

TSIMBA



ARCHAEOLOGICAL
FOOTPRINTS (PTY) LTD

**PHASE 1 HERITAGE IMPACT
ASSESSMENT FOR THE PROPOSED KWA-
PHARAFINI/NGCENGENI WATER
SUPPLY SCHEME IN WARD 3 MSINGA
LOCAL MUNICIPALITY**

DEVELOPED FOR



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St Helier, Gillitts,
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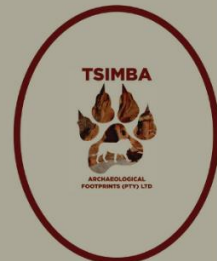
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MAY 2022

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Association of Professional Heritage Professionals (APHP)

International Association Impact Assessment South Africa (IAIAsa)

KwaZulu-Natal Amafa and Research Institute

Society of Black Archaeologist

Cultural Resources Management Projects Completed:

: Over 100 Heritage Impact Assessments

: Close to 500 historical human burials excavated

This report including all its related data, project results and recommendations forming part of the submission and any other subsequent reports or project documents such as the inclusion in the Environmental Impact Assessment (EIA) document for which it is intended for totally vest with the author(s) Mr. Roy Muroyi and the company he represent Tsimba Archaeological Footprints (Pty) Ltd and the client. No part of this publication may be reproduced distributed or transmitted in any form or by any means including photocopying recording, or other mechanical methods without the prior written permission of the author, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright

TECHNICAL SUMMARY

DOCUMENT INFORMATION ITEM	DESCRIPTION
Proposed development and location	The proposed the proposed KwaPharafini/Ngcengeni Water Supply Scheme. The project area is located within Ward 3 of the Msinga Local Municipality, which forms part of the greater uMzinyathi District Municipality in KwaZulu Natal.
Purpose of the study	To carry out a Phase 1 Heritage Impact Assessment to determine the presence/absence of archaeological assess their archaeological significance in terms of the NHRA of 1999, The Kwazulu-Natal Amafa and Research Institute (Act 5 of 2018) and SHARA guidelines.
Municipalities	Msinga Local Municipality, which forms part of the greater uMzinyathi District Municipality
Predominant land use of surrounding area	Rural Homesteads
Applicant	Msinga Local Municipality
Site Coordinates	South 28° 41' 58.74" East 30° 21' 03.83"
Client Details	EnviroPro Environmental Consulting (Pty) Ltd 1A Leinster Place, St Helier, Gillitts, Durban, 3610 Email: admin@enviropro.co.za
Heritage Consultant	Tsimba Archaeological Footprints (Pty) Ltd 24 Lawson Mansions 74 Loveday Street, Johannesburg, 200

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Development criteria in terms of Section 38(1) of the NHR Act	Yes	No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	<input checked="" type="checkbox"/>	
Construction of bridge or similar structure exceeding 50m in length		
Development exceeding 5000 sq m		
Development involving three or more existing erven or subdivisions		
Development involving three or more erven or divisions that have been consolidated within past five years		
Rezoning of site exceeding 10 000 sq m		
Any other development category, public open space, squares, parks, recreation grounds		

EXECUTIVE SUMMARY

The Applicant, City of uMhlathuze Local Municipality proposes to construct the KwaPharafini/Ngcengeni Water Supply Scheme is aimed at providing potable water to approximately 10,700 residents within the Ngubo, Esijozini, Mambeni, Ngcengeni and Pharafini communities. The project area is located within Ward 3 of the Msinga Local Municipality, which forms part of the greater uMzinyathi District Municipality in KwaZulu Natal. The construction of new reticulation infrastructure is proposed for KwaPharafini and Ngcengeni area. However, the proposed bulk infrastructure of this scheme will improve the water supply to the neighbouring areas of Mambeni, Ngubo and Esijozini. Six Seminal Historical Battlefield Sites of National and International Importance are located in close proximity to each other in Msinga. Despite the fact that the majority of the Battlefield Sites are located outside of Msinga Municipality, the battlefield route follows the R33 all south of the proposed development footprint. The R33 runs through the municipality. In integrating the Battlefields Heritage and Zulu Cultural Tourism, the Municipality, in collaboration with the District Municipality, can obtain a possible competitive edge

EnviroPro Environmental Consulting (Pty) Ltd has been appointed as the Environmental Assessment Practitioner (EAP) for the proposed development (hereafter referred to as “the EAP”) have been appointed has been appointed by BVi Consulting Engineers (KZN), on behalf of the Applicant to undertake the Basic Assessment process for the proposed development.

In-turn EnviroPro Environmental Consulting (Pty) Ltd requested Tsimba Archaeological Footprints (Pty) Ltd to conduct a Phase 1 Heritage Impact Assessment (HIA) for the proposed development. This HIA study was commissioned through the provisions of the National Heritage Resources Act of 1999 and supporting regulations such as the South African Heritage Resources Agency Minimum Standards for Specialist Heritage Studies (Archaeology, Palaeontology, Built Environment and Living Heritage). In order to produce an up best practice product. The assessment was also informed by the international standards such as the ICOMOS Guidelines on Impact Assessment near World Heritage places, and ICOMOS Australia’s Burra Charter. Combined, these standards of best practice motivate for robust impact assessment processes and a cautious approach to the management of sites. They set out firmly that the cultural significance of heritage places must guide all decisions, developmental and otherwise.

The findings of this report have been informed by desktop data review, archaeological field survey and impact assessment reporting which include recommendations to guide heritage authorities in making decisions with regards to the proposed project. This study was conducted before any activities took place on the proposed development area. The impact assessment study also includes detailed recommendations on how to mitigate and manage negative impacts while enhancing positive effects on the project area. Given below is a real time presentation of the survey conducted in various parts of the proposed pipeline route.



Figure 1: Real Time presentation of the field survey

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ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
LIA	Late Iron Age
MIA	Middle Iron Age
MSA	Middle Stone Age
SAHRA	South African Heritage Resources Agency

GLOSSARY

Achievement	<ul style="list-style-type: none"> ▪ Something accomplished, esp. by valour, boldness, or superior ability
Aesthetic	<ul style="list-style-type: none"> ▪ Relating to the sense of the beautiful or the science of aesthetics.
Community	<ul style="list-style-type: none"> ▪ All the people of a specific locality or country
Culture	<ul style="list-style-type: none"> ▪ The sum total of ways of living built up by a group of human beings, which is transmitted from one generation to another.
Cultural	<ul style="list-style-type: none"> ▪ Of or relating to culture or cultivation.
Diversity	<ul style="list-style-type: none"> ▪ The state or fact of being diverse; difference; unlikeness.
Geological (geology)	<ul style="list-style-type: none"> ▪ The science which treats of the earth, the rocks of which it is composed, and the changes which it has undergone or is undergoing.
High	<ul style="list-style-type: none"> ▪ Intensified; exceeding the common degree or measure; strong; intense, energetic
Importance	<ul style="list-style-type: none"> ▪ The quality or fact of being important.
influence	<ul style="list-style-type: none"> ▪ Power of producing effects by invisible or insensible means.
Potential	<ul style="list-style-type: none"> ▪ Possible as opposed to actual.
Integrity	<ul style="list-style-type: none"> ▪ The state of being whole, entire, or undiminished.
Religious	<ul style="list-style-type: none"> ▪ Of, relating to, or concerned with religion.
Significant	<ul style="list-style-type: none"> ▪ important; of consequence
Social	<ul style="list-style-type: none"> ▪ Living, or disposed to live, in companionship with others or in a community, rather than in isolation.
Spiritual	<ul style="list-style-type: none"> ▪ Of, relating to, or consisting of spirit or incorporeal being.
Valued	<ul style="list-style-type: none"> ▪ Highly regarded or esteemed

1.0 INTRODUCTION

1.1 Project Background

The Applicant proposes to construct the Kwa-Pharafini/Ngcengeni Water Supply Scheme is aimed at providing potable water to approximately 10,700 residents within the Ngubo, Esijozini, Mambeni, Ngcengeni and Pharafini communities. The project area is located within Ward 3 of the Msinga Local Municipality, which forms part of the greater uMzinyathi District Municipality in KwaZulu Natal. The construction of new reticulation infrastructure is proposed for Kwa-Pharafini and Ngcengeni area. However, the proposed bulk infrastructure of this scheme will improve the water supply to the neighbouring areas of Mambeni, Ngubo and Esijozini

A Basic Impact Assessments (BIA) currently being conducted by EnviroPro Environmental Consulting (Pty) Ltd is used as an analytic approach for evaluating the expected impacts of development. A Phase 1 Heritage Impact Assessment was found to be necessary as part of the Basic Impact Assessment currently being conducted by. Whenever relevant, BIA also include cultural heritage as a factor to be evaluated. Both the BIA and HIA adopt a similar approach. In brief, first, the overall scope of the study is defined. Second, a baseline survey is carried out to provide a reference point against which impacts can be measured, including a desktop study and a field archaeological study.

