, R.	2016	Heritage Impact Assessment Study for the Proposed Modimolle Bilk Water Supply and Storage Reservoir, Modimolle, Limpopo Province.	No Sites

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

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

6.2 Archaeological Background

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

6.2.1 Stone Age

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

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

The Limpopo province is an archaeological rich landscape with Stone Age sites and associated finds commonly found throughout. The landscape in which the project area falls does however lack any significant ESA and MSA sites. This may be due to lack of archaeological research in the area, but surveys near the project area also did not identify significant Stone Age finds. Many LSA associated rock art sites have been identified in the Waterberg situated further north of the project area (Bergh 1999, Van der Ryst 1998). At the Modimolle Hill, multiple rock shelters and associated artefacts were identified relating to the LSA. Important LSA deposits have also been excavated in Oliboompoort Cave (Mason 1962). Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters.

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 area only saw an influx of Iron Age communities from the Later Iron Age and onwards. The Modimolle Mountain has also shown be have been an important LIA occupation site. Three LIA groups are known to have occupied the landscape, the Bakgatla, the Bantwane a Pedi and the Langa Ndebele. According to Huffman (2007), ceramic facies likely to occur on this landscape include *Icon, Madikwe, Uitkomst, Rooiberg, Mzonjani, Bambata, Diamant, and Eiland.* These ceramic facies originate from both the eastern associated stream of migration of the Urewe Tradition and the western associated stream of migration of the Kalundu Tradition.
Around 1825, during their occupation of Modimolle Mountain, the Bantwane a Pedi were under attack by Mzilikazi and the Matabele Ndebele who were said to have thrown Bantwane a Pedi people from the cliffs of the mountain (Küsel 2019). Three low stone walling sites have been found on the eastern side of the mountain, each around 100m in diameter (Küsel 2019).

According to the most recent archaeological cultural distribution sequences by Huffman (2007), the larger region falls within the distribution area of various cultural groupings originating out of both the Urewe Tradition (eastern stream of migration) and the Kalundu Tradition (western stream of migration). The facies that may be present are:

- Urewe Tradition: Moloko Branch – Icon facies AD 1300 - 1500 (Late Iron Age)
- Madikwe facies AD 1500-1700 (Late Iron Age)
- Blackburn Branch- Uitkomst facies AD 1650-1820 (Late Iron Age)
- Rooiberg facies AD 1650-1750 (Late Iron Age)
- Kwale branch- Mzonjani facies AD 450 – 750 (Early Iron Age)
- Kalunda Tradition: Benfica sub-branch – Bambata facies AD 150-650 (Early Iron Age)
- Happy Rest sub-branch – Diamant facies AD 750-1000 (Early Iron Age)
- Eiland facies AD 1000-1300 (Middle Iron Age)

6.2.3. Historical Period

In the 1860s, Voortrekkers, referred to as the ‘Jerusalemgangers’ entered the region after leaving the Groot Marico area. Upon arrival, the Voortrekkers found the Langa Ndebele occupying the Modimolle Mountain after the attacks of Mzilikazi. The Voortrekkers felt that the area bore similarities to the descriptions of Egypt and assumed that the river was the Nile River and the Modimolle Mountain was mistaken for a pyramid (Raper 2004). Their settlement was then named Nylstroom (referring to the Nile stream) and the town was established in 1866. Nylstroom served as an important trade route for farms in the region. In 1899 the railway line between Pretoria and Pietersburg was completed, with the railway running through Nylstroom. In 2002, Nylstroom was renamed to Modimolle, which in Tswana means ‘the forefather’s spirit has eaten’ or ‘God has eaten’ (Breuts 1989).

6.2.4. Anglo-Boer War

During the Anglo-Boer War (1899 – 1902), conflict between the British troops and the Boer settlers in the region was high. People of Nylstroom had joined the Waterberg Commando led by General F.A Grobler during the war. A concentration camp was established in Nylstroom from May 1901 to March 1902 whereby the British held the Boer women, children and elders. Approximately 525 people died in the concentration camp (www.angloboerwar.com). Victims are buried in the Modimolle concentration camp cemetery.

7 Description of the Physical Environment

The vegetation and landscape are described by Mucina and Rutherford (2006) as Central Sandy Bushveld and is intersected by the Waterberg Mountain Bushveld. The Central Sandy Bushveld is described as Low undulating areas, sometimes between mountains, and sandy plains and catenas supporting tall, deciduous *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils (with the former often dominant on the lower slopes of sandy catenas) and low, broad-leaved *Combretum* woodland on shallow rocky or gravelly soils. Species of *Acacia*, *Ziziphus* and *Euclea* are found on flats and lower slopes on eutrophic sands and some less sandy soils. *A. tortilis* may dominate some areas along valleys. Grass-dominated herbaceous layer with relatively low basal cover on dystrophic sands. The Waterberg Mountain Bushveld is described as rugged mountains with vegetation grading from *Faurea saligna–Protea caffra* bushveld on higher slopes (in turn grading into the Gm 29 Waterberg-Magaliesberg Summit Sourveld) through broad-leaved deciduous bushveld (dominated by *Diplorhynchus condylocarpon*) on rocky mid- and footslopes to *Burkea africana–Terminalia sericea* savanna in the lower-lying valleys as well as on deeper sands of the plateaus. The grass layer is moderately developed or well developed.

