

**EKUVUKENI B SERVICE SITES, ALFRED DUMA  
LOCAL MUNICIPALITY, KZN**

**FOR INZUZO YESIZWE DEVELOPMENT  
CONSULTANTS**

**DATE: 3 SEPTEMBER 2020**

**By Gavin Anderson**

**Umlando: Archaeological Surveys and Heritage  
Management**

**PO Box 102532, Meerensee, 3901**

**Phone: 035-7531785      Cell: 0836585362**

**umlando@gmail.com**



## EXECUTIVE SUMMARY

The Alfred Duma Local Municipality has identified the need to develop a Township Establishment that will provide 500 Serviced Residential Stands including a shopping centre and other additional sites (44 stands) at Ekuvukeni. Such a process was initiated as a means to address the Municipality's housing backlog and as a matter of urgency in order to facilitate the process of giving people security of tenure (title deeds) through creating integrated and sustainable human settlements that will improve the living conditions and quality of life in its rural communities.

The HIA recorded thirty-eight (38) features of which thirty-three (33) were graves. These varied from single graves to seven graves. Most of the graves occur on the eastern part of the study area, while a few occur in the central area and to the west. The developer has an option to either buffer all, or some of the graves, and/or opt for grave relocation. If grave relocation is undertaken, then a full PPP is required and a permit from KZNARI is required.

The palaeontology of the area is noted as being highly sensitive due to the occurrence of the Vryheid Formations. However, these deposits are overlain by sandstone deposits that are of low significance. No further PIA mitigation is required, however a Chance Find Protocol was initiated.

## 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
KZNARI	KwaZulu-Natal Amafa & Research Institute

## TABLE OF CONTENT

INTRODUCTION .....	6
KWAZULU NATAL AMAFA AND RESEARCH INSTITUTE, ACT 05, 2018 .....	11
METHOD .....	13
Defining significance.....	14
RESULTS .....	17
DESKTOP STUDY .....	17
PALAEONTOLOGICAL SENSITIVITY .....	22
FIELD SURVEY .....	24
UIT1065.....	27
UIT1066.....	28
UIT1067.....	29
UIT1068.....	30
UIT1069.....	31
UIT1070.....	32
UIT1071.....	33
UIT1072.....	34
UIT1073.....	35
UIT1074.....	36
UIT1075.....	37
UIT1076.....	38
UIT1077.....	39
UIT1078 & UIT1079.....	40
UIT1080.....	41
UIT1081.....	42
UIT1082.....	43
UIT1083.....	44
UIT1084.....	45
UIT1085.....	46
UIT1086.....	47
UIT1087.....	48
UIT1088.....	49
UIT1089.....	50
UIT1090.....	51
UIT1091.....	53
UIT1092.....	54
UIT1093.....	55
UIT100102.....	61
UIT10004.....	62
RECOMMENDATIONS .....	67
CONCLUSION.....	69
REFERENCES .....	70
<b>EXPERIENCE OF THE HERITAGE CONSULTANT .....</b>	<b>71</b>
<b>DECLARATION OF INDEPENDENCE.....</b>	<b>71</b>

### TABLE OF FIGURES

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT .....	7
FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT .....	8
FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT (2002) .....	9
FIG. 4: SCENIC VIEW OF THE STUDY AREA .....	10
TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES.....	16
FIG. 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA .....	18
FIG. 6: LOCATION OF THE STUDY AREA IN 1852 .....	19
FIG. 7: LOCATION OF THE STUDY AREA IN 1938 .....	20