This HIA is designed to assist statutory authorities in identifying and preventing the approval of aggressive developments, understood as the development that destroys the cultural significance of heritage properties. HIA structure an evaluation of the potential damage or benefits that may accrue to the significance of the cultural heritage assets.

1.2 Proposed project scope of works

➡ *Information supplied by EnviroPro Environmental Consulting (Pty) Ltd*

Construction works on the project will consist of the following:

- Construction of 0.9 M³, 1.2 M³ & 2 M³ capacity Concrete Reservoirs with associated inlet/ outlet / scour and overflow chambers.
- Construction of 7 No.6k³ capacity concrete Break Pressure Tanks with associated pipework, valves and chambers.

- ☑ Construction of rising mains, consisting of approximately 15.46 km of 250 - 150 mm \varnothing Ductile Iron pipelines.
- ☑ Construction of gravity mains, comprising approximately 13.48 km of 250 - 150 mm \varnothing uPVC / HDPE / Ductile Iron pipelines.
- ☑ Construction of approximately 80.72 km of HDPE / uPVC reticulation pipelines (250 mm - 20 mm \varnothing).
- ☑ Construction approximately 216 No. communal standpipes.
- ☑ Construction of gravel access roads in the vicinity of the proposed reservoirs, with isolated sections consisting of reinforced concrete panels (where required due to steeper grades).
- ☑ Replacement of existing booster pumps in the existing pump station with 2 No. 137 kW pumps and motors, as well as alterations / additions to the fabricated pipework within the existing pump station.
- ☑ Construction of new Pump station, which will contain 2 No. 32 kW rated vertical multistage centrifugal pumps and motors, with associated pipework and valves. The pump station structure shall consist of reinforced concrete strip foundations, brickwork walls and a concrete roof slab.
- ☑ Provision of waterworks valves including air valves, scour valves, isolating valves etc. with associated inspection chambers constructed from precast concrete rings and/or brickwork.
- ☑ Stream crossings, road crossings, protection works and other ancillary pipeline infrastructure.

1.3 Project Motivation / Need for the project

➔ Information supplied by *EnviroPro Environmental Consulting (Pty) Ltd*

The KwaPharafini/Ngcengeni Water Supply Scheme is aimed at providing potable water to approximately 10,700 residents within the Ngubo, Esijozini, Mambeni, Ngcengeni and Pharafini communities. The proposed bulk infrastructure of this scheme will improve the water supply to the neighbouring areas of Mambeni, Ngubo and Esijozini. The existing Sampofu Water Treatment Works which abstracts water from the Tugela River will be the source of water for the scheme. The existing Sampofu Water Treatment Works currently has a capacity of 3 M \varnothing /day capacity package plant is in the process of being commissioned at the same location. The design capacity of the plant therefore total 11 M \varnothing /day.

2.0 THE HERITAGE IMPACT ASSESSMENT PROCES

2.1 The Terms of Reference for this HIA study are:

Heritage impact assessments (hereinafter referred to as HIA) are applied to cultural heritage assets. This is a recent notion grounded in the requirements to perform environmental assessments at the project or more strategic levels. The practice of performing an impact analysis is not new, however. As Clark (2001, p. 22) observes, “impact analysis is not a particularly special, unusual or complex process; it is simply a codification of the basic analysis undertaken by any competent conservation adviser”. The HIA exists to:

- Review existing theories and models of cultural heritage resources interpretation and how to develop effective methods of archaeological interpretation for future generations to assist and assist SAHRA in their deliberations;
- Clarify the extent and ways in which current site context archaeological findings may affect the interpretation of cultural sites for present and future generations;
- Shed light on the potential challenges and opportunities brought about by the existence of archaeological sites and other conflicting views of the values of a site;
- Set out the ethical considerations on the interpretation and preservation of archaeological findings given the varied range of approaches available;
- Explain that the issue of archaeological preservation and conservation as relevant not only National Heritage or Provincial Heritage properties, but also for any significant cultural site;
- Focus on best practice of interpretation and preservation of archaeological findings.

2.2 The aim: - There are two interlinked aims for this HIA. The first is to identify and document cultural heritage sites, cultural resources, sites associated with oral histories (intangible heritage), graves, cultural landscapes, and any structures of historical significance (tangible heritage) that may be affected within the development footprint. The second aim of this HIA is to assess the archaeological significance of the findings and make recommendations based on the best archaeological practice of interpretation and preservation of archaeological findings

2.3 The findings: - The findings of this report have been informed by desktop data review and impact assessment reporting which include recommendations to guide heritage authorities in making decisions with regards to the proposed project. This study was conducted before any activities too place on the proposed development area. The impact assessment study also includes detailed recommendations on how to mitigate and manage negative impacts while enhancing positive effects on the project area.

2.4 Legislative Frame works used

- The Australia ICOMOS charter for places of cultural significance (the Burra Charter).
- The principles for the analysis, conservation and structural restoration of architectural heritage (2003)
- The National Heritage and Resources Act of South Africa No.25 of 1999
- The Athens Charter, the Restoration of Historic Monuments (1931)
The International Council on Monuments and Sites (1965)
- The World Heritage Convention (1972)
- The Washington Charter (1987)
- The International Charter for the Conservation and Restoration of Monuments and sites (the Venice charter 2006).
- The Organisation of World Heritage Cities (1993).

2.5 HIA Scope of works

The Proposed project scope of the activities is given in the table below;

➤ **Desktop study**

Conduct a full desktop study where information on the area is collected to provide a background setting of the archaeology that can be expected in the area.

➤ **Field Survey**

A surface physical of the proposed development footprint where the proposed development will take place. The aim of the survey will be to identify any cultural heritage resources that may be available within the boundaries of the study site.

➤ **Reporting**

Report on the identification of anticipated and cumulative impacts that 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 Heritage legislation and the code of ethics and guidelines of ASAPA.

➤ **Reasoned Opinion**

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 25 of 1999). The Kwazulu-Natal Amafa and Research Institute (Act 5 of 2018).

3.0 DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1 Locality Information

The proposed development site is located within Ward 3 of the Msinga Local Municipality, which forms part of the greater uMzinyathi District Municipality in KwaZulu Natal.