The proposed R33 road upgrade commences just outside Modimolle Town at km 0.6 and ends at Km 13.6 at Witklip. The roadreserve is altered through the construction activities of the existing road and is marked by tall grass after the summer rains although some areas have been slashed. General site conditions are illustrated in Figures 7.1 to 7.18.

Figure 7-1. General site conditions- Road conditions near the extent of the Modimolle section of the upgrade.

Figure 7-2. Klein Nyl River Bridge which will be replaced with a new, larger bridge.

Figure 7-3. The intersection at the entrance of the Koro Creek Bushveld Golf Estate which will be upgraded.

Figure 7-4. General site conditions next to existing road where the grass have been slashed.

Figure 7-5. General site conditions – dense vegetation next to existing road at the alma turnoff.

Figure 7-6. Running water next to the road from high summer rainfall.

Figure 7-7. Overgrown vegetation and power lines running next to the road.

Figure 7-8. Overgrown vegetation and power lines running next to the road.

8 Findings of the Survey

8.1 Heritage Resources

The construction of the existing road would have impacted on heritage features if any were present in these areas. The study area lacks any focal points like pans or rocky outcrops that would have attracted human occupation in antiquity and with the degraded nature of the road servitude is considered to be of low heritage potential. This was confirmed during the survey and no heritage sites were identified along the existing road.

8.2 Cultural Landscape

The project area is situated along the existing R33 provincial route for approximately 13km. The surrounding region was marked by largescale cultivation areas between Modimolle and Witklip.