FIG. 8: LOCATION OF THE STUDY AREA IN 1967 .....	21
FIG. 9: PALAEOANTHROPOLOGICAL SENSITIVITY MAP .....	23
FIG. 10: GRAVES WITHIN EXISTING SETTLEMENTS.....	25
FIG 11: LOCATION OF RECORDED SITES .....	26
FIG.12: GRAVE AT UIT1065.....	27
FIG.13: GRAVES AT UIT1066 .....	28
FIG. 14: GRAVES AT UIT1067 .....	29
FIG. 15: OLD GRAVE AT UIT1068 .....	30
FIG. 16: GRAVES AT UIT1069 .....	31
FIG. 17: GRAVE AT UIT1070.....	32
FIG. 18: GRAVE & UPPER GRINDING STONE AT UIT1071 .....	33
FIG. 19: GRAVE AT UIT1072.....	34
FIG. 20: GRAVE AT UIT1073.....	35
FIG. 21: GRAVE AT UIT1074.....	36
FIG. 22: GRAVE AT UIT1075.....	37
FIG. 23: GRAVE AT UIT1076.....	38
FIG. 24: KRAAL AT UIT1077 .....	39
FIG. 25: GRAVE AT UIT1078.....	40
FIG. 26: GRAVE AT UIT1080.....	41
FIG. 27: GRAVE AT UIT1081.....	42
FIG. 28: GRAVE AT UIT1082.....	43
FIG. 29: GRAVES AT UIT1083 .....	44
FIG. 30: GRAVES AT UIT1084 .....	45
FIG. 31: GRAVE AT UIT1085.....	46
FIG. 32: GRAVES AT UIT1086 .....	47
FIG. 33: GRAVES AT UIT1087 .....	48
FIG. 34: FEATURE AT UIT1088 .....	49
FIG. 35: FOUNDATIONS AT UIT1089 .....	50
FIG. 36: GRAVES & FOUNDATIONS AT UIT1090 .....	52
FIG. 37: FOUNDATIONS AT UIT1091 .....	53
FIG. 38: GRAVE AT UIT1092.....	54
FIG. 39: SELECTED FEATURES AT UIT1093 - 1095.....	56
FIG. 40: GRAVES AT UIT1096 .....	57
FIG. 41: GRAVES AT UIT1097 .....	58
FIG. 42: GRAVES AT UIT1098 .....	59
FIG.43: GRAVES AT UIT1099 .....	60
FIG.44: GRAVE AT UIT10000.....	61
FIG. 45: GRAVES AT UIT10001 .....	62
STONE AGE MATERIAL.....	63
FIG. 45: MIDDLE STONE AGE HORIZON AND TOOL.....	63
FIG. 46: LOCATION OF RECORDED FINDS.....	64
TABLE 2: LOCATION AND SIGNIFICANCE OF RECORDED SITES. ....	65

## INTRODUCTION

The Alfred Duma Local Municipality has through the IDP process identified the need to develop a Township Establishment that will provide 500 Serviced Residential Stands including a shopping centre and other additional sites (44 stands) that will cater for a variety of land uses including commercial, recreational, health, social and community facilities as part of the Integrated Residential Development Programme (IRDP) (previously known as the Project Linked Subsidy) within its area of jurisdiction to ensure a holistic and sustainable community. Such a process was initiated as a means to address the Municipality's housing backlog and as a matter of urgency in order to facilitate the process of giving people security of tenure (title deeds) through creating integrated and sustainable human settlements that will improve the living conditions and quality of life in its rural communities.

The project is the Ekuvukeni B Phase 1 Serviced Sites Project within Ward 33 of the Alfred Duma Local Municipality. The Council has appointed Siyathuthu Developments CC, trading as Inzuzo YeSizwe Development Consultants, during June 2019 to act as a qualified/experienced Project Manager (PM), Implementing Agent and Professional Service Provider of the Ekuvukeni B Serviced Sites Project, which is geographically located within Ward 33 of the Alfred Duma Local Municipality within the Uthukela District Municipality in the KwaZulu Natal Province.

