

**HIA DESKTOP FOR THE GREATER AMAOTI
HOUSING DEVELOPMENT**

FOR SIVEST (PTY) LTD

DATE: 7 NOVEMBER 2021

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Abbreviations

HP	Historical Period
IIA	Indeterminate Iron Age
LIA	Late Iron Age
EIA	Early Iron Age
ISA	Indeterminate Stone Age
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
HIA	Heritage Impact Assessment
PIA	Palaeontological Impact Assessment

INTRODUCTION

The proposed development entails the formalisation and development of the Greater Amaoti area. The project area is approximately 1235,59 ha in extent and is located on a portion of Wards 52, 53, 55, 56, 57, 59 and 102 of the eThekweni Metropolitan Municipality. This project aims at delivering approximately 25 357 Greenfield and Brownfield residential units together with supporting infrastructure and social facilities.

The following land uses are proposed for the development:

- Mixed Use Development;
- High Density Residential;
- Interface Zones;
- Medium Density Residential;
- Open Space;
- Parkway;
- Road & Pedestrian
- Stormwater drainage
- Water supply and reservoirs
- Sanitation

Umlando was requested to undertake an HIA of the proposed development. Figures 1 – 3 show the location of the development.

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT

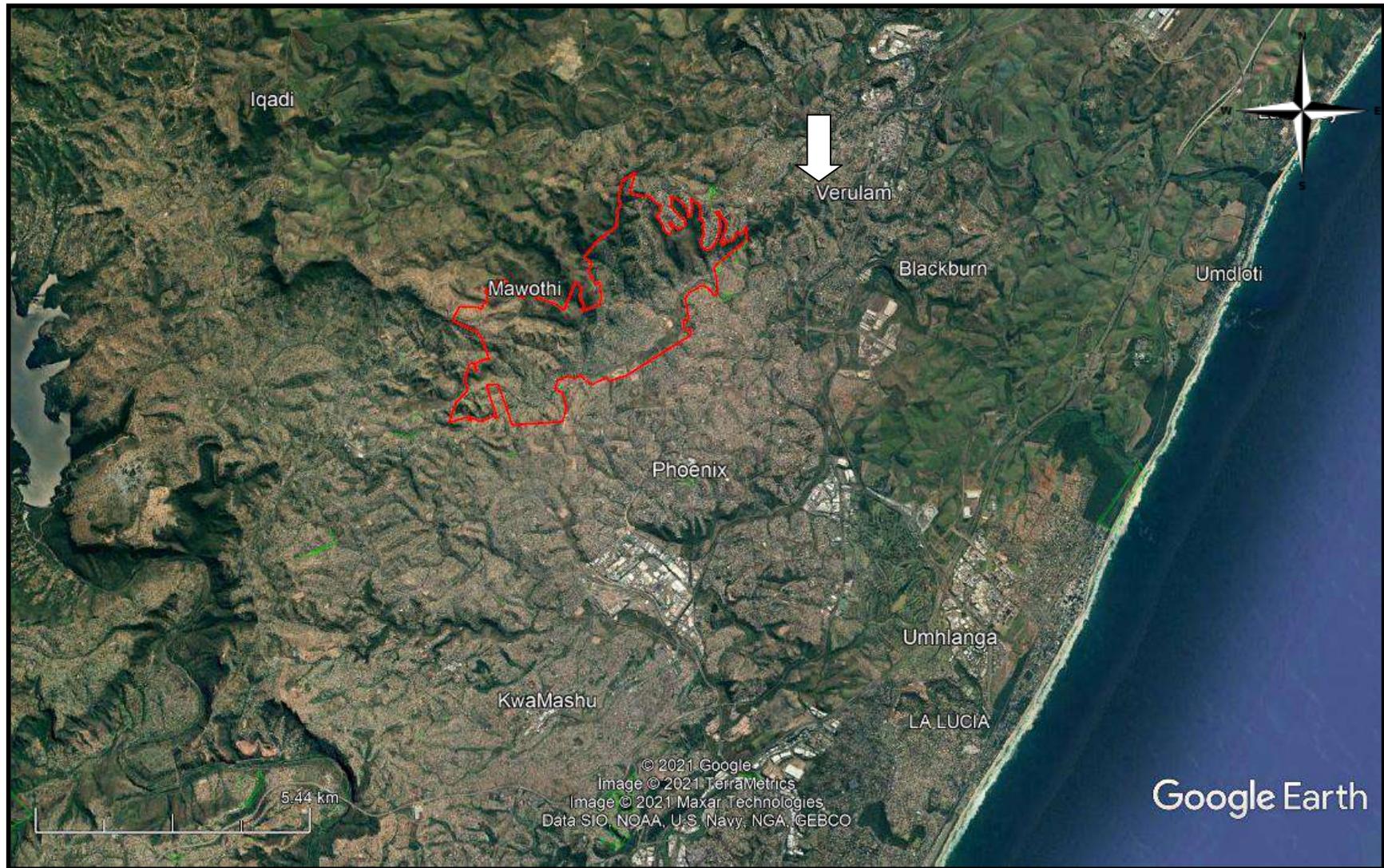


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT

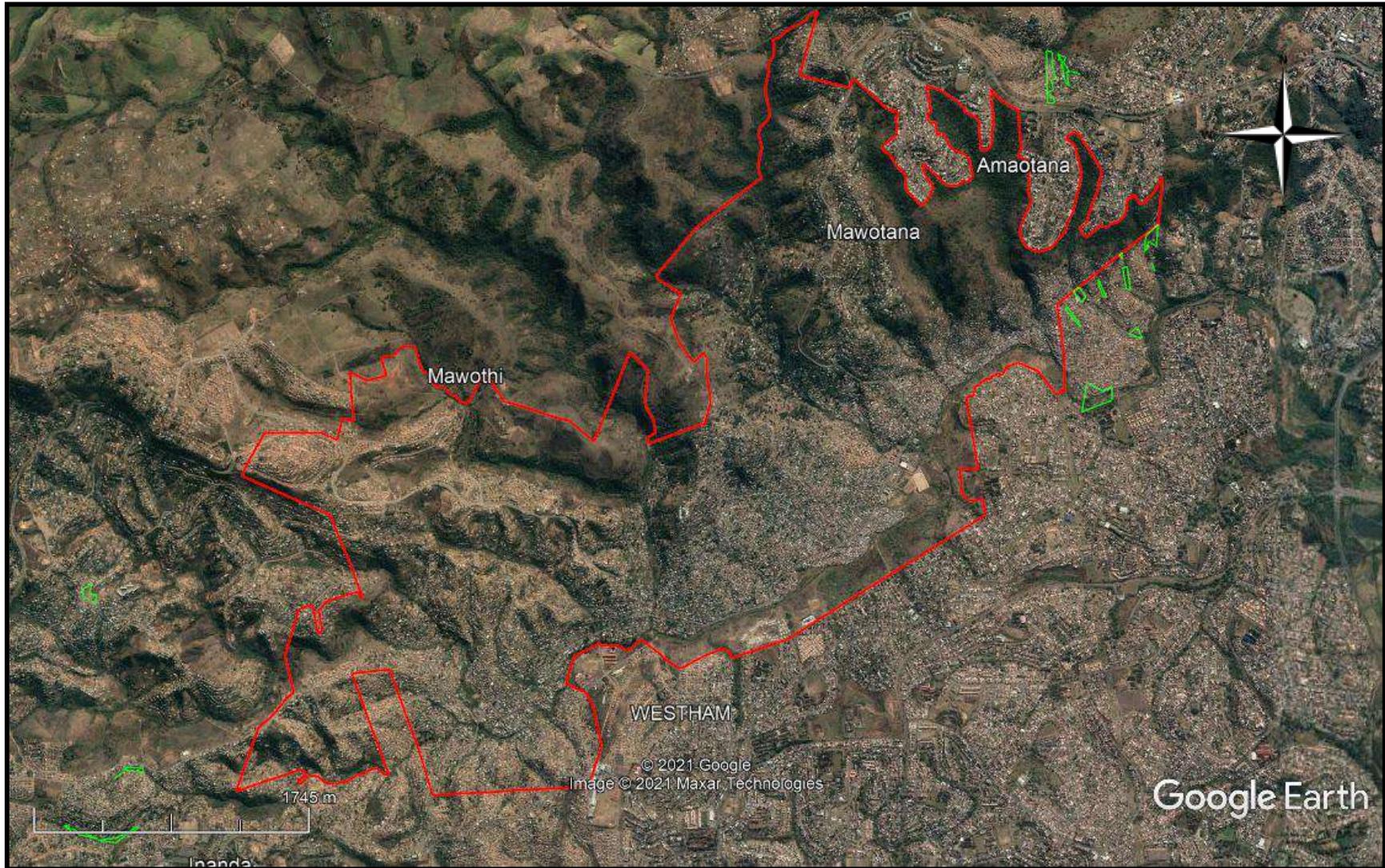
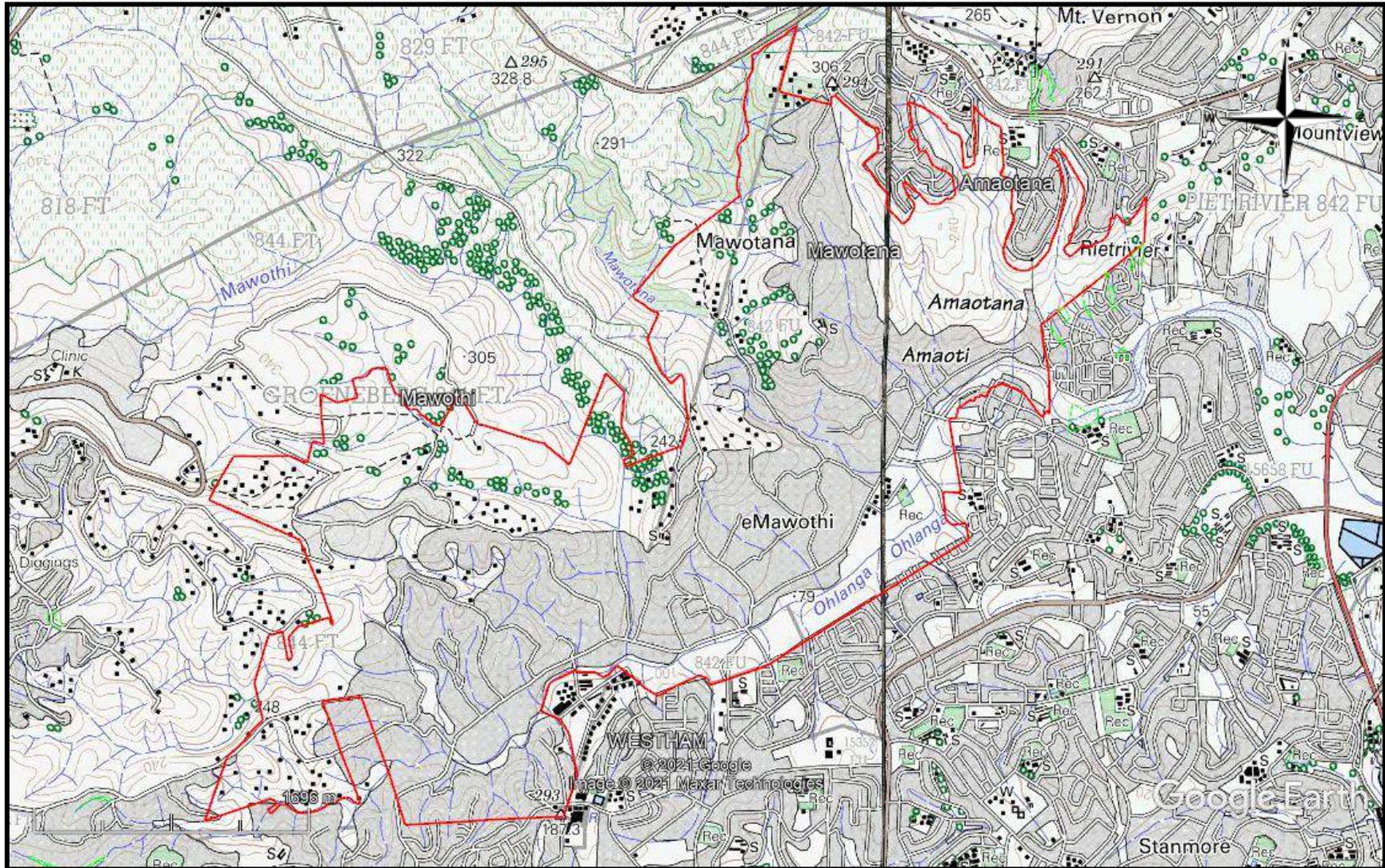


FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT (2002)



KWAZULU NATAL AMAFA AND RESEARCH INSTITUTE, ACT 05, 2018

“General protection: Structures.—

- No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Council having been obtained on written application to the Council.
- Where the Council does not grant approval, the Council must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- The Council may, by notice in the *Gazette*, exempt—
- A defined geographical area; or
- defined categories of sites within a defined geographical area, from the provisions of subsection where the Council is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.

General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—

- the grave of a victim of conflict;
- a cemetery made up of such graves; or
- any part of a cemetery containing such graves, without the prior written approval of the Council having been obtained on written application to the Council.
- General protection: Traditional burial places.—
- No grave—
- not otherwise protected by this Act; and
- not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original

position, or otherwise disturbed without the prior written approval of the Council having been obtained on written application to the Council.

The Council may only issue written approval once the Council is satisfied that—

- the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
- the applicant and the relevant communities or individuals have reached agreement regarding the grave.

General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—

- No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
- Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Council without delay.
- The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.
- No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
- No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or

- excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Council having been obtained on written application to the Council.
- The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.”

METHOD

The method for Heritage assessment consists of several steps.

The first step forms part of the desktop assessment. Here we would consult the database that has been collated by Umlando. This databases contains archaeological site locations and basic information from several provinces (information from Umlando surveys and some colleagues), most of the national and provincial monuments and battlefields in Southern Africa (<http://www.vuvuzela.com/googleearth/monuments.html>) and cemeteries in southern Africa (information supplied by the Genealogical Society of Southern Africa). We use 1st and 2nd edition 1:50 000 topographical and 1937 aerial photographs where available, to assist in general location and dating of buildings and/or graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required we would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at times. We also consult with an historical architect, palaeontologist, and an historian where necessary.