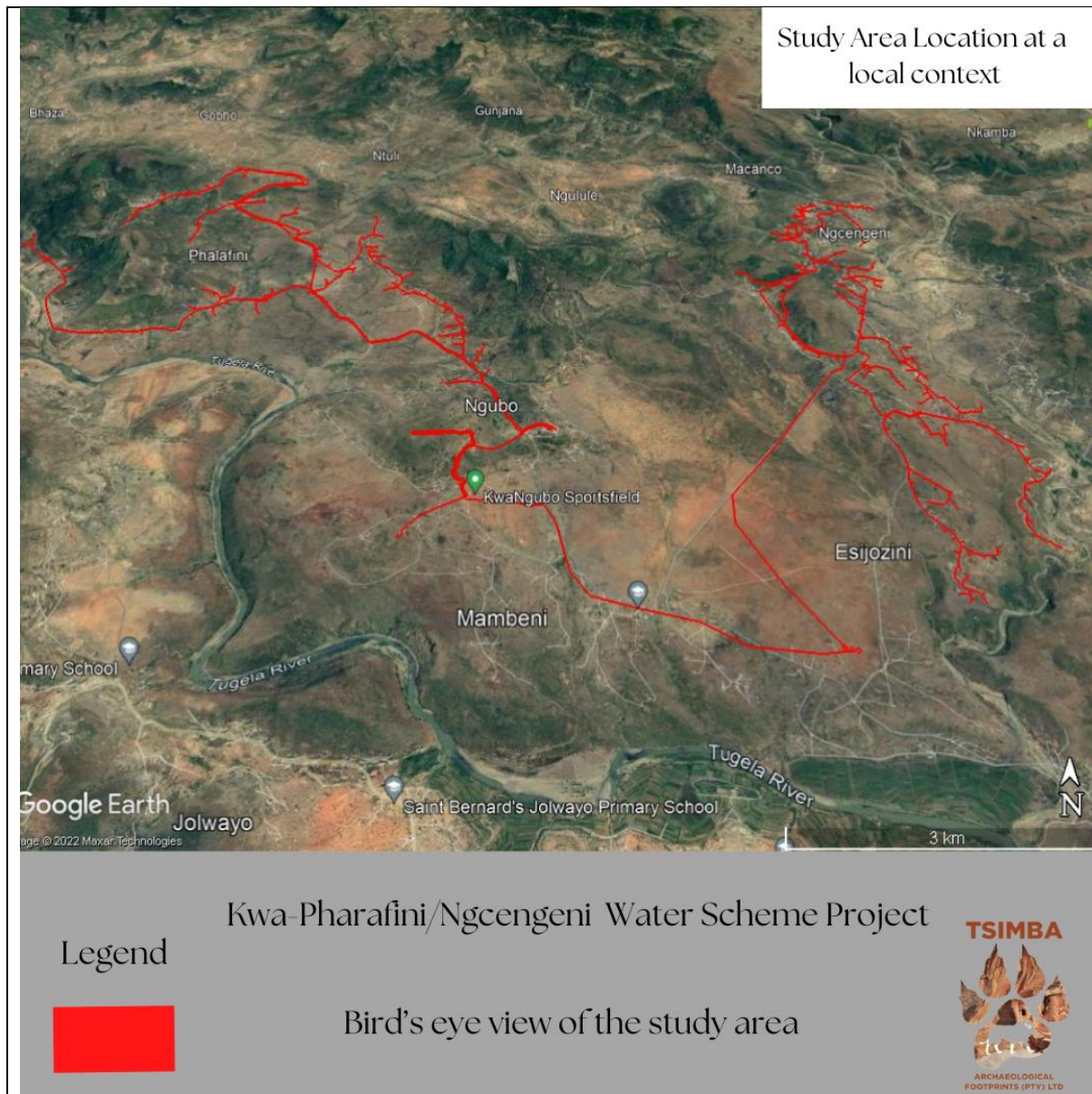


Figure 2: A closer view of the proposed development site

3.2 Spatial Context

The landscape's geomorphology can be described as a low-relief area bordered by a shoreline and a high-relief terrain on the landward side. The area, which is part of the Tugela River Basin, has a history of erosion and sedimentation, as well as sea level variations. Past geomorphologic processes created a one-of-a-kind terrain that supports complex hydrological systems, resulting in a high level of species diversity. Natural floods, climate change, and sea level rise all threaten the low-lying coastal floodplain, potentially increasing flood hazards over time. As a result, landscape characteristics play an essential role in decision-making and development planning.

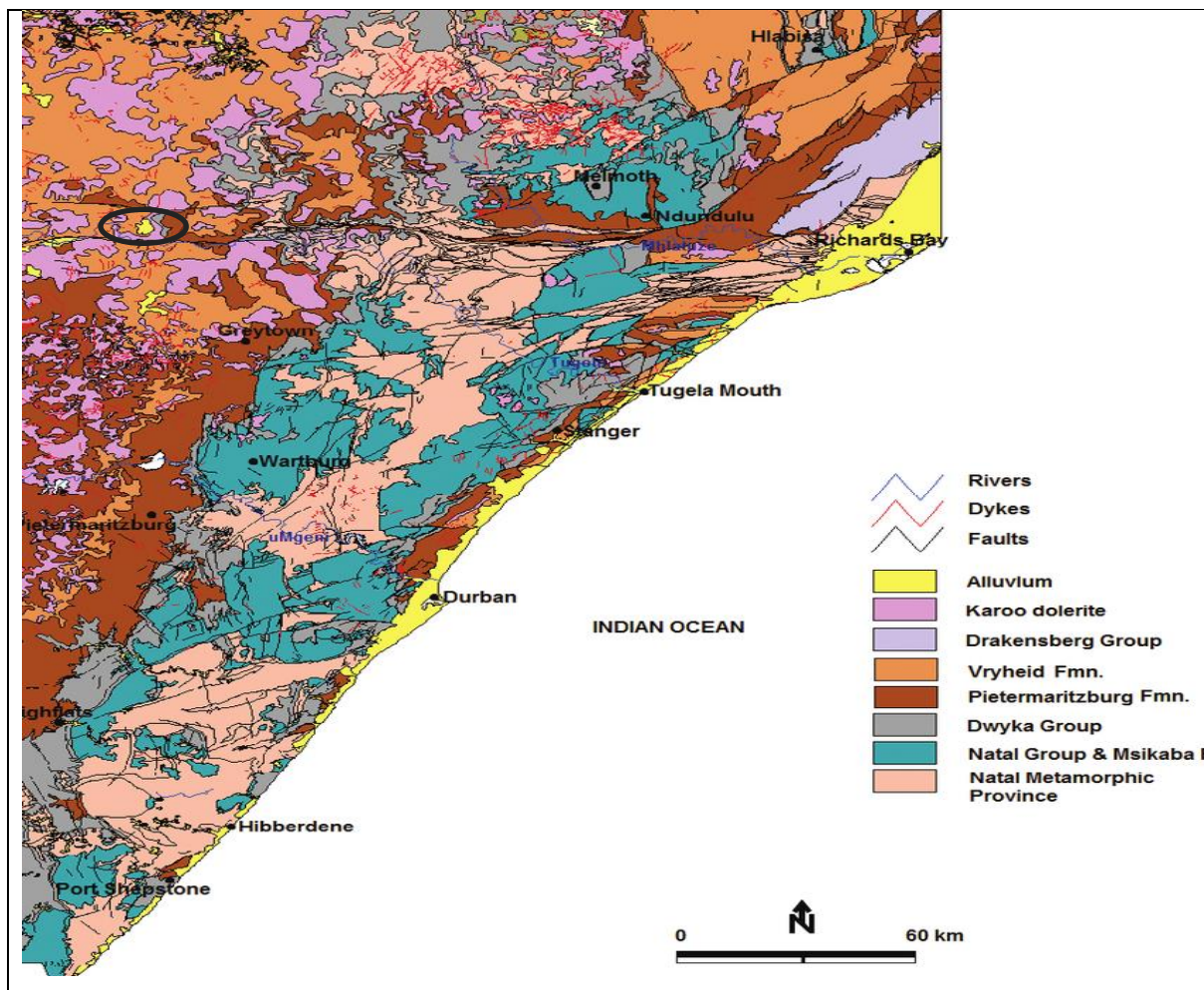


Figure 3: Geological map of the area along the Tugela River Basin. The proposed development site is circled in black (Council for Geoscience, 1998)

4.0 METHODOLOGY

4.1 Literature review

The methodology used in this HIA is based on a comprehensive understanding of the current or baseline situation; the type, distribution and significance of heritage resources as revealed through desk-based study and additional data acquisition, such as archaeological investigations, built heritage surveys, and recording of crafts, skills and intangible heritage. This is systematically integrated by the use of matrices with information on the nature and extent of the proposed engineering and other works to identify potential. The following tasks were also undertaken in relation to the cultural heritage and are described in this report:

The background information search of the proposed development area was conducted following the site maps from the client. Sources used in this study included:

- Published academic papers and HIA and PIA studies conducted in and around the region where the proposed infrastructure development will take place;
- Available archaeological literature on the broader study Msinga area was consulted;
- The SAHRIS website and the National Data Base were consulted to obtain background information on previous heritage surveys and assessments in the area; and other planning documents.
- Map Archives - Historical maps of the proposed area of development and its surrounds were assessed to aid information gathering of the proposed area of development and its surrounds

4.3 Data Consolidation and Report Writing

Data captured on the development area (during the field survey) by means of a desktop study and physical survey is used as a basis for this HIA. This data is also used to establish assessment for any possible current and future impacts within the development footprint. This includes the following:

- ✚ Assessment of the significance of the cultural resources in terms of their archaeological, built environment and landscape, historical, scientific, social, religious, aesthetic and tourism value;
- ✚ A description of possible impacts of the proposed development, especially during the construction phase, in accordance with the standards and conventions for the management of cultural environments;
- ✚ Proposal of suitable mitigation measures to minimize possible negative impacts on the cultural environment and resources that may result during construction;

- ✚ Review of applicable legislative requirements that is the NEMA (read together with the 2014 EIA Regulations) and the NHRA of 1999
- ✚ The consolidation of the data collected using the various sources as described above;
- ✚ Acknowledgement of impacts on heritage resources (such as unearthed graves) predicted to occur during construction; and
- ✚ Geological Information Systems mapping of known archaeological sites and maps in the region
- ✚ A discussion of the results of this study with conclusions and recommendations based on the available data and study findings.