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

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT

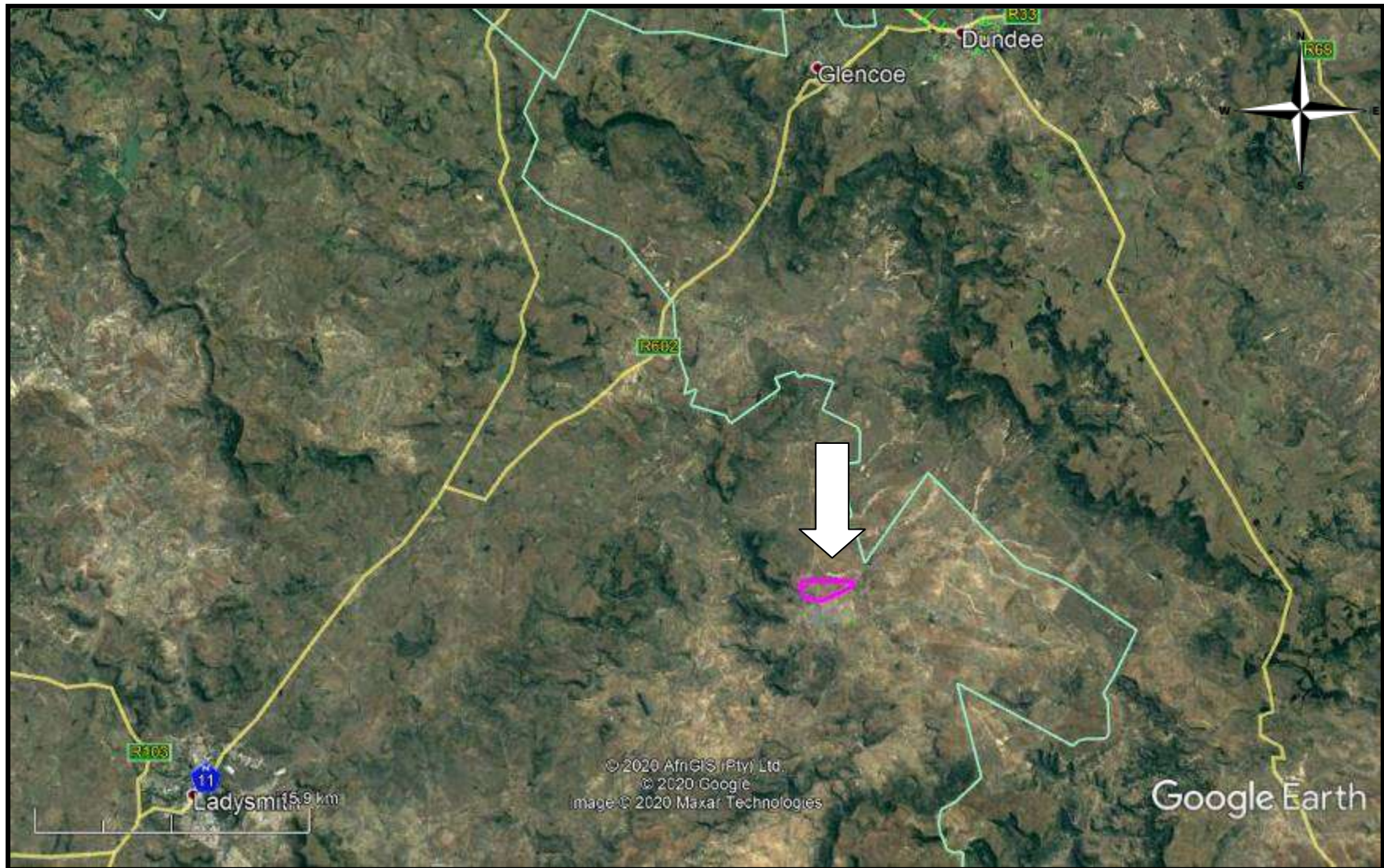


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT

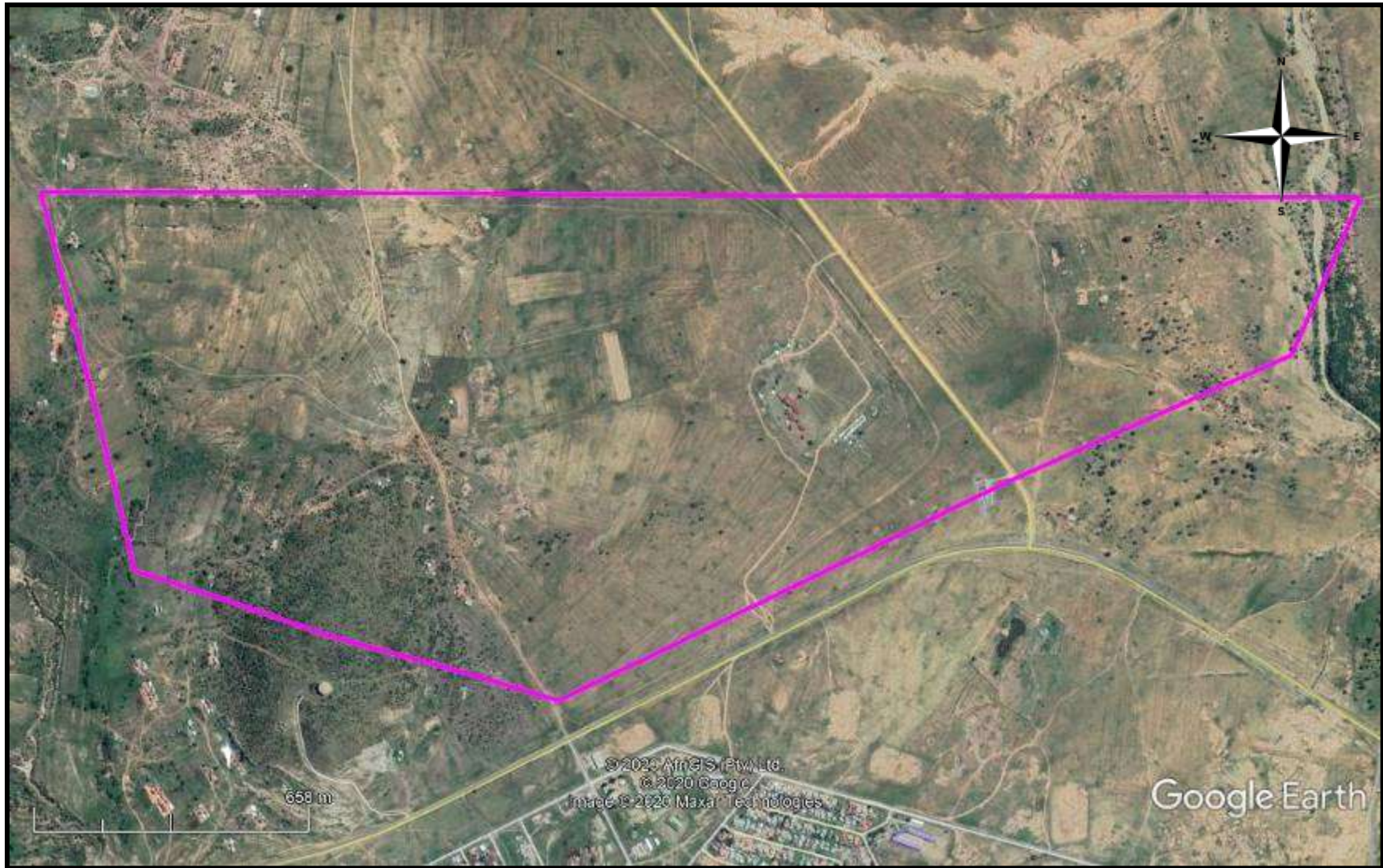




FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT (2002)