The survey results will define the significance of each recorded site, as well as a management plan.

All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

Defining significance

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

1. State of preservation of:

- 1.1. Organic remains:
 - 1.1.1. Faunal
 - 1.1.2. Botanical
- 1.2. Rock art
- 1.3. Walling
- 1.4. Presence of a cultural deposit
- 1.5. Features:
 - 1.5.1. Ash Features
 - 1.5.2. Graves

- 1.5.3. Middens
- 1.5.4. Cattle byres
- 1.5.5. Bedding and ash complexes

2. Spatial arrangements:

- 2.1. Internal housing arrangements
- 2.2. Intra-site settlement patterns
- 2.3. Inter-site settlement patterns

3. Features of the site:

- 3.1. Are there any unusual, unique or rare artefacts or images at the site?
- 3.2. Is it a type site?
- 3.3. Does the site have a very good example of a specific time period, feature, or artefact?

4. Research:

- 4.1. Providing information on current research projects
- 4.2. Salvaging information for potential future research projects

5. Inter- and intra-site variability

- 5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?
- 5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

6. Archaeological Experience:

6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

7. Educational:

- 7.1. Does the site have the potential to be used as an educational instrument?
- 7.2. Does the site have the potential to become a tourist attraction?
- 7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

8. Other Heritage Significance:

- 8.1. Palaeontological sites
- 8.2. Historical buildings
- 8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites
- 8.4. Graves and/or community cemeteries
- 8.5. Living Heritage Sites
- 8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts. Table 1 lists the grading system.

TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES

SITE SIGNIFICANCE	FIELD RATING	GRADE	RECOMMENDED MITIGATION
High Significance	National Significance	Grade 1	Site conservation / Site development
High Significance	Provincial Significance	Grade 2	Site conservation / Site development
High Significance	Local Significance	Grade 3A / 3B	
High / Medium Significance	Generally Protected A		Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C		On-site sampling monitoring or no archaeological mitigation required prior to or during development / destruction

RESULTS

DESKTOP STUDY

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. There are only a few recorded sites outside of the study area. (fig. 4). One provincial heritage site (Amafa3475) is listed on the SAHRIS database. However, there is no information on the site on the KZNARI list of heritage sites (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_KwaZulu-Natal). There are no listed buildings or heritage sites within the study area.

The 1937 aerial photograph indicates that there are settlements and buildings in the study area (fig. 5). The rest of the study area is grassland or farmland in the north. The settlements are wattle and daub constructions and no longer exist.

The 1942 Inanda and Verulam topographical maps indicate that there are settlements in the general area as well as buildings. (fig. 6). The map is probably based on the 1937 aerial photographs. These buildings would be older than 60 years in age and thus are protected by the heritage legislation. The locations of the buildings are listed in Table 2.

The buildings were then reviewed with the latest Google Earth imagery to see if they still exist, had been obviously replaced with other buildings or if they were to be affected in the development plan. Figure 7 shows these buildings where yellow refers to those buildings that could be older than 60 years and green to buildings that have been destroyed, replaced or outside of the planned area. No known buildings older than 60 years have been officially noted on SAHRIS.

These buildings will require some form of management plan and thus a Built Environment desktop was undertaken.