5.0 LEGISLATIVE FRAMEWORK

This HIA is informed and conducted to fulfil the requirements of the National Heritage Resources Act (No 25 of 1999) - 38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as— (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; and 4) No person may, without a permit issued by the responsible heritage resources authority— (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

5.1 Scope of the Phase 1 HIA

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 within the broader cultural landscape;
- Identify any heritage resources within the proposed development site;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

5.2 Cultural Heritage Resources Management Policy Objectives

- a. To preserve representative samples of the National archaeological resources for the scientific and educational benefit of present and future generations;
- b. To ensure that development proponents consider archaeological resource values and concerns in the course of project planning; and
- c. To ensure where decisions are made to develop land, the proponents adopt one of the following actions:
 - avoid archaeological sites wherever possible;
 - implement measures which will mitigate project impacts on archaeological sites; or
 - Compensate the local communities for unavoidable losses of significant archaeological value.

6.0 CULTURAL LANDSCAPE ASSESSMENT

6.1 Introduction

In interpreting the cultural heritage significance of any particular landscape, recent heritage management research has shown that it is important to have a clear framework of criteria to assist in consistent assessment of the different host cultural landscapes that occur within the broader proposed development area falls within. These will be based on established practice from other works that have been carried out within the existing cultural landscape. It is likely to be based on a wide range of criteria (archaeological background of the area, historical background of the area, the settlement pattern in the area and degree of apparent human influence, among others) and it will define the degree of significance of the existing cultural landscape.

The question of the value of cultural landscape receptors will need careful consideration. By its very nature the work is concerned with designated cultural landscapes of national value for their cultural heritage values but the cultural landscapes within designated areas do nevertheless vary in their character and quality. It may therefore be appropriate to make a fine-grained assessment of the value of the cultural landscape character areas affected in the designated area. This will draw on statements about the special qualities contributing to the cultural heritage value of individual designated areas, on established criteria such as landscape quality and condition, scenic quality, historic/ heritage value, perceptual aspects and associations, and on other information such as the extent and setting of heritage assets including registered cultural heritage sites, burial grounds and archaeological sites.

6.2 Cultural Landscape Methodology

The methodology employed in carrying out the cultural landscape assessment of the proposals for the proposed development has been drawn from best practice guidelines and the Landscape Institute and the Institute of Environmental Management & Assessments "Guidelines for Landscape and Visual Impact Assessment" Second Edition (Spon Press 2002). The aim of these guidelines is to set high standards for the scope and contents of landscape and visual assessments and to establish certain principles that will help to achieve consistency, credibility and effectiveness in cultural landscape impact assessment. Guidance is contained in this publication on some approaches and techniques, which have been found to be effective and useful in practice by landscape professionals. However, the guidelines are not intended as a prescriptive set of rules, and have been adapted to the specific project.

Stage 1: Through a desktop and archival research process the heritage specialist is required to identify those landscape character types/areas of National, Provincial and Regional heritage significance which may be affected by the proposed development. The specialist should also locate information relevant to assessing landscape value for example written historical statements of special qualities.

Stage 2: Initial identification of potential effects the proposed development will bring to the broader regional area and design options to mitigate potential effects;

Stage 3: Design the development taking account of identified potential mitigation measures to avoid negative effects.

Stage 4: Assessment of effects the proposed developments have on the broader cultural landscape and considers its residual effects;

Stage 5: Fitting the cultural landscape assessment into the whole HIA.

6.3 Archaeological background of the study area

➤ Stone Age Period

From a theoretical perspective, the historical profile of the area under study is a pointer to the potential richness of the area in terms of tangible and intangible heritage, and possibly archaeology. There were changes that occurred slowly in the Early Stone Age; for more than a million years and over a wide geographic area, only slight differences existed in the forms of stone tools. The slow alterations in hominins' physical appearance that took place over the same time period, however, have allowed physical anthropologists to recognize new species in the genus Homo. An archaic form of Homo sapiens appeared about 500 000 years ago; important specimens belonging to this physical type have been found at Hopefield in Western Cape province and at the Cave of Hearths in Mpumalanga province.

The long episode of cultural and physical evolution gave way to a period of more rapid change about 200 000 years ago. Hand axes and large bifacial stone tools were replaced by stone flakes and blades that were fashioned into scrapers, spear points, and parts for hafted, composite implements. This technological stage, now known as the Middle Stone Age, is represented by numerous sites in South Africa. No systematic research concerning the Early and Middle Stone Ages of the lower Thukela Basin has been undertaken, although dozens of open-air scatters of stone artefacts dating to this period have been recorded there.

Most Early Stone Age sites in South Africa can probably be connected with the hominin species known as *Homo erectus*. Simply modified stones, hand axes, scraping tools, and other bifacial artifacts had a wide variety of purposes, including butchering animal carcasses, scraping hides, and digging for plant foods. Most South African archaeological sites from this period are the remains of open camps, often by the sides of rivers and lakes, although some are rock shelters, such as Montagu Cave in the Cape region. Open camps and rock overhangs were used for shelter. Day-to-day debris has survived to provide some evidence of early ways of life, although plant foods have rarely been preserved.

The Early Stone Age sites occur close to permanent water sources. Some Middle Stone Age flakes, probably dating back to ca. 40 000 – 200 000 years ago, occur in disturbed context in dongas and road cuttings. The majority of Later Stone Age sites as well as rock art sites occur further west in the foothills of the Drakensberg. These typically occur in small shelters in the sandstone formations some leading up to the Drakensberg.

Early Stone Age (ESA) dating between 2 million years ago to about 200 000 years ago. Gavin Anderson recorded two ESA sites on the R 3 road in Estcourt south East of the proposed development site. The site consists of two stone-walled archaeological sites on the same ridge of a hill. The first site is near the location of pylon no. 240. This site is a low stone-walled structure. The walling is not well-preserved, but there appears to be an archaeological deposit associated with the walling. This site may date to between 1250 AD and 1440 AD. This site is of medium archaeological significance and any impact will be negative. The second site in this group is near pylon no. 242. The site extends from the existing transmission line to the Ariadne-Venus line path, and has already been negatively affected by the current pylon.

The site consists of three to four circular stone-walled structures that may be the remains of houses and a cattle-byre. There is a potential archaeological deposit at this site. The site is of medium archaeological significance and any impact will be negative. The stone-walled features of this site were accurately mapped. The tower would not affect the site itself, however the access road has the potential to damage portions of the site.

Middle Stone Age bands hunted medium-sized and large prey, including antelope and zebra, although they tended to avoid the largest and most dangerous animals, such as the elephant and the rhinoceros. They also ate seabirds and marine mammals that could be found along the shore and sometimes collected tortoises. The most well-known are Sibidu Cave and Umhlatuzana Cave in the study area's

south east, and Border Cave in the study area's north. All of these locations gave compelling evidence of high-resolution data, and stratigraphy in depth (Wadley & Jacobs, 2006). Fourteen sites from the Middle Stone Age have been discovered in the Msinga area. Like the Early Stone Age sites, these are primarily relegated to open-air locations with little residual archaeological context.

The good organic preservation at Sibidu cave allows for analyses of charcoal, seeds and bone and these, in turn, permit environmental reconstructions of the period between about 26 000 and 62 000 years ago. Vegetation changes are apparent from the charcoal (Allott, this issue) and seed studies (Wadley, this issue), and faunal analysis (Plug, this issue) reveals that there was a rich and diverse animal population in the area.

The cave occupants were clearly skilled hunters for there is little evidence that non-human predators contributed bone to the archaeologically recovered sample. Cultural material from Sibidu includes a huge collection of late MSA stone tools and rare pieces of worked bone, one of which has been directly dated (Cain, this issue). Residue analysis on a large sample of the stone tools shows that the cave occupants processed much plant material and used individual tools for multiple tasks (Williamson, this issue).