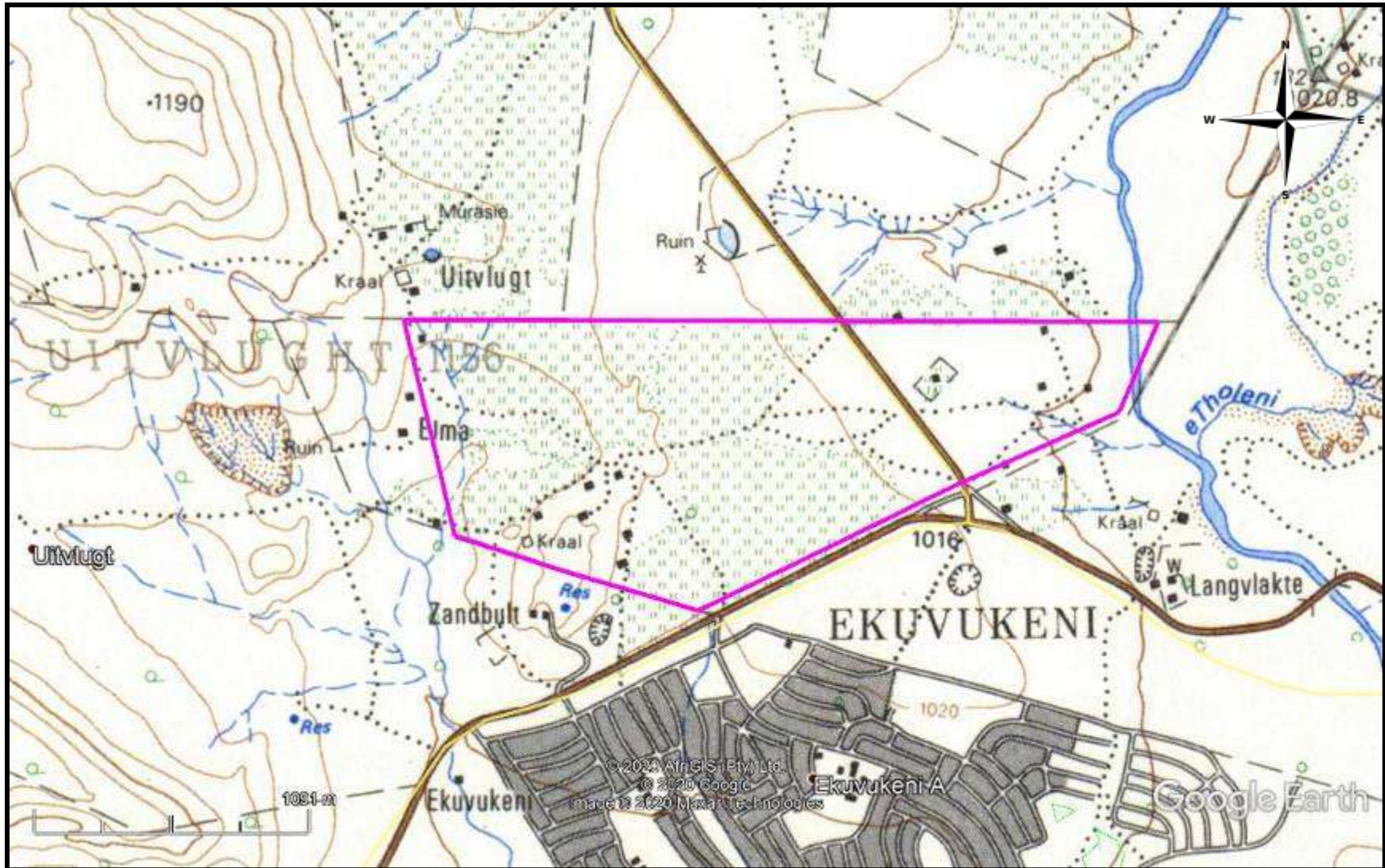


FIG. 4: SCENIC VIEW OF THE STUDY AREA



**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 1<sup>st</sup> and 2<sup>nd</sup> 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. Many archaeological sites occur in the general area. The archaeological sites tend to be open Stone Age scatters of low significance, Overhangs with Rock Paintings, Late Iron Age walling, and Historical Period structures (fig. 5). One HIA survey was undertaken on the adjacent property (Anderson 2015). This survey noted a Shembe Temple and several 20<sup>th</sup> graves near the quarry.

The Surveyor General map indicates that the Farm Uitvlucht 1156 was first surveyed in 1852 (fig. 6). No buildings or roads are noted on the diagram, but it does suggest that the land was sold shortly thereafter. The study area is in a Portion of Uitvlucht 1156.

The 1937 aerial photograph indicates four settlements on the map (fig. 7). These are probably farm labourer's houses related to the Farm Uitvlucht to the north. The map also shows that most of the land is under cultivation.

The 1953 topographical map indicates that there are ten settlements in the study area and several more near the boundary (fig. 8).

The desktop study suggests that the colonial occupation of the farm began in the early 1850s. The original farmhouse occurs in the Portion 1 to the north, while the study area appears to have been used by farm labourers. Late Iron Age and Stone Age sites will probably occur in the general area and predate the Colonial Period.