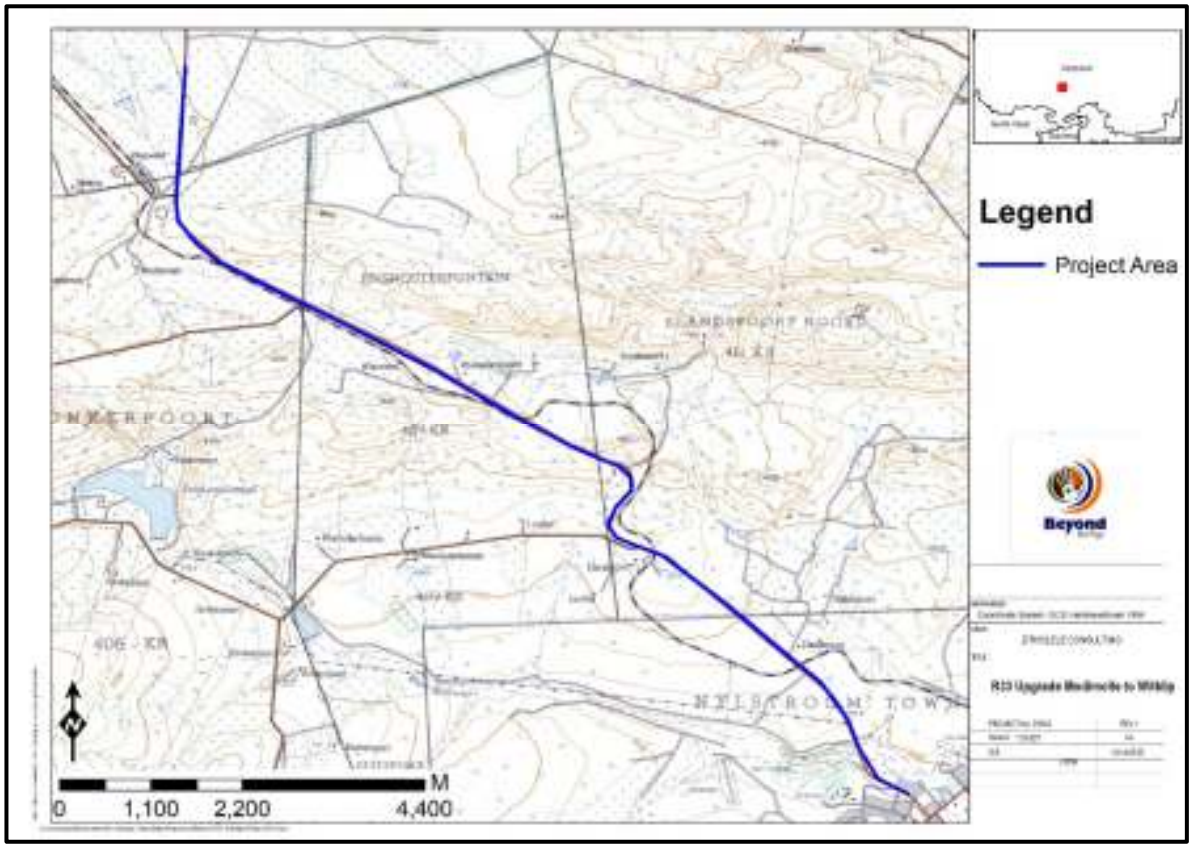

Figure 8-1. 1965 Topographic map indicating the existence of the road which will be upgraded. The surrounding area is largely undeveloped.

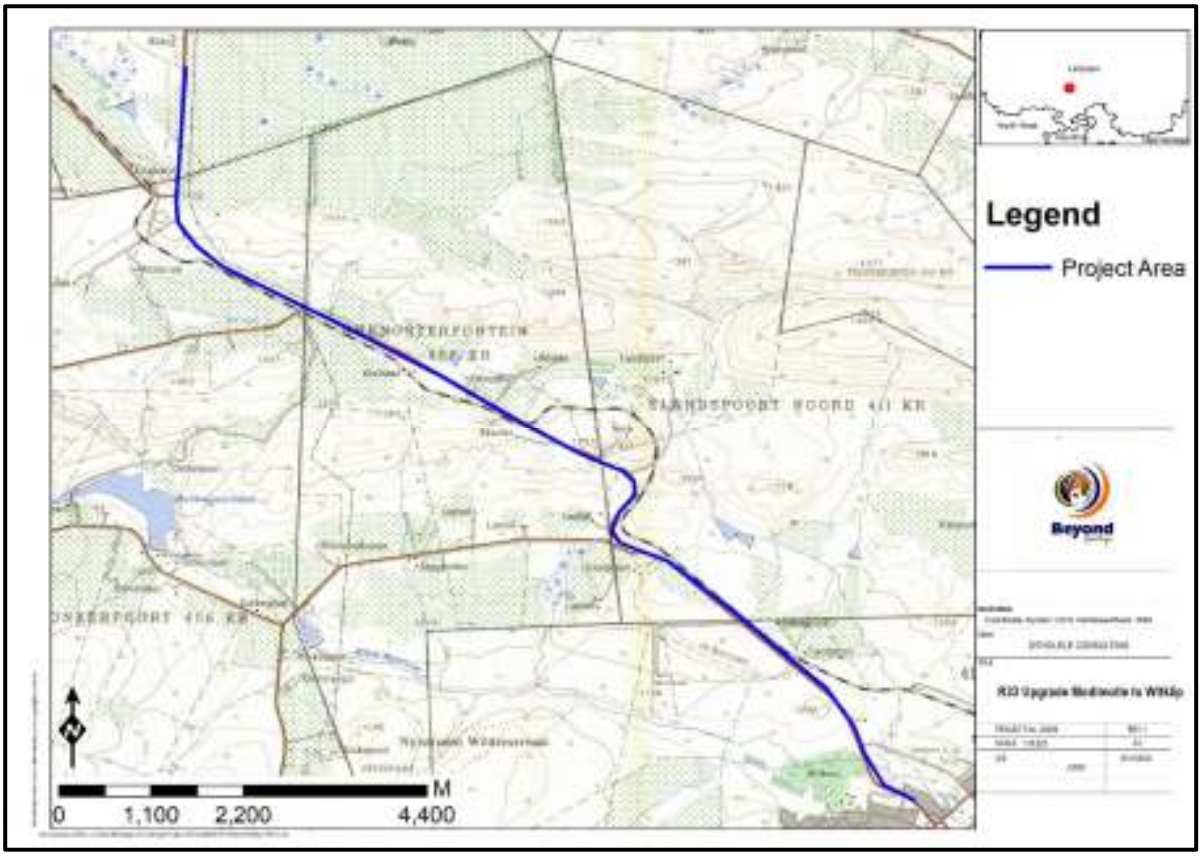

Figure 8-2. 1981 Topographic map indicating the development of power lines next to the road around the Witklip area. The surrounding area saw large scale cultivation.