The excavations are ongoing and the papers presented here do not, therefore, provide the last word on Sibidu Cave. New excavations conducted since completing the analyses communicated in this issue have uncovered a long Howiesons Poort occupation in the deeper, older deposits of the site and there is no indication that bedrock will be reached soon.

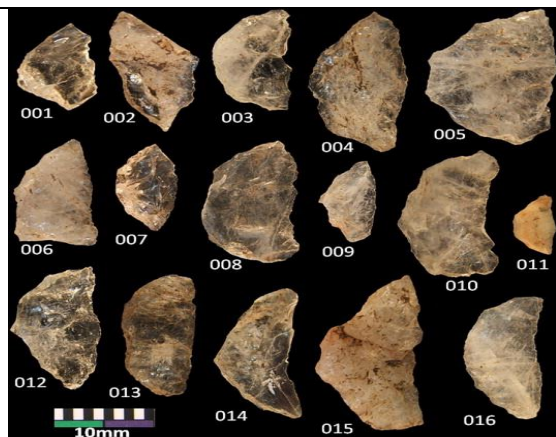


Figure 4: Quartz tipped arrows over 60ka found at Sibidu cave



Figure 5: Marine shell beads from Sibidu cave



Figure 6: Early evidence of middle stone age at Umhlatuzana cave



Figure 7: Stone and bone technology used at Sibidu cave in the Middle Stone Age



Figure 8: Bone assemblage at Sibidu cave



Figure 9: Boulders from Umhlatuzana cave

6.4 Historical background of the study area

Archaeological evidence shows that Bantu-speaking agriculturists first settled in southern Africa around AD 300. The earliest agricultural sites in KwaZulu-Natal date to between AD 400 and 550. All were situated close to sources of iron ore, and within 15 km of the coast. From 650 onwards, climatic conditions improved, and agriculturists expanded into the valleys of KwaZulu-Natal, where they settled close to rivers in savanna or bushveld environments. Metal production was a key activity since it provided the tools of cultivation and hunting. In general, sites dating between 1050 and 1250 are smaller than most earlier agriculturist settlements. This new pattern of settlement was in some way influenced by a changing climate, for there is evidence of increasing aridity from about AD 900. A new pattern of economic inter-dependence evolved that continued into the colonial period nearly 500 years later.

Beater and Muroyi (2019) Heritage Impact assessment study of the Babanango game reserve observed the existence of many Iron Age Zulu stone walled homesteads. The stone walled sites consist of at least two distinct circular stone walled enclosures (livestock/cattle kraal), various sections of stone walling, some other less visible and distinct enclosures, with concentrations of stone cairns of varying sizes and other features. Iron Age studies have also noted the existence of these sites in the wider area. Archaeologists have also excavated some of these Iron Age sites in the interior grasslands of KwaZulu-Natal. These have aided in the interpretations for homestead patterns among the Zulu in the game reserve.

The Type B settlement sites consisted of primary stone enclosures arranged in a roughly circular plan and linked by secondary walls to form secondary enclosures. The entrances to the Babanango enclosures were often distinctive with carefully cobbled passages that were invariably placed to lead up the slope of the hill (Mitchell 2002:354).

The eMakhosini Cultural Landscape north of the proposed development site is a combination of historic sites, landscapes and history bound by oral traditions and cultural significance defining the Zulu culture. eMakhosini (literally “the valley of the chiefs”) lies south-east of the project area. Much of the area is defined by the presence of several stone walled sites associated with the powerful Buthelezi and Khumalo clans. These clans among others were key players in the formation of the Zulu kingdom. The famous King Shaka Zulu was born here around 1785 and it is here that his forbearers, Nkosinkulu Zulu, Phunga,

Mageba, Ndaba, Jama and Senzangakhona lie buried. The graves and royal residences of four paramount rulers of the Zulu – Shaka, Dingane, Mpande and Cetshwayo - are located in and around the eMakhosini Valley (G&A Heritage 2011 p.25). However, around the proposed development area the Mabhudu, Ndwandwe, and Mthethwa were the most important, largest, and powerful states of the time. Other smaller states, meanwhile, developed themselves in the region.

These included the Qwabe, Bhaca, Mbo, Hlubi, Bhele, Ngwane, and many others in the south (Wright & Hamilton, 1989). The Thembu and Mucu clans lived in the larger Msinga area. In the early nineteenth century, the Zulu empire, founded by King Shaka, remained the most powerful in the region. Shaka fought mercilessly and frequently vanquished his opponents, conquering their cattle, wives, and villages.

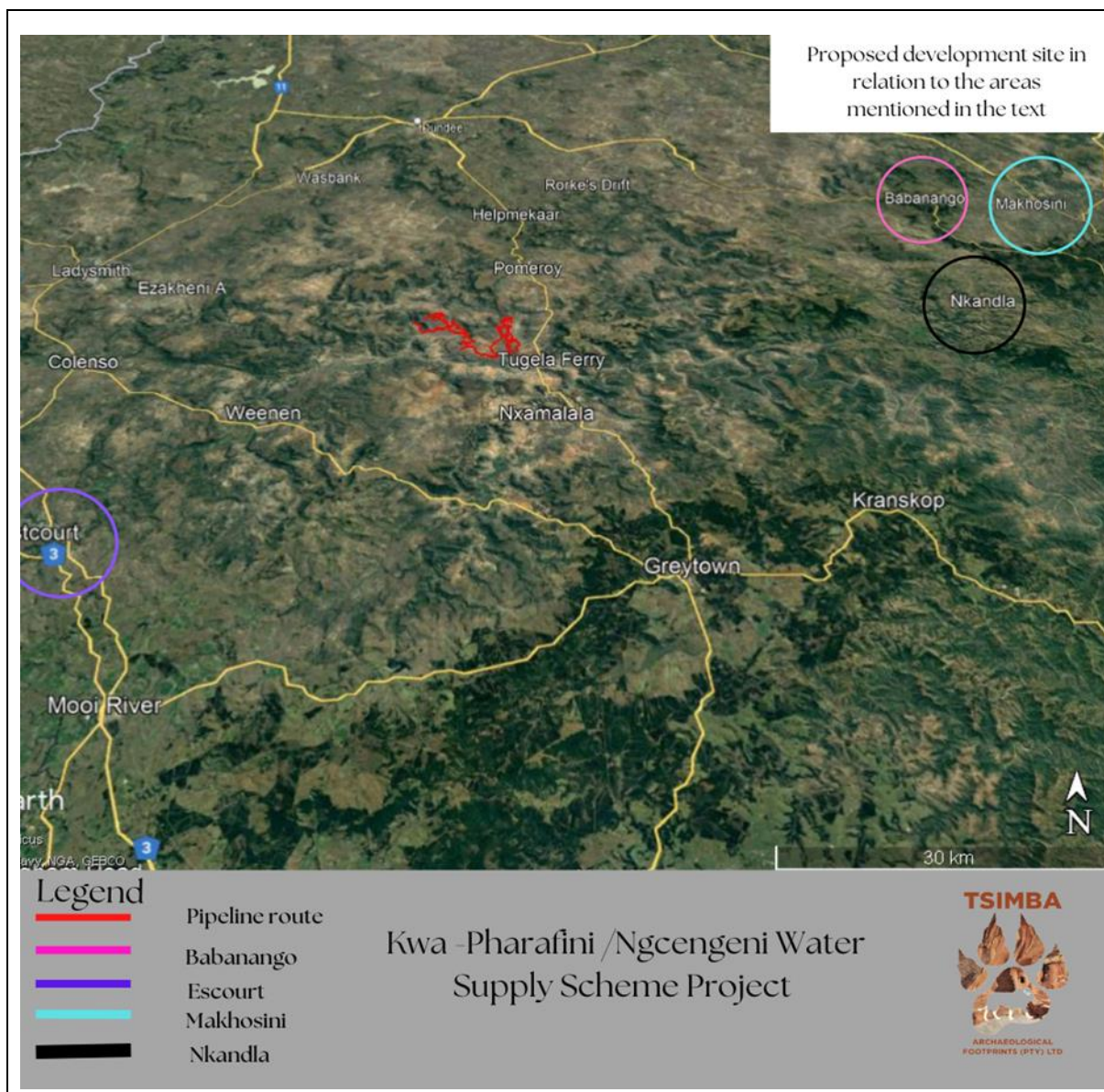


Figure 10: Map showing the study area in relation to some of the places mentioned in the literature review

6.6 Cultural Landscape Assessment of Significance

Significance is not absolute and can only be identified in relation to each individual development and its unique location. It is important that any assessment of significance adopts an informed and well-reasoned judgement, supported through a clear justification as to how the conclusions about significance for each effect have been derived. It should be emphasised that whilst this methodology is designed to be robust and transparent, professional judgement is ultimately applied to determine the level of significance applied to each effect.