FIG. 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA



FIG. 6: LOCATION OF THE STUDY AREA IN 1852

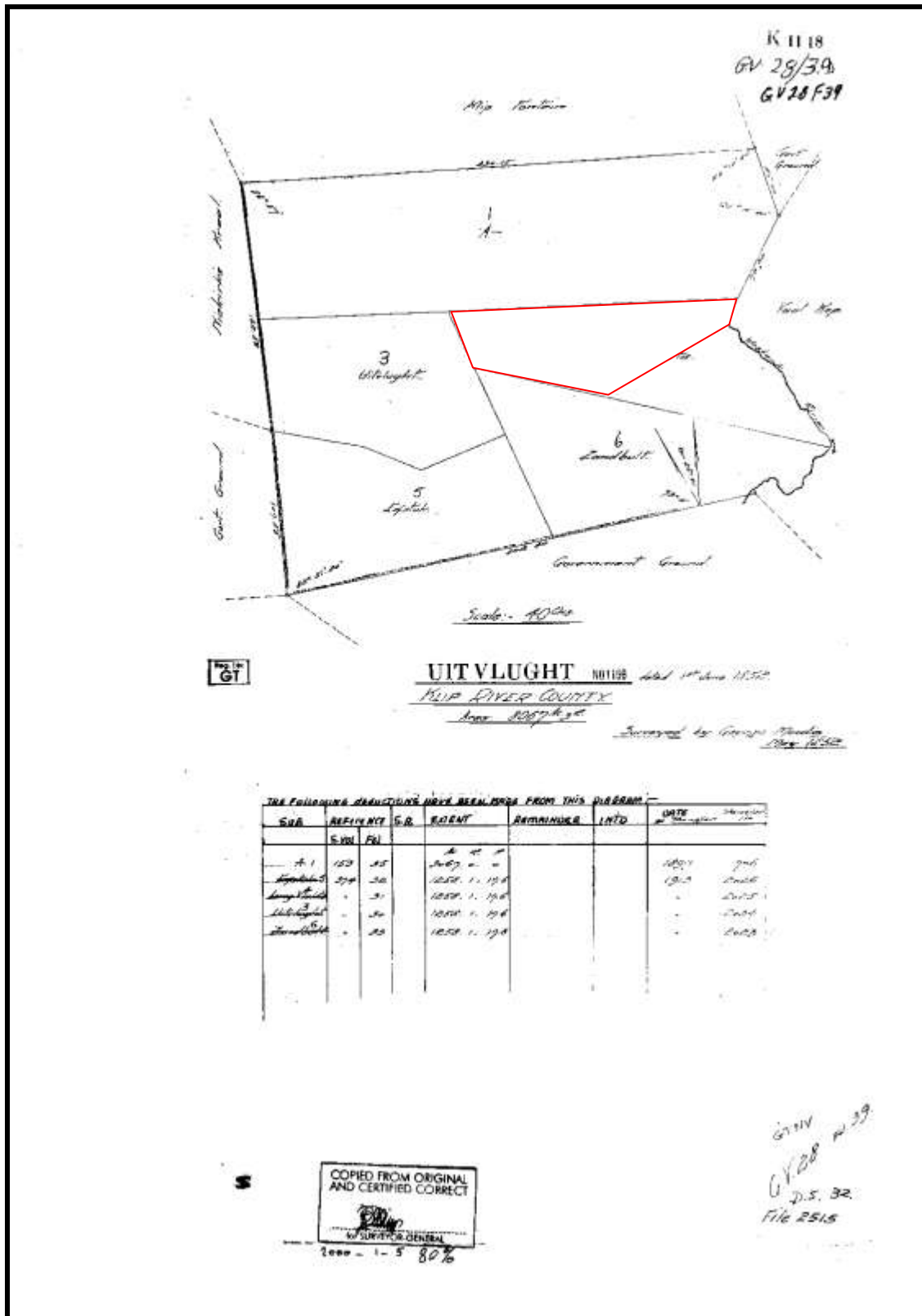
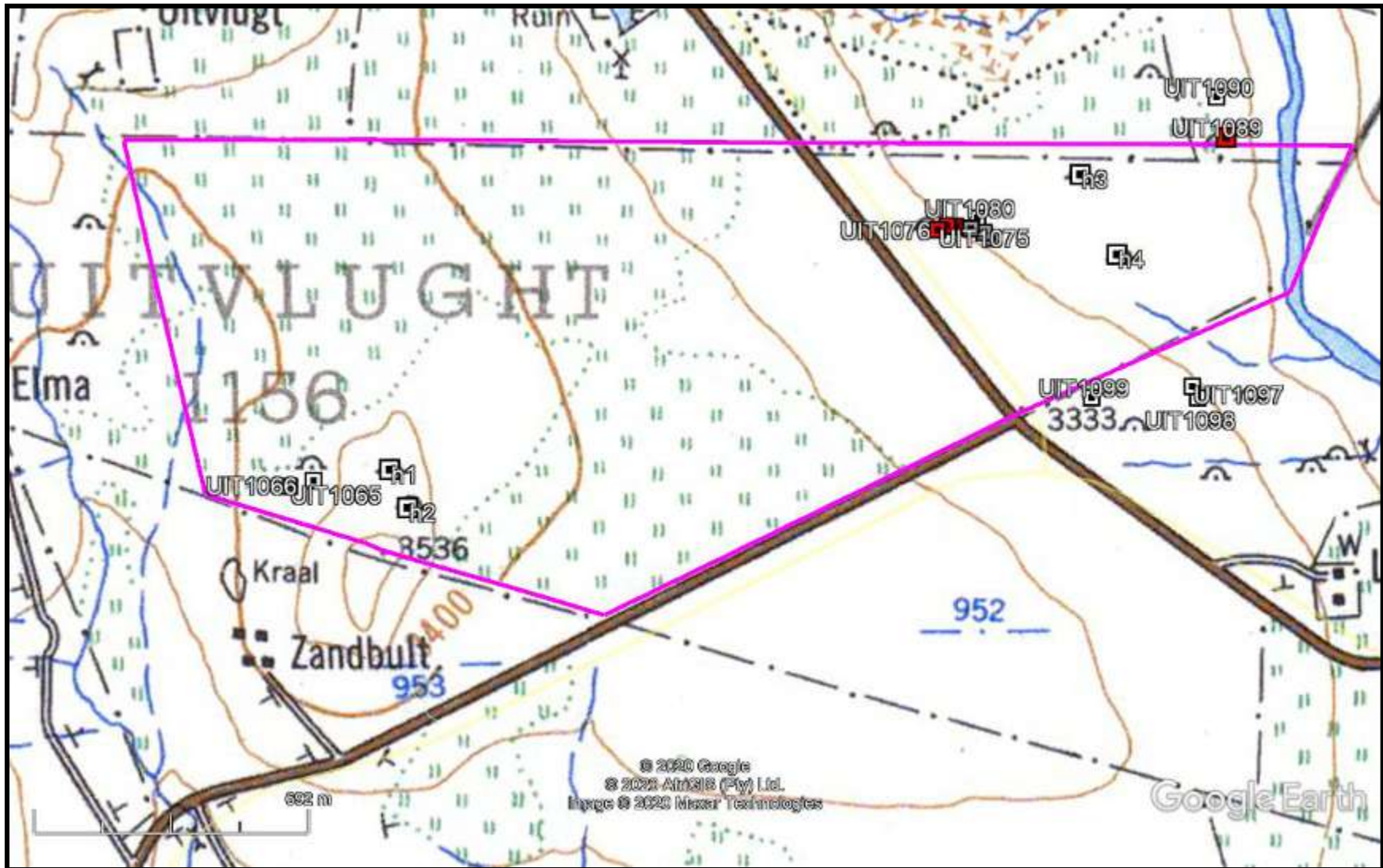