FIG. 4: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA

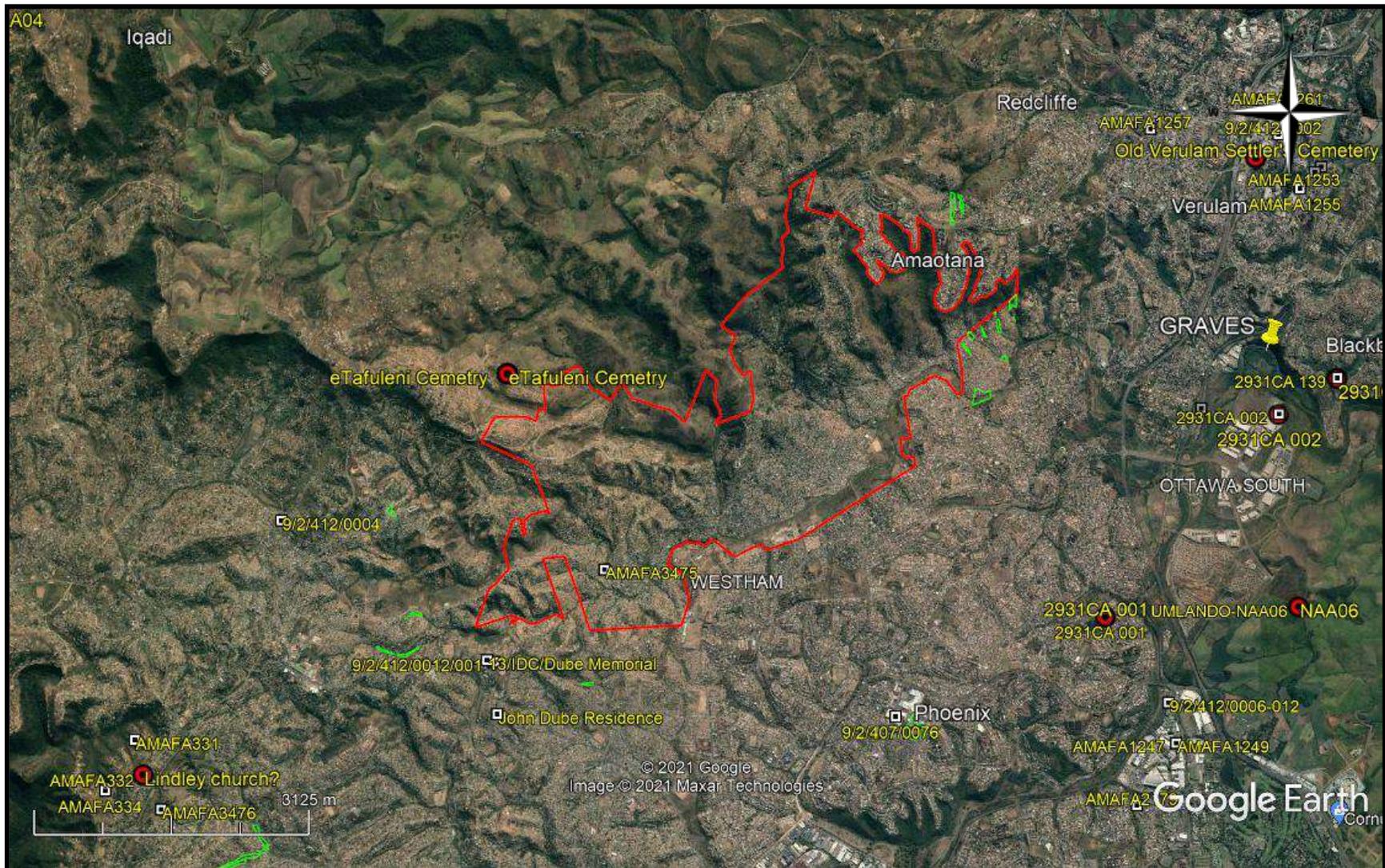


FIG. 5: LOCATION OF THE STUDY AREA IN 1937

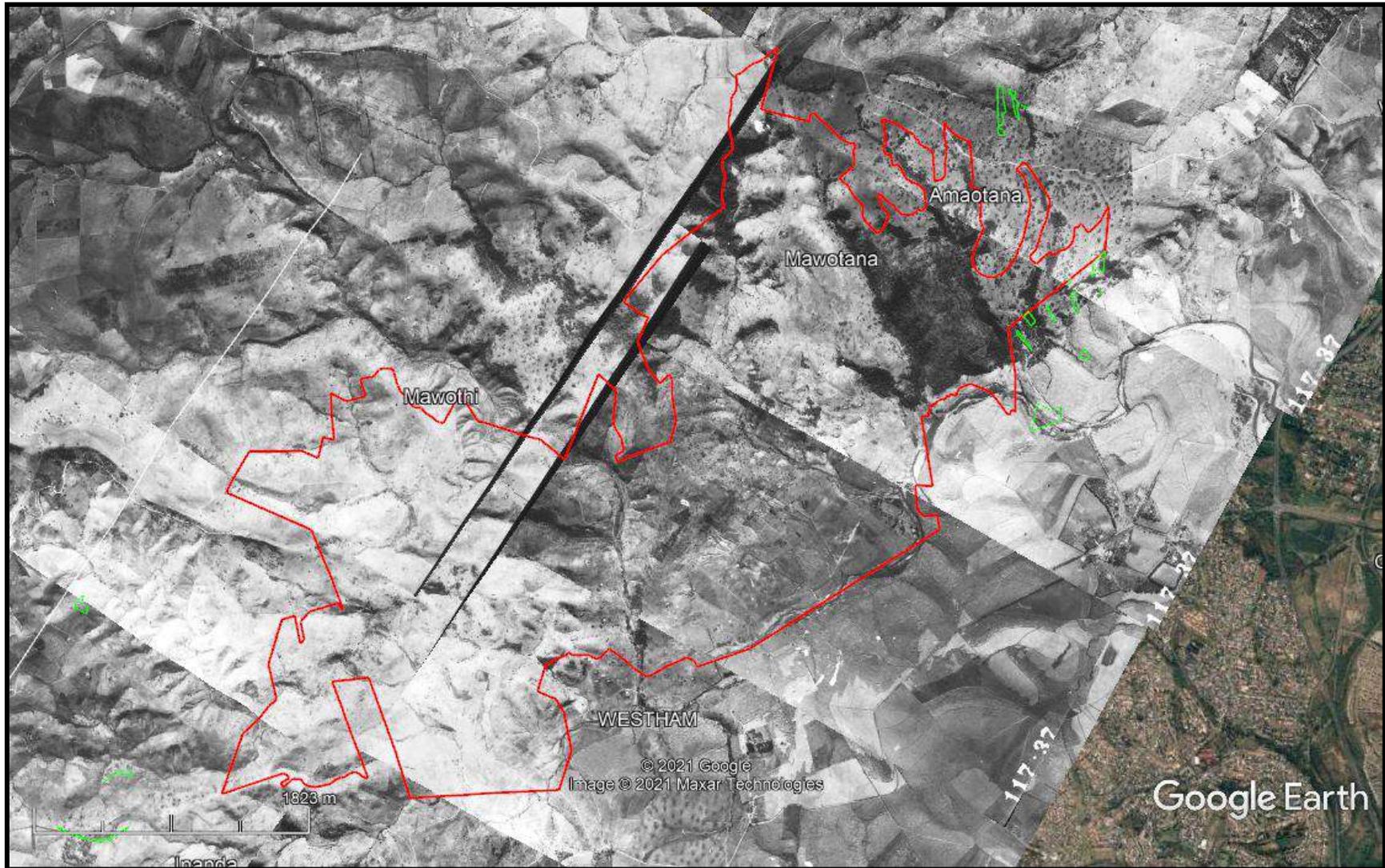


FIG. 6: LOCATION OF THE STUDY AREA IN 1942

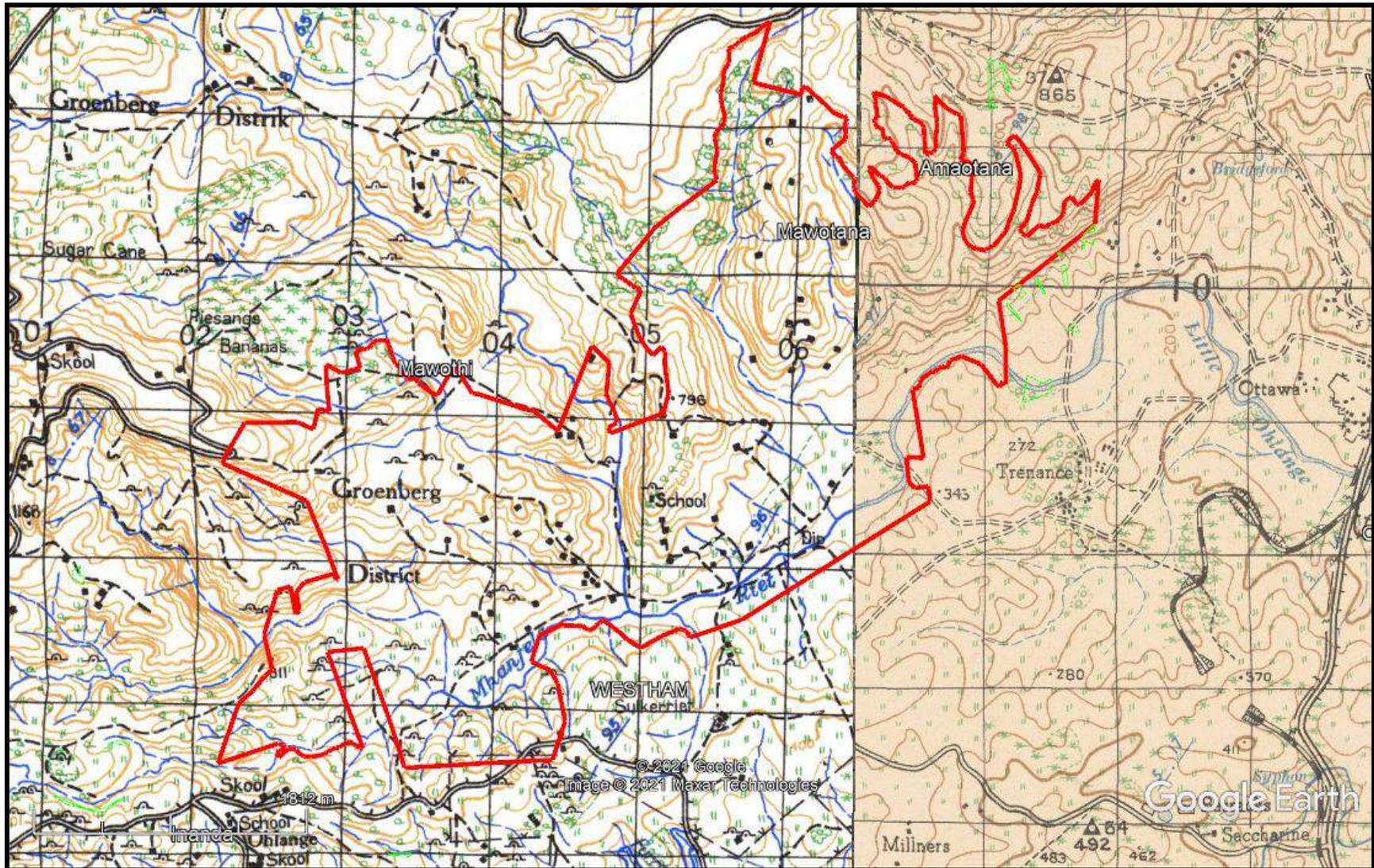
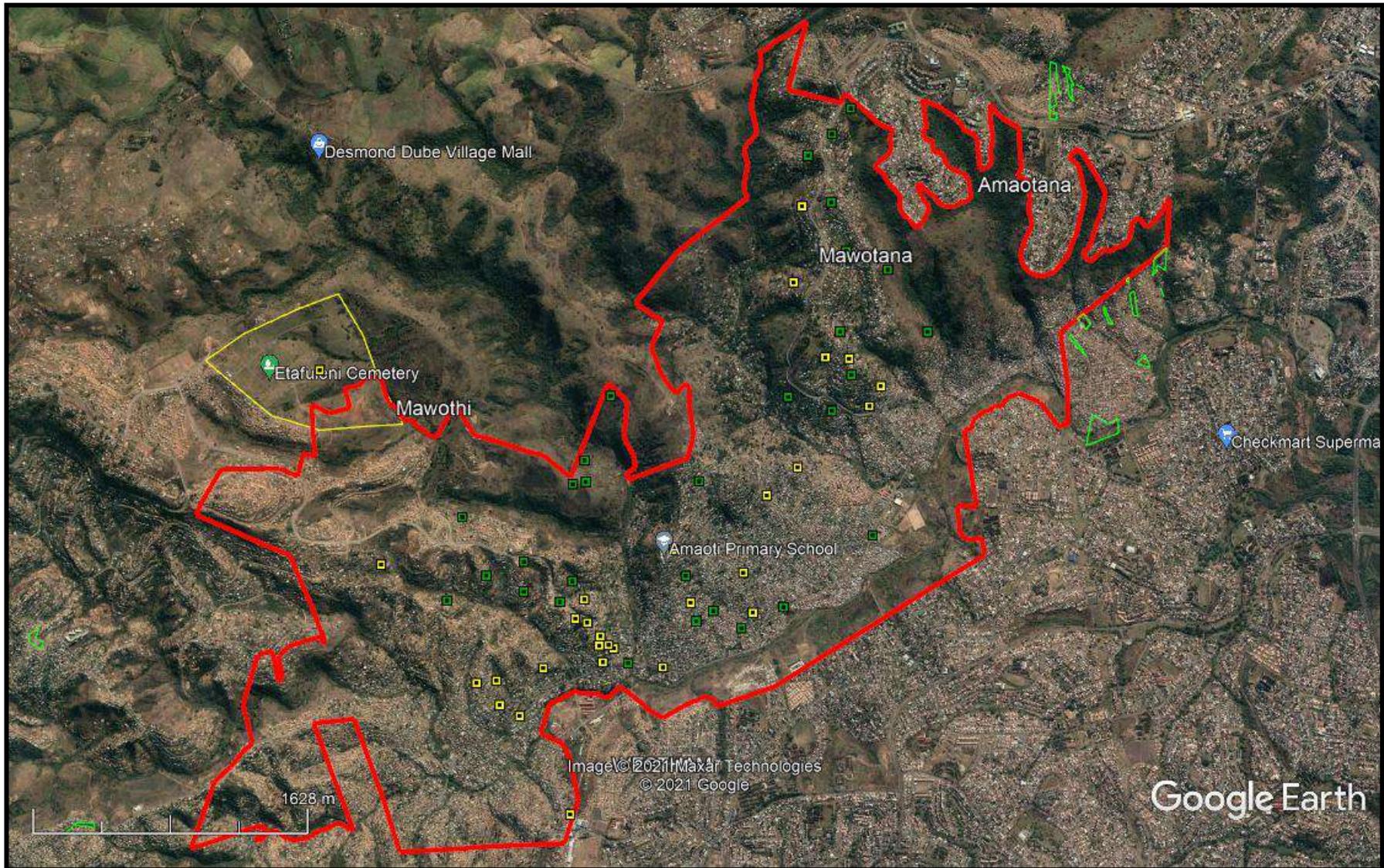


FIG. 7 LOCATION OF BUILDINGS ON THE 1942 TOPOGRAPHICAL MAPS¹



¹ Yellow: could still exist; green: no longer exists

TABLE 2: LOCATION OF 1942 BUILDINGS

Name	Latitude	Longitude	Description
b5	-29.658825980	30.993899040	Possibly exists
b8	-29.662949210	30.993392570	Possibly exists
b10	-29.667067600	30.995401900	Possibly exists
b11	-29.667148392	30.996911030	Possibly exists
b13	-29.668628130	30.999025320	Possibly exists
b16	-29.669732618	30.998303513	Possibly exists
b18	-29.677668077	30.985787139	Possibly exists
b20	-29.678996890	30.990253380	Possibly exists
b21	-29.674683041	30.991738852	Possibly exists
b22	-29.673141510	30.993725910	Possibly exists
b25	-29.681243950	30.990871780	Possibly exists
b27	-29.680650414	30.986865985	Possibly exists
b31	-29.684299509	30.985074087	Possibly exists
b33	-29.683215957	30.981921165	Possibly exists
b34	-29.683025533	30.981595314	Possibly exists
b35	-29.683996870	30.981221150	Possibly exists
b36	-29.682523680	30.981074580	Possibly exists
b37	-29.683048620	30.980996940	Possibly exists
b38	-29.681744880	30.980256530	Possibly exists
b39	-29.681511443	30.979500731	Possibly exists