The two principal criteria determining the significance of effects are the scale or magnitude of effect, and the cultural heritage sensitivity of the location or receptor. With regard to visual receptors, a **HIGH** significance of effect would be from **HIGH** sensitivity receptors such as Regional to National significance old buildings and heritage sites with a Local rating where they would receive a major change in the view. A low significance of effect would be from the least sensitive low significance old buildings and heritage sites with a Local rating would be affected for a smaller period of time as they would experience transient views. Where no change is identified the significance is assessed as neutral. These thresholds will be determined by combining sensitivity and magnitude, with reference to any general terminology accepted for the whole Heritage Impact Assessment.

			Landscape receptor sensitivity		
			High	Medium	Low
Assessment of significance of the cultural landscape impacts <ul style="list-style-type: none"> ▪ Red cells represent significant adverse impacts ▪ Yellow cells represent significant beneficial impacts ▪ Blue cells represent impacts that are not significant 			Landscape with National heritage significance Status sites and cultural Landscapes with Provincial heritage Significance Status	Regional or Local Significance Heritage sites valued characteristics reasonably tolerant of changes of the type proposed.	A relatively unimportant cultural landscape with few features of value or interest, potentially tolerant of substantial change of the type proposed.
Magnitude of landscape impact	Major adverse	Significant adverse changes, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness for more than 2 years	High adverse significance	High/Medium adverse significance	Medium adverse significance
	Moderate adverse	Noticeable but not significant adverse changes for more than 2 years or significant adverse changes for more than 6 months but less than 2 years, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness.	High/Medium adverse significance	Medium adverse significance	Low adverse significance
	Slight adverse	Noticeable adverse changes for less than 2 years, significant adverse changes for less than 6 months, or barely discernible adverse changes for any length of time.	Medium adverse significance	Low adverse significance	Neutral
	Neutral	Any change would be negligible, unnoticeable or there are no predicted changes.	Neutral	Neutral	Neutral
	Slight benefit	Noticeable beneficial changes for less than 2 years, significant beneficial changes for less than 6 months, or barely discernible beneficial changes for any length of time.	Medium beneficial significance	Low beneficial significance	Neutral
	Moderate benefit	Noticeable but not significant beneficial changes for more than 2 years or significant beneficial changes for more than 6 months but less than 2 years, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness.	High/Medium beneficial significance	Medium beneficial significance	Low beneficial significance
	Major benefit	Significant beneficial changes, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness for more than 2 years	High beneficial significance	High/Medium beneficial significance	Medium beneficial significance

6.7 Significance of Cultural Landscape Impacts

This project is given a Low adverse significance to the cultural landscape. This is due to the fact that the proposed development landscape has very minimal known cultural heritage significance. Given below is a table that shows the ICOMOS assessment of significance of cultural landscapes.

Table 1: ICOMOS guideline for assessing significance of cultural landscape impacts

6.8 Cultural Landscape Significance Assessment

The broader geographical landscape of Msinga is home to Six Seminal Historical Battlefield Sites of National and International Importance are located in close proximity to each other in Msinga. Despite the fact that the majority of the Battlefield Sites are located outside of Msinga Municipality, the battlefield route follows the R33 all south of the proposed development footprint. The R33 runs through the municipality. In integrating the Battlefields Heritage and Zulu Cultural Tourism, the Municipality, in collaboration with the District Municipality, can obtain a possible competitive edge.

No cultural heritage resources were recorded in the Kwa-Pharafini Cultural Landscape (proposed development landscape).

Table 2: Cultural Landscape Significance Assessment

Msinga Cultural Landscape	The Msinga Cultural Landscape with National heritage significance Status sites and cultural Landscapes with Provincial heritage Significance Status
Kwa-Pharafini Cultural Landscape	The Kwa-Pharafini Cultural Landscape is A relatively unimportant cultural landscape with few features of value or interest, potentially tolerant of substantial change of the type proposed.

7.0 DISCUSSION OF THE FINDINGS

This field visit, completed by a qualified archaeologist assessed the entire area that could be impacted during construction phase of proposed pipeline within a 10-metre radius of the proposed pipeline route. The field survey was undertaken on the 10th of May 2022. The surveyed area is vegetated with a number of access roads leading into the surrounding rural homesteads. Vegetation cover can sometimes be a hindrance to archaeological artefacts being identified. Archaeological resources may however be discovered during excavations or any ground breaking activities that may impact on the study area.

The assessment included visual inspection to identify features with predictable archaeological potential, surface inspection of areas with exposed sediments for cultural materials, subsurface testing of terrain features exhibiting archaeological potential, and ground conditions, the thawing, screening and analysis of frozen sediment samples. Disturbed and exposed layers were investigated. These areas are likely to be exposed or yield archaeological and other heritage resources that may be buried underneath the soil and be brought to the surface by human activities. The survey covered both the proposed phase 1 and phase 2 of the proposed development footprint.

Firstly, the impact types most commonly observed are alteration, transfer, and removal. This area has been heavily disturbed by past human activities. Soil, clay, and sand were removed down to the level of bedrock. Although certain types of alterations to artifacts may impair the potential for providing data on original function or on manufacturing sequences of artifacts, in general, the artifacts (in small pieces) would still be identifiable. However, their altered condition poses an insurmountable problem for analysis, that is, a sherd can no longer be identified as a sherd, and a flake by their nature are difficult to analyse. Post depositional edge damage to lithic artifacts or debitage may occasionally be misidentified as use-wear (see Hamilton 1987).

The topography of the area forms part of the escarpment and consists of hills and cliffs in regions where outcrops of Vryheid Formation sandstone and mudstone are intruded by a thick dolerite sill. The larger part of the study area is underlain by deeply weathered dolerite.

After the field study has been completed, a report including associated findings was compiled for permit application from Amafa Research and Institute.



Figure 11: Some of the scattered stones along the pipeline route accessed for possible Stone age sites or artefacts



Figure 12: View of a recent cattle pen synonymous with Later Iron Age cattle pens in this area. The owners confirmed this to be a recent structure



Figure 13: View of a suspected grave along the pipeline route. Consultations with the nearest homestead owners confirmed this as not being a grave but just a pile of stones



Figure 14: View of a tared road along the proposed pipeline route



Figure 15: View of electricity power lines traversing across the proposed development site



Figure 16: View of a foot path within the proposed development site. There are a number of these around the study area since this is a rural setting



Figure 17: View of a dust road in the in Phalafini area



Figure 18: A junction showing the different villages or areas were the pipeline will traverse



Figure 19: Typical rural homesteads around the proposed development footprint



Figure 20: View of the landscape around Ngubo village



Figure 21: View of a local traditional leader's house consulted for possible heritage sites in the area



Figure 22: Vegetation cover in some of the rocky areas surveyed for possible Stone Age sites