FIG. 7: LOCATION OF THE STUDY AREA IN 1938



FIG. 8: LOCATION OF THE STUDY AREA IN 1967

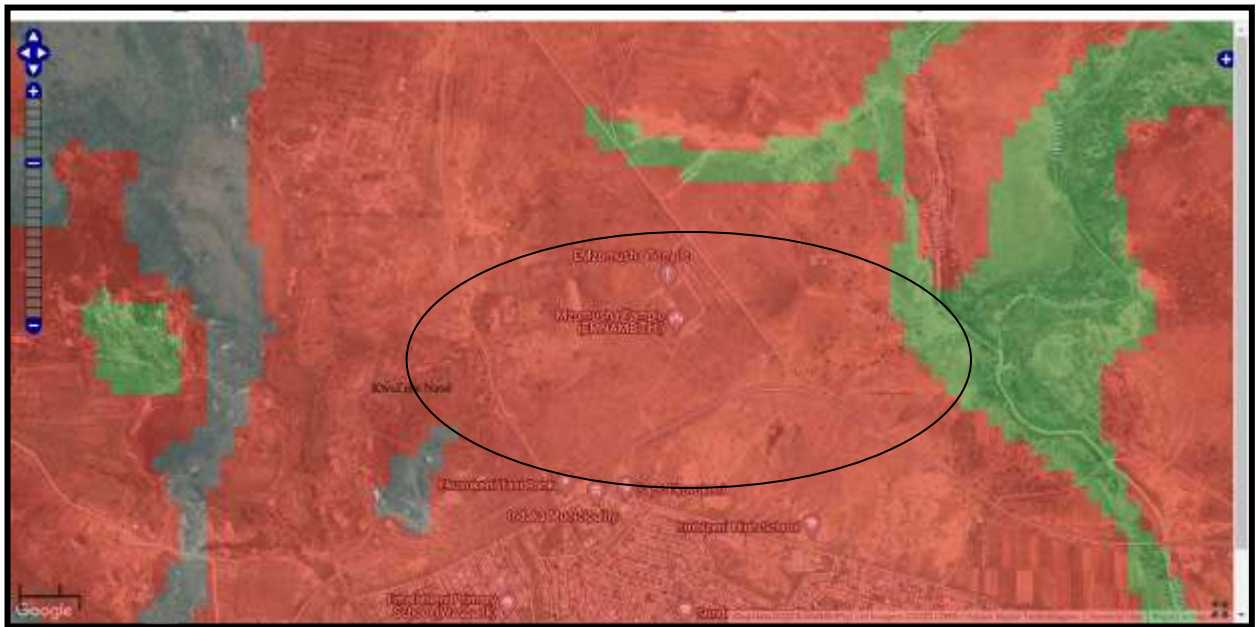


## PALAEONTOLOGICAL SENSITIVITY

The area is in an area of very high palaeontological sensitivity (fig. 9). A desktop PIA was undertaken by Dr Alan Smith (see Appendix A). He states “The SAHRIS Palaeosensitivity Map of the area (Fig. 4), which is based on the SA Council for Geosciences 1:250 000 map, indicated a “very high” sensitivity rating (red), owing to the fact that the Vryheid Formation is identified on site. This sandstone was originally deposited as a high energy deposit and unlikely to be fossiliferous. The siltstone and mudstone may contain trace fossils or botanical fossils. The botanical fossils are important for dating but are very common. Coal, if present, is totally comprised of botanical fossils. Again this is common. Vertebrate fossils are possible but these are exceedingly rare. The Masotcheni Formation is unlikely to be fossiliferous, but has a very low chance of including reworked (and probably damaged fossils). The Karoo Dolerite is an igneous intrusion and non-fossiliferous.

A “Chance Find Protocol” has been included to cater for unlikely events. No further Palaeontological Work required. “

FIG. 9: PALAEOLOGICAL 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.