b40	-29.680449070	30.980059530	Possibly exists
b45	-29.684296290	30.977417720	Possibly exists
b46	-29.684956410	30.974449210	Possibly exists
b47	-29.686991171	30.975886521	Possibly exists
b48	-29.685068470	30.973196000	Possibly exists
b49	-29.686345910	30.974632230	Possibly exists
b50	-29.692310050	30.979192230	Possibly exists
Groenberg Cemetery	-29.678438770	30.967315160	Exists
	-29.667818343	30.963625382	Exists
b3	-29.656093680	30.994247450	replaced
b1	-29.653576930	30.996905210	no longer exists, not affected
b2	-29.654959530	30.995737990	replaced
b4	-29.658641580	30.995713010	replaced
b6	-29.661277800	30.996678110	no longer exists
b7	-29.662270510	30.999333620	no longer exists, not affected
b9	-29.665658180	30.996316350	replaced
b12	-29.668031900	30.997076640	replaced
b14	-29.669223210	30.993091890	replaced
b15	-29.669993000	30.995910010	replaced
b17	-29.665612900	31.002012550	no longer exists
b19	-29.673877870	30.987412930	replaced
b23	-29.676945570	30.998603590	replaced
b24	-29.680943780	30.992848470	replaced, not affected
b26	-29.679134830	30.986555990	replaced
b32	-29.684066720	30.982845150	replaced
b29	-29.681689950	30.987227950	replaced
b28	-29.681122710	30.988322270	replaced
b30	-29.682111045	30.990128534	replaced
b41	-29.680569740	30.978535680	replaced
b42	-29.679428380	30.979325520	replaced, not affected
b43	-29.678313496	30.976275274	replaced
b44	-29.679995730	30.976222030	replaced, not affected
b51	-29.669196980	30.981809250	replaced, not affected