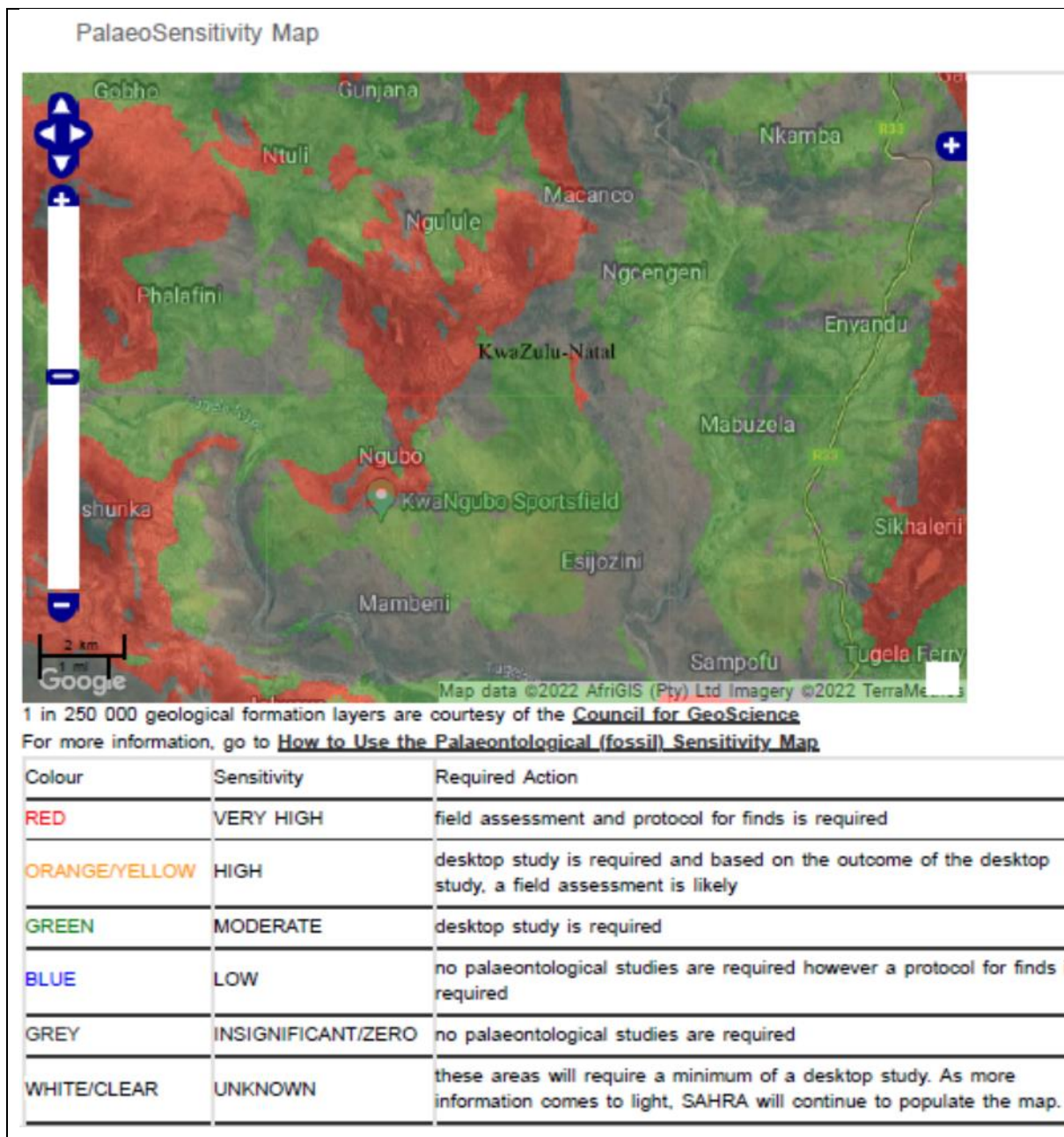


Figure 23:SAHRIS palaeosensitivity map for the site for the proposed development site showing the Paleontological sensitivity of the site to be insignificant-low-High -Very High paleo sensitive.

The study area lies on Alluvium of the Kalahari Group that is exposed along the Tugela River. Just south of this stretch of river is a large exposure of the Masotcheni Formation that Colluvium and hill wash make up this composition. These types of eroded sediments are frequent in coastal areas. KwaZulu Natal has a high topography. They consist of a complicated cycle of sheet washing, soiling, and drying. forming, eroding, and filling. They have been dated using radiocarbon dating. and are less than 40 000 years old.

The Jurassic dolerite dykes confine the river's northern bank at this stretch. These dykes have encroached on the land.

The Jurassic dolerite dykes confine the river's northern bank at this stretch. The Dwyka Group diamictites and the Pietermaritzburg Formation are outcrops of the lowermost Karoo deposits, which have intruded into the earlier Karoo series. As the Carboniferous glaciers and icesheets melted, Dwyka diamictites, along with sandstones and mudstones, were deposited. Deep seas of the early Karoo inland sea deposited the Pietermaritzburg dark grey shales. The Vryheid and Volksrust Formations lie beneath the Pietermaritzburg Formation. They were deposited in a warmer climate, along the Karoo Sea's gradually filling vegetated shoreline and deltas.

Table 3: Short, medium- and long-term impacts

IMPACT LAND USE CHANGES ON ALTERNATIVE 1 AND ALTERNATIVE 2	
OBJECTIVE: The overall goal is to identify and mitigate Impacts within the proposed development area.	
Project component/s	Construction Phase
Potential Impact	Alteration of the natural character and possible changes of use within the communal standpipes that will be built at convenient locations within the settlements
Project component/s	The Operational Phase
Potential Impact	There will be changes to land use within the communal standpipes that will be built at convenient locations within the settlements.
Activity/risk source	Exclusion of the mitigation measures aimed at mitigating impacts to cultural heritage.
Extent	The impact will only be expected only within a 10-metre radius of the proposed development footprint.
Duration	The impact and its effects will be permanent.
Magnitude	The impact will not alter the broader land use and it can still be used/function in a moderately modified way and maintains general integrity
Probability	There is a low chance of the Impact occurrence given the fact that the proposed development site is already altered.
Reversibility	The impact cannot be reversed but can be mitigated by making use of the recommendations made in this report and measures to be included in the EMPr.
Irreplaceable loss of resources	The impact of land use changes on heritage sites will result in marginal - minimal loss of resources.
Cumulative effect	The impact would result cumulative effects should additional pipelines be introduced outside of the 10-meter radius surveyed.

Table 4: Site Assessment of values

1. Historic value				
Is it important in the community, or pattern of history			No	
Does it have strong or special association with the life or work of a person, group or organization of importance in history			No	
Does it have significance relating to the history of slavery			No	
2. Aesthetic value				
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			No	
3. Scientific value				
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage			No	
Is it important in demonstrating a high degree of creative or technical achievement at a particular period			No	
4. Social value				
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			No	
5. Rarity				
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			No	
6. Representivity				
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects			Yes	
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class			No	
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.			No	
7. Sphere of Significance		High	Medium	Low
International				
National				
Provincial				
Regional				
Local				
Specific community				Yes
8. Significance rating of feature				
1.	Low			Yes
2.	Medium			
3.	High			
9. Field Register Rating				
1.	National/Grade 1: High significance - No alteration whatsoever without permit from SAHRA			

2.	Provincial/Grade 2: High significance - No alteration whatsoever without permit from provincial heritage authority.	
3.	Local/Grade 3A: High significance - Mitigation as part of development process not advised.	
4.	Local/Grade 3B: High significance - Could be mitigated and (part) retained as heritage register site	
5.	Generally protected 4A: High/medium significance - Should be mitigated before destruction	
6.	Generally protected 4B: Medium significance - Should be recorded before destruction	
7.	Generally protected 4C: Low significance - Requires no further recording before destruction	Yes

8.0 CONCLUSIONS

This report is an independent view and makes recommendations to the Amafa Research and Institute based on its findings. The authority will consider the recommendations and make a decision based on conservation principles.

- There are six recorded Seminal Historical Battlefield Sites of National and International Importance are located in close proximity to each other in Msinga. Despite the fact that the majority of the Battlefield Sites are located outside of Msinga Municipality, the battlefield route follows the R33 all south of the proposed development footprint. The R33 runs through the municipality. In integrating the Battlefields Heritage and Zulu Cultural Tourism, the Municipality, in collaboration with the District Municipality, can obtain a possible competitive edge
- Based on experience and the lack of any previously recorded heritage resources from the study area. It is unlikely that the development will impact on any heritage resources.
- During our consultation process, no cultural heritage resources were reported by the local community within the homesteads where the pipeline will travers within a 10-metre radius.
- Due to the length of the proposed pipeline, the field survey paid attention to properties within a 10 - metre radius of the proposed pipeline route. No graves were identified or reported along the proposed pipeline route within the 10-metre radius surveyed as expected since this is a rural community where families burry their loved ones within the homestead. Since the construction of the proposed project will limited to the proposed pipeline route, the risk of graves within homestead yards outside the 10-metre radius surveyed being disturbed is therefore very low and essentially unlikely.