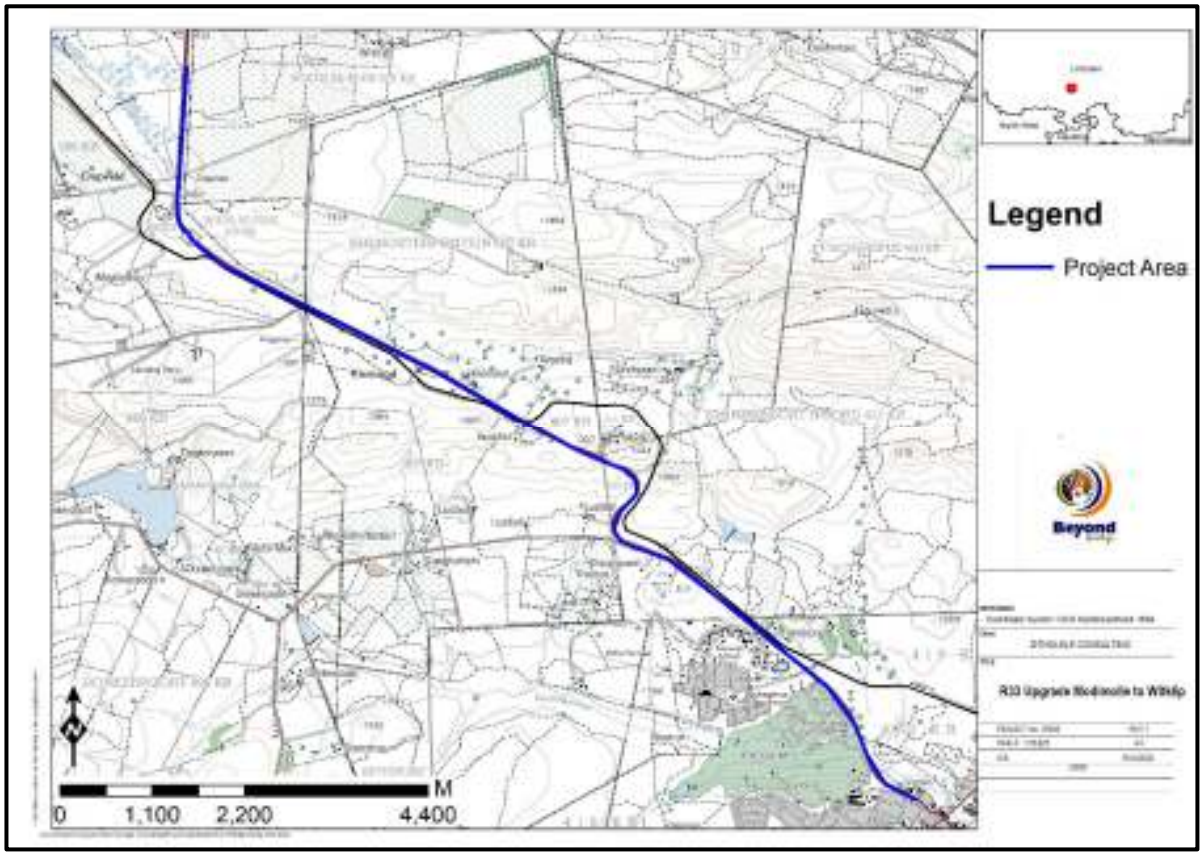

Figure 8-3. 2005 Topographic map indicating further developments in the surrounding area of the project area.

8.3 Paleontological Heritage

The study area is indicated as of moderate palaeontological significance area on the SAHRA Paleontological map with a small area of insignificant/zero sensitivity which intersects the project (Figure 8.4) and an independent study was conducted for this aspect (Bamford 2023).

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

Figure 8-4. Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

9 Potential Impact

Due to the lack of any archaeological finds within the project area, there will be no impact to known heritage resources.

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 if mitigation measures are followed (Table 7).

9.1.1 Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage

features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.2 Construction Phase

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

9.1.3 Operation Phase

No impacts are expected during the operation phase.

9.1.4 Impact Assessment for the Project

Table 7. Impact assessment on the Project area

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 (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**16 (Low)**	**16 (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: • Implementation of a chance find procedure for the project.		
Cumulative impacts: The proposed project will have a low cumulative impact as no significant heritage resources will be adversely affected.		
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 is located along the existing provincial route R33, Section 13 between Modimolle (km0.6) to Witklip (km13.6). The construction and maintenance of the existing road would have impacted on any heritage resources if any were present. The study area lacks any focal points like pans or rocky outcrops that would have attracted human occupation in antiquity and with the degraded nature of the road servitude is considered to be of low heritage potential. This was confirmed during the survey whereby no heritage resources were identified within the road servitude. The palaeontological sensitivity of the study is moderate with a small section of insignificant/zero, and an independent assessment was done (Bamford 2023).

The impact on heritage resources is low, and it is recommended that the Project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA.

10.1 Recommendations for condition of authorisation

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

Recommendations:

- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during 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, unrecorded cultural material and burial sites. This can cause delays during construction, as well as additional costs involved in mitigation, as well as possible layout changes.

10.5 Monitoring Requirements

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

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

Table 8. Monitoring requirements for the project

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Cultural Resources Chance Finds	Entire project area	ECO	Weekly (Pre construction and construction phase)	Proactively	• 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)
General project area	Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction;	Construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

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