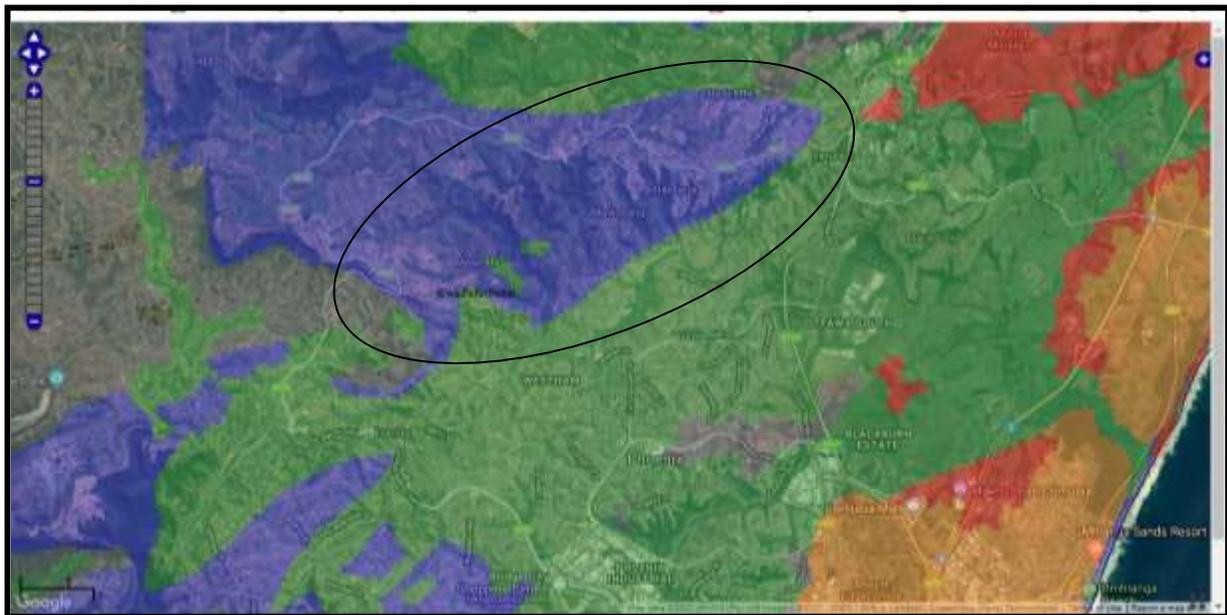
b52	-29.675843380	30.972409160	replaced, not affected
b53	-29.672738010	30.980104560	replaced, not affected
b54	-29.673921300	30.980202640	replaced
b55	-29.674041100	30.979389770	replaced
b56	-29.679090850	30.973887540	replaced
b57	-29.680469260	30.971381210	replaced, not affected

PALAEONTOLOGICAL SENSITIVITY

Amaoti is in areas of no and medium palaeontological sensitivity. Dr Alan Smith undertook the desktop assessment for this project (Appendix A). The area is made up of the Natal and Dwyka Groups and the Pietermaritzburg Formation. (fig. 8). The natal Group does not contain fossil remains. The Dwyka Group will contain trace fossils and these are of low significance. The Pietermaritzburg Formation will contain fragmentary plant fossils and invertebrate trace fossils.

The chance of significant fossils being found on this site is Low, but not Zero. A “Chance Find Protocol” has been included

FIG. 8: PALAEONTOLOGICAL SENSITIVITY MAP



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.

BUILT ENVIRONMENT

The Built Environment desktop was undertaken by Lindsay Napier (Appendix B). It is noted that most of the structures in the Amaoti area were of the wattle and daub type, of which some would have tin roofs. The area was unserviced up to the 1980s and thus there would not have been any formal architecture, while the traditional vernacular architecture would not have preserved. These houses are thus unlikely to exist.

Larger buildings such as schools, clinics, general grocers, could still exist and these need to be assessed if they are to be upgraded. The farm building Groenberg is unlikely to exist, especially where it is located on the 1942 map, as it is halfway down a steep hill.

RECOMMENDATIONS

No known archaeological sites occur within the study area. If any did, they would be severely damaged and out of context. No further mitigation is required for archaeological sites.

The chances of finding palaeontological material are very low. No further mitigation is required for archaeological sites. A Chance Find Protocol was initiated.

The occurrence of buildings possibly older than 60 years in age required further mitigation in terms of a Built Environment desktop. This desktop noted that most of the houses would have been wattle and daub type constructions and would not have preserved well. However, if any schools, clinics or general stores need to be refurbished, then they will require field assessment.

The Google Earth file has been submitted with the report. This should be used with the main design plan to determine which buildings will be affected and in what manner.

CONCLUSION

A desktop heritage survey was undertaken for the proposed Greater Amaoti Housing Development, Ethekewini Municipality. The development intends to upgrade existing houses and infrastructure.

The desktop noted that there are no known archaeological sites within the study area. Similarly, it is unlikely that palaeontological material will occur here. There buildings from the 1942 topographical map were probably wattle and daub constructions and would not have preserved well. Only formal buildings such as school, clinics and general stores would require further assessment.

REFERENCES

2930 DB Inanda 1942, 2000

2931 DA Verulam 1942, 2000

17B_046_36665 to 17B_046_36667

117B_048_36595 to 117B_048_36597

KZN Museum Database

SAHRIS Database

Umlando Database

https://en.wikipedia.org/wiki/List_of_heritage_sites_in_KwaZulu-Natal

EXPERIENCE OF THE HERITAGE CONSULTANT

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the Association of Professional Archaeologists of Southern Africa in 1998 when it was formed. Gavin is rated as a Principle Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

DECLARATION OF INDEPENDENCE

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

A handwritten signature in black ink, appearing to read 'G. Anderson', with a horizontal line underneath.

Gavin Anderson
Archaeologist/Heritage Impact Assessor

APPENDIX A
DESKTOP PIA

**PROPOSED FORMALISATION AND DEVELOPMENT
OF THE GREATER AMOATI AREA, INANDA, ETHEKWINI
MUNICIPALITY, KWAZULU-NATAL: DESK-TOP PIA**

FOR

**UMLANDO: Archaeological Surveys & Heritage Management
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by

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asconsulting@telkomsa.net

30 October 2021

Declaration of Independence

This report has been compiled by Dr Alan Smith (Pr. Sc. Nat.) of Alan Smith Consulting, Durban. The views expressed in this report are entirely those of the author, if not then the source has been duly acknowledged. No other interest was displayed during the decision making process for the Project.

Specialist: Dr Alan Smith

Signature:



EXECUTIVE SUMMARY

Alan Smith Consulting was appointed to conduct a desk-top assessment of the potential impacts to **Palaeontology Resources** that might occur through the proposed formalisation and development of the Greater Amaoti area, Inanda, Ethekewini, KwaZulu-Natal. This project is to be constructed on Natal Group, Dwyka Group, Pietermaritzburg Formation and Karoo Dolerite.

Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), requires a Palaeontological Impact Assessment (PIA) to assess any potential impacts to palaeontological heritage.

The chances of encountering fossils is very **Low**, but **Not Zero**; consequently a “*Chance Find Protocol*” has been included.

No further formal palaeontological work is required at this stage.

ACRONYMS

BA:	Basic Assessment
EDTEA:	(Department of) Economic Development, Tourism and Environmental Affairs
HIA:	Heritage Impact Assessment
PIA;	Palaeontological Impact Assessment
SAHRA:	South African Heritage Resource Agency
SAHRIS:	South African Heritage Resources Information System

1. INTRODUCTION

Dr Alan Smith of Alan Smith Consulting was appointed to conduct a desk-top PIA by UMLANDO: Archaeological Surveys & Heritage Management, Meerensee, KwaZulu-Natal 3901. This report forms part of a Heritage Impact Assessment (HIA) which complies with the requirements of the South African National Heritage Resource Act No 25 of 1999 (revised 2017) as well as the KwaZulu-Natal Heritage Act No 4 of 2008. In accordance with Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), a PIA is required to assess any potential impacts to palaeontological heritage within the development area.

2. BACKGROUND

The proposed development entails the formalisation and development of the Greater Amaoti Formalisation and Development area which forms part of Inanda (Figure 1), The Amaoti study area is located within the interior of Durban, West of the N2 freeway.



Figure 1: Location map of Proposed Greater Amaoti development (red line).

The project area is approximately 1235,59 ha in extent and is located on a portion of Wards 52, 53, 55, 56, 57, 59 and 102 of the eThekweni Metropolitan Municipality. The study area lies outside of any Town Planning Scheme boundaries and has not formal zoning.

3. TERMS OF REFERENCE

Alan Smith Consulting was requested by **UMLANDO: Archaeological Surveys & Heritage Management, PO Box 102532, Meerensee, KwaZulu-Natal 3901** to provide a desk-top Palaeo Impact Assessment to assess the likelihood of encountering palaeontological material on the Amaoti Formalisation and Development site. The work was to be based on the knowledge gained from a desktop literature review, maps and personal experience (see Section 11 of this report). This report is to meet the requirements of the National Environmental Management Act (Act 107 of 1998) [as amended] Environmental Impact Assessment (EIA) regulations, Appendix 6.

4. SCOPE AND PURPOSE OF REPORT

A Palaeontological Impact Assessment (PIA) is a means of identifying any significant palaeontological material on a given site. This desk-top investigation fulfills the requirements of the heritage authorities (SAHRA), such that a comment can be issued by them for consideration by the competent authority (EDTEA), who will review the Basic Assessment (BA) and grant or refuse authorisation. The PIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation, should this be granted.

5. METHODOLOGY

A fieldwork site inspection took place on 3 September, 2021. This was synthesized with desk-top research and personal experience to construct this desk-top report.

6. GEOLOGY

Three lithologies: Natal Group, Dwyka Group, Pietermaritzburg Formation and Karoo Dolerite are present on this site (Figure 2).



Figure 2: Extract from the Durban 2930 1:250 000 Geological map. The Dwyka Group (C-Pd), Pietermaritzburg Formation (Brown) and Natal Group Formation (O-Sn: light blue) and a Karoo dolerite (Red-Jd) rocks are present.

Natal Group

The Natal Group formed early in the history of the Gondwana Supercontinent. The Natal Group comprises reddish coloured sandstones, when seen in the field. Deposition of the Natal Group began in the Early Ordovician and lasted possibly to the Late Ordovician, 485-443 (Ma) millions of years (Vorster et al., 2015). Deposition took place in a terrestrial-dominated setting on the Gondwana Supercontinent. It was probably deposited in a small, half-graben, continental basin (Vorster et al., 2014). This unit is very poorly understood.

Dwyka Group

The Dwyka Group is a lithified glacial deposit (Tillite) which accumulated in the southern African region of the Gondwana Supercontinent during the global Late Palaeozoic Glaciation (Visser, 1990), otherwise known locally as the Dwyka Glaciation. This global glaciation began at 327 Ma and ended about 260 Ma (Fielding et al., 2008). The Dwyka Group comprises two Formations. In this region it comprises only the Elandsvlei Formation which is characterized by massive debrites. This sediment, ranging from boulder to silt, was freed by a melting ice sheet retreating across the Karoo Sea.

Pietermaritzburg Formation

The Pietermaritzburg Formation is very dark blue (when fresh) and crops out as a massive siltstone (Figure 3). These rocks belong to the Karoo Sequence. The Pietermaritzburg Formation is Lower Permian in age and was deposited within the Karoo Sea in the centre of the Gondwana Supercontinent, during the Late Paleozoic Glaciation melting phase. This unit was deposited under low energy conditions (Bordy et al., 2017).



Figure 3: Example of what the Pietermaritzburg Formation might look like in this area.

Karoo Dolerite

The Karoo Dolerite is represented by dykes (Figure 3) and sills, within this area. It is part of the Karoo Large Igneous Province (LIP). The Karoo LIP was a sequence of lavas up to 4.5 km thick which was deposited about 184 Ma (million years ago). This igneous deposit was extruded as a “Continental Flood Basalt”, a process that has never been witnessed by mankind. This process takes place by fissure eruption. This event triggered the break-up of the Gondwana supercontinent (Hastie et al., 2014).

7. PALAEOLOGY

Natal Group

This is believed to have been laid down in a terrestrial setting. At this time there was little terrestrial life on Earth. No fossils are known from the Natal Group.

Dwyka Group

The Dwyka Group is believed to have formed in a marine setting. Occasional trace fossils (no palaeontological value) have been found. No body fossils have been recorded from this lithology.

Pietermaritzburg Formation

The Pietermaritzburg Formation may contain scattered, fragmentary plant fossils and invertebrate trace fossils, all of which are diagnostic of marine conditions (eg. *Helminthopsis*) (Bordy et al., 2017). Potentially it could contain body fossils, but to the writer's knowledge none have been found.