## FIELD SURVEY

The field survey was undertaken on 21 October 2020. Ground visibility was very good as it was the end of spring and the grass was either burnt or very short. Along the western side of the study area, at the base of the hill are several existing settlements. Most of these settlements have graves within their yards (fig. 10). These were omitted from the study as they are not 'abandoned' graves, but part of a living settlement. These houses will probably be included in the service sites. UIT1000 is one of these grave sites.

For the purpose of this report any stone cairn in an oval shape, is considered to be a grave. For adults these are normally 2m long and 1m wide, but would vary according to the individual. It must be treated as a grave unless otherwise stated in the report or proven via PPP and/or excavation.

The location of the various recorded heritage sites are shown in fig. 11 and Table 2.

All graves are in an approximate east-west orientation. Most of the graves have some form of headstone but are not visibly marked. I do not move (fallen) headstones unless I have permission from a community. The headstones can be a square rock or a flattened stone at the end of one side of the grave. These may even be footstones and not headstones.

The four houses noted on the 1967 map could not be located. These areas must be treated as sensitive for potential human graves. Four of the houses from the 1937 aerial photograph were recorded.



FIG. 10: GRAVES WITHIN EXISTING SETTLEMENTS

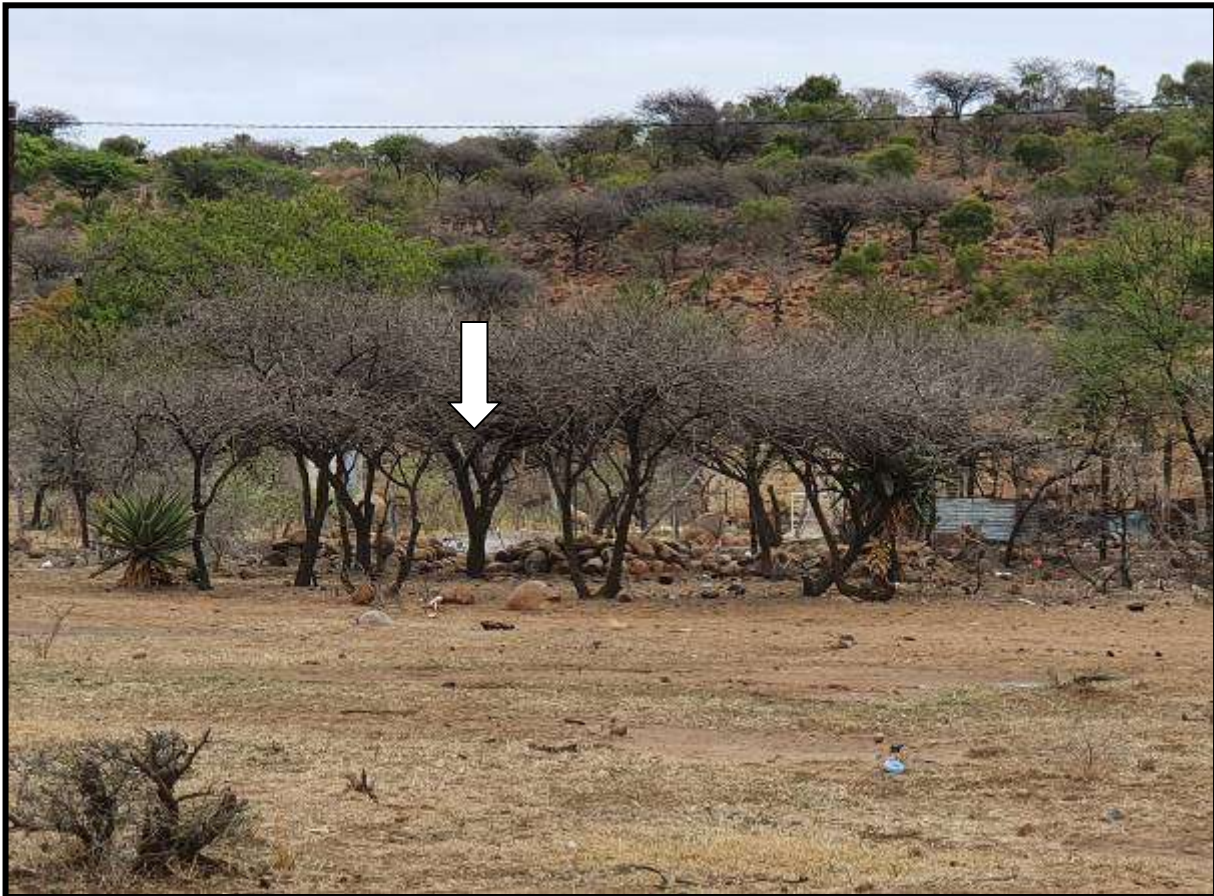