9.0 RECOMMENDATIONS

From a heritage perspective, the proposed development may be allowed to proceed subject to the following recommendations:

- The construction teams must be inducted on the possibility of encountering graves or burials that may be accidentally exposed during clearance and construction prior to commencement of work on the site in order to ensure appropriate mitigation measures and that course of action is afforded to any chance finds in accordance with the Chance Find Procedure.
- Strict and clear reporting procedures for chance finds must be followed by the client and contractors throughout the construction period.
- It is further recommended that the local community must be made aware by the Environmental Officer of the need to report any possible unmarked and unknown graves that unearthed during the construction/ excavation phase.

10.0 MEASURES FOR INCLUSION IN THE EMPR

- Since proposed water supply scheme will not provide reticulation to every individual house, communal standpipes will be built at convenient locations within the settlements. As a precaution measure, during construction the contractor should engage with the adjacent households out of the 10-metre radius surveyed to ensure no graves are affected by the project.
- It is very unlikely that any heritage resources within the development servitude. However, a Chance Find Protocol should be added to the EMPR. If any heritage resources listed in Appendix E are found by the contractor, environmental officer, or other responsible person once excavations have commenced then they should be reported to Amafa Research and institute.

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APPENDIX A: CARCRAEOLOGICAL CHANCE FINDS PROCEDURE

What is a Chance Finds Procedure?

The purpose of Archaeological Chance Find Procedure (CFP) is to address the possibility of cultural heritage resources and archaeological deposits becoming exposed during ground altering activities within the project area and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required.

A CFP is a tool for the protection of previously unidentified cultural heritage resources during construction and mining. The main purpose of a CFP is to raise awareness of all mine workers on site regarding the potential for accidental discovery of cultural heritage resources and establish a procedure for the protection of these resources. Chance finds are defined as potential cultural heritage (or paleontological) objects, features, or sites that are identified outside of or after Heritage Impact studies, normally as a result of construction monitoring. Archaeological sites are protected by The National Heritage Resources Act of 1999.

They are non-renewable, very susceptible to disturbance and are finite in number. Archaeological sites are an important resource that is protected for their historical, cultural, scientific and educational value to the general public, local communities. What are the objectives of the CFP? The objectives of this 'Chance Find Procedure' are to promote preservation of archaeological data while minimizing disruption of construction scheduling. It is recommended that due to the moderate to high archaeological potential of some areas within the project area, all on site personnel and contractors be informed of the Archaeological Chance Find Procedure and have access to a copy while on site.

Where is a CFP applicable?

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits. Chance finds may be made by any member of the project team who may not necessarily be an archaeologist or even visitors. Appropriate application of a CFP on development projects has led to discovery of cultural heritage

resources that were not identified during archaeological and heritage impact assessments. As such, it is considered to be a valuable instrument when properly implemented. For the CFP to be effective, the mine manager must ensure that all personnel on the proposed mine site understand the CFP and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided. In short, the Chance Find Procedure details the necessary steps to be taken if any culturally significant artefacts are found during mining or construction.

What is the CF Procedure?

The following procedure is to be executed in the event that archaeological material is discovered:

- All construction activity in the vicinity of the accidental find/feature/site must cease immediately to avoid further damage to the site.
- Briefly note the type of archaeological materials you think you've encountered, its location, and if possible, the depth below surface of the find.
- Report your discovery to your supervisor or if they are unavailable, report to the project Environmental Control Officer (ECO) who will provide further instructions.
- If the supervisor is not available, notify the ECO immediately. The ECO will then report the find to the Manager who will promptly notify the project archaeologist and SAHRA.
- Delineate the discovered find/ feature/ site and provide a 25m buffer zone from all sides of the find

APPENDIX B: TERMINOLOGY USED IN THE TEXT

The terminology adopted in this document is mainly influenced by the NHRA of South Africa (1999) and the Burra Charter (1979).

Adaptation: Changes made to a place so that it can have different but reconcilable uses.

Artefact: Cultural object (made by humans).

Buffer Zone: Means an area surrounding a cultural heritage which has restrictions placed on its use or where collaborative projects and programs are undertaken to afford additional protection to the site.

Co-management: Managing in such a way as to take into account the needs and desires of stakeholders, neighbours and partners, and incorporating these into decision making through, amongst others, the promulgation of a local board.

Conservation: In relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance as defined. These processes include, but are not necessarily restricted to preservation, restoration, reconstruction and adaptation.

Contextual Paradigm: A scientific approach which places importance on the total context as catalyst for cultural change and which specifically studies the symbolic role of the individual and immediate historical context.

Cultural Resource: Any place or object of cultural significance

Cultural Significance: Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance of a place or object for past, present and future generations.

Feature: A coincidental find of movable cultural objects.

Grading: The South African heritage resource management system is based on a grading system, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Heritage Resources Management: The utilization of management techniques to protect and develop cultural resources so that these become long term cultural heritage which are of value to the general public.

Heritage Resources Management Paradigm: A scientific approach based on the Contextual paradigm, but placing the emphasis on the cultural importance of archaeological (and historical) sites for the community.

Heritage Site Management: The control of the elements that make up the physical and social environment of a site, its physical condition, land use, human visitors, interpretation etc. Management

may be aimed at preservation or, if necessary, at minimizing damage or destruction or at presentation of the site to the public.

Historic: Means significant in history, belonging to the past; of what is important or famous in the past.

Historical: Means belonging to the past, or relating to the study of history.

Maintenance: Means the continuous protective care of the fabric, contents and setting of a place. It does not involve physical alteration.

Object: Artefact (cultural object)

Paradigm: Theories, laws, models, analogies, metaphors and the epistemological and methodological values used by researchers to solve a scientific problem.

Preservation: Refers to protecting and maintaining the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary. Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

Protection: With reference to cultural heritage resources this includes the conservation, maintenance, preservation and sustainable utilization of places or objects in order to maintain the cultural significance thereof.

Place : Means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions.

Reconstruction: To bring a place or object as close as possible to a specific known state by using old and new materials.

Rehabilitation: The repairing and/ or changing of a structure without necessarily taking the historical correctness thereof into account.

Restoration: To bring a place or object back as close as possible to a known state, without using any new materials.

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artefacts, found on a single location.

Sustainable: Means the use of such resource in a way and at a rate that would not lead to its long-term decline, would not decrease its historical integrity or cultural significance and would ensure its continued use to meet the needs and aspirations of present and future generations of people.

APPENDIX D: DEFINITION OF VALUES

Value	Definition
Historic Value	Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.
Scientific Value	Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period
Aesthetic Value	Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
Social Value	Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
Rarity	Does it possess uncommon, rare or endangered aspects of natural or cultural heritage
Representivity	Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use function, design or technique) in the environment of the nation, province region or locality.

APPENDIX E: RESOURCE LIKELY TO OCCUR WITHIN THESE CONTEXTS AND LIKELY SOURCES OF HERITAGE IMPACTS/ISSUES

HERITAGE CONTEXT	HERITAGE RESOURCES	SOURCES OF HERITAGE IMPACTS/ISSUES
A. PALAEOLOGICAL LANDSCAPE CONTEXT	Fossil remains. Such resources are typically found in specific geographical areas, e.g. the Karoo and are embedded in ancient rock and limestone/calcrete formations.	Road cuttings Quarry excavation
B. ARCHAEOLOGICAL LANDSCAPE CONTEXT	Archaeological remains dating to the following periods: <ul style="list-style-type: none"> ▪ ESA ▪ MSA ▪ LSA ▪ LSA - Herder ▪ Historical ▪ Maritime history 	<ul style="list-style-type: none"> ▪ Subsurface excavations including ground leveling, landscaping, foundation preparation. ▪ In the case of maritime resources, development including land reclamation, harbor/marina/water front developments, marine mining, engineering and salvaging.
	Types of sites that could occur include: <ul style="list-style-type: none"> ▪ Shell middens 	
	<ul style="list-style-type: none"> ▪ Historical dumps 	
	<ul style="list-style-type: none"> ▪ Structural remains 	
C. HISTORICAL BUILT URBAN LANDSCAPE CONTEXT	<ul style="list-style-type: none"> • Historical townscapes/streetscapes. • Historical structures; i.e. older than 60 years • Formal public spaces. • Formally declared urban conservation areas. • Places associated with social identity/displacement. 	<p>A range of physical and land use changes within this context could result in the following heritage impacts/issues:</p> <ul style="list-style-type: none"> • Loss of historical fabric or layering related to demolition or alteration work. • Loss of urban morphology related to changes in patterns of subdivision and incompatibility of the scale, massing and form of new development. • Loss of social fabric related to processes of gentrification and urban renewal.