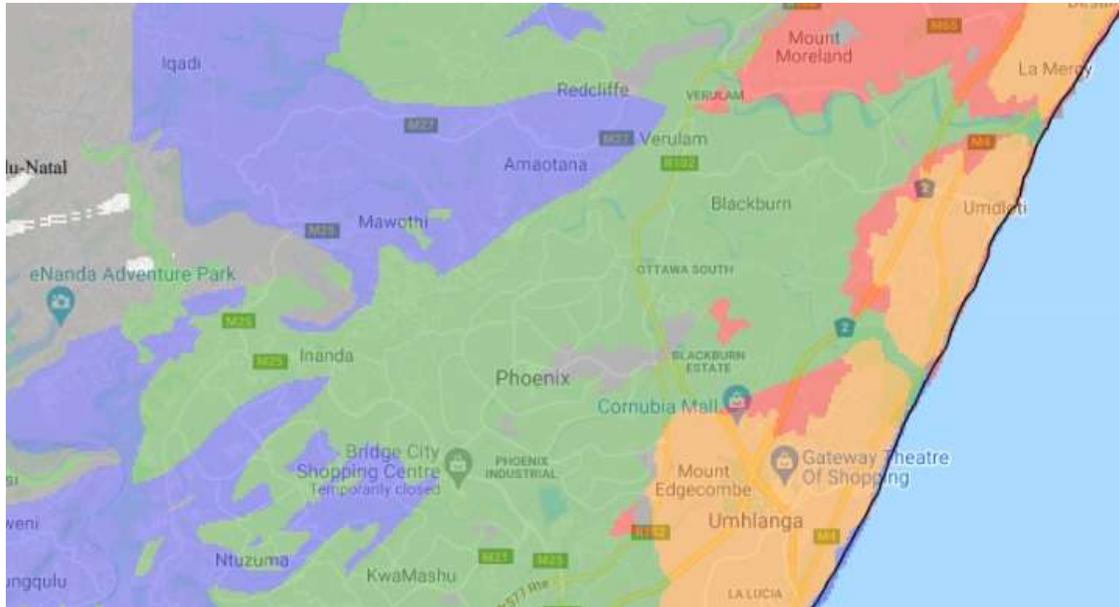


Figure 4: Palaeosensitivity of the Amaoti Formalisation and Development area. Blue represents Natal Group sandstone and Green the Dwyka Group and Pietermaritzburg Formation. See Table 1 for the palaeosensitivity codes.

Table 1: Summary of SAHRIS categories

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

Karoo Dolerite

This rock is igneous and by definition cannot be fossiliferous.

8. SUMMARY

The chance of significant fossils being found on this site is **Low**, but not **Zero**. A “**Chance Find Protocol**” has been included to cover this eventuality. No further formal palaeontological work is required, unless triggered by the “**Chance Find Protocol**”, which must form part of the Environmental Management Program (EMPr) for the site

9. CHANCE FIND PROTOCOL

This Chance Find Protocol must be included in the site EMPr.

If any fossils are found, a Palaeontologist must be notified immediately by the ECO and/or EAP and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material:

- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.
- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.

4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.
5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.
6. Costs of basic curation and storage until collected. Documentary record of palaeontological occurrences must be done.
7. The contractor will, in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist.
8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.
9. Locations of samples and measured sections are to be pegged, and routinely and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

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11. DETAILS OF SPECIALIST

Dr Alan Smith

Private Consultant: *Alan Smith Consulting, 29 Brown's Grove, Sherwood, Durban, 4091*

&

Honorary Research Fellow: *Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Durban.*

Role: Specialist Palaeontological Report production

Expertise of the specialist:

- PhD in Geology (University of KwaZulu-Natal), Pr. Sc. Nat., I.A.H.S.
- Expert in Vryheid Formation (Ecca Group) in northern KZN, this having been the subject of PhD.
- Scientific Research experience includes: Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits.
- Experience includes understanding Earth Surface Processes in both fluvial and coastal environments (modern & ancient).
- Alan has published in both national and international, peer-reviewed journals. He has published + 50 journal articles with 497 citations (detailed CV available on request).
- Attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, South Africa) and is actively involved in research.

Selected recent palaeo-related work includes:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Fieldwork PIA: Mpungoze water supply scheme, Empangeni. Client: Enviropro.
- Fieldwork PIA: Helpmekaar Dam. Client: Afzelia environmental consultants.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.
- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.

- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.
- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No. Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.

APPENDIX B
BUILT ENVIRONMENT DESKTOP

**DESKTOP HERITAGE STUDY : BUILT ENVIRONMENT
FOR
THE GREATER AMAOTI HOUSING DEVELOPMENT
AMAOTI, INANDA, KWA-ZULU NATAL**

Date 15-11-2021

PREPARED FOR:

Sivest (Pty)(Ltd)

PREPARED BY:

Lindsay Napier Architect
Architectural Heritage Consultant

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A Built-environment desktop study was commissioned by Gavin Anderson of Umlando as part of the HIA for the Greater Amaoti Housing Development.

Google Earth imagery, topographical maps and aerials photography were used.

Reference is made to Umlando's HIA desktop study dated 7 November 2021 :

Figure 5 : Aerial photograph 1937

Figure 6 : Topographical map 1942

Figure 7 : Google earth image.

Historical Significance :

The area is located close to the "Inanda Heritage Route" which includes the following educational/ religious and tourist sites :

1. Ghandi's Phoenix Settlement	S-29°42'34.7" E-030°58'28.0"
2. Shembe Settlement of Ekuphakueni	S-29°42'42.4" E-030°57'49.8"
3. Ohlange Institute and John Dube's house	S-29°41'59.5" E-030°57'22.1"
4. Inanda Seminary	S-29°42'18.9" E-030°55'21.1"
5. Shembe Settlement of Ebuhleni	S-29°42.101' E-030°53.433'
6. Mzinyati Falls	S-29°41.909' E-030°54.509'
7. Inanda Dam	S-29°41.539' E-030°53.391'
8. Afrika Church	S-29°41.905' E-030°54.507'
9. Sizimisele Development Trust	S-29°41.805' E-030°56.907'
10. St. Josephines	S-29°40'57.7" E-030°56'20"
11. Etafuleni	S-29°39.893' E-030°5.511'
12. Seme's Store	S-29°41'16.6" E-030°54'52.4"

The area is rich in historic and spiritual significance.

The greater Amaoti area is North East of this Heritage Route and includes the West end of Etafuleni Mountain (11).

The study area was an informal settlement located in the valley South of the mountain relating mainly to natural watercourses.

In the early 1980's the settlement was hit by a plague of dysentery which threatened their survival. The inhabitants were moved to higher ground and homes were abandoned. The period of time that they were displaced is unconfirmed, but during the 1990's there was a large influx of people setting up informal dwellings in the valley in order to find work in the City.

Analysis of data :

Analysis of the above maps and imagery reveal a progression of settlement patterns. The area was grassland and farmland with pockets of settlement in 1937. Dwellings would have been built of wattle and daub either as traditional huts or as rectangular houses with sheet roofs. With the proximity to factories and modern building types, building materials may have been mixed, unlike traditional dwellings in remote areas.

Therefore, the 1942 topographical map picks up these structures as "buildings".

The jump from 1942 to the current imagery reveals a high-density settlement with more formal buildings interspersed with informal and traditional homesteads.

This information, combined with the history, indicates that any structure that may appear to have existed in 1942 is likely to have been replaced with a formal dwelling or alternative structure in the last 40 years.

A wattle and daub structure has a limited lifespan and is only retained in its original form if it is constantly maintained and re-plastered. This is unlikely to have happened with the prevalence of modern building construction methods in the area.

Conclusion :

Due to the development of the City of Durban, the built environment of Amaoti is seen to be “dynamic” ie. always changing. Therefore making it impossible to identify any single structure as from a specific period.

Buildings associated with religion or education may have retained some significance through their continued use by the community. If their buildings do not fall into the category of “protected buildings”, the institutions may still have value and a sense of place.

Buildings identified through oral history may hold significance through connections with early families who settled in the area.

The highly significant historical and spiritual sites have been identified in the adjacent area of Inanda and are under the care of KZN Amafa and Research Institute.

Recommendations :

Important sites identified through public consultation and connected to education, religion and/or oral history should be inspected to assess the impact of a development.

Any structure found to be over 60 years or to hold cultural, spiritual or contextual significance is protected by the KZN Amafa Heritage Act and a permit for demolition or alteration will be required.

References :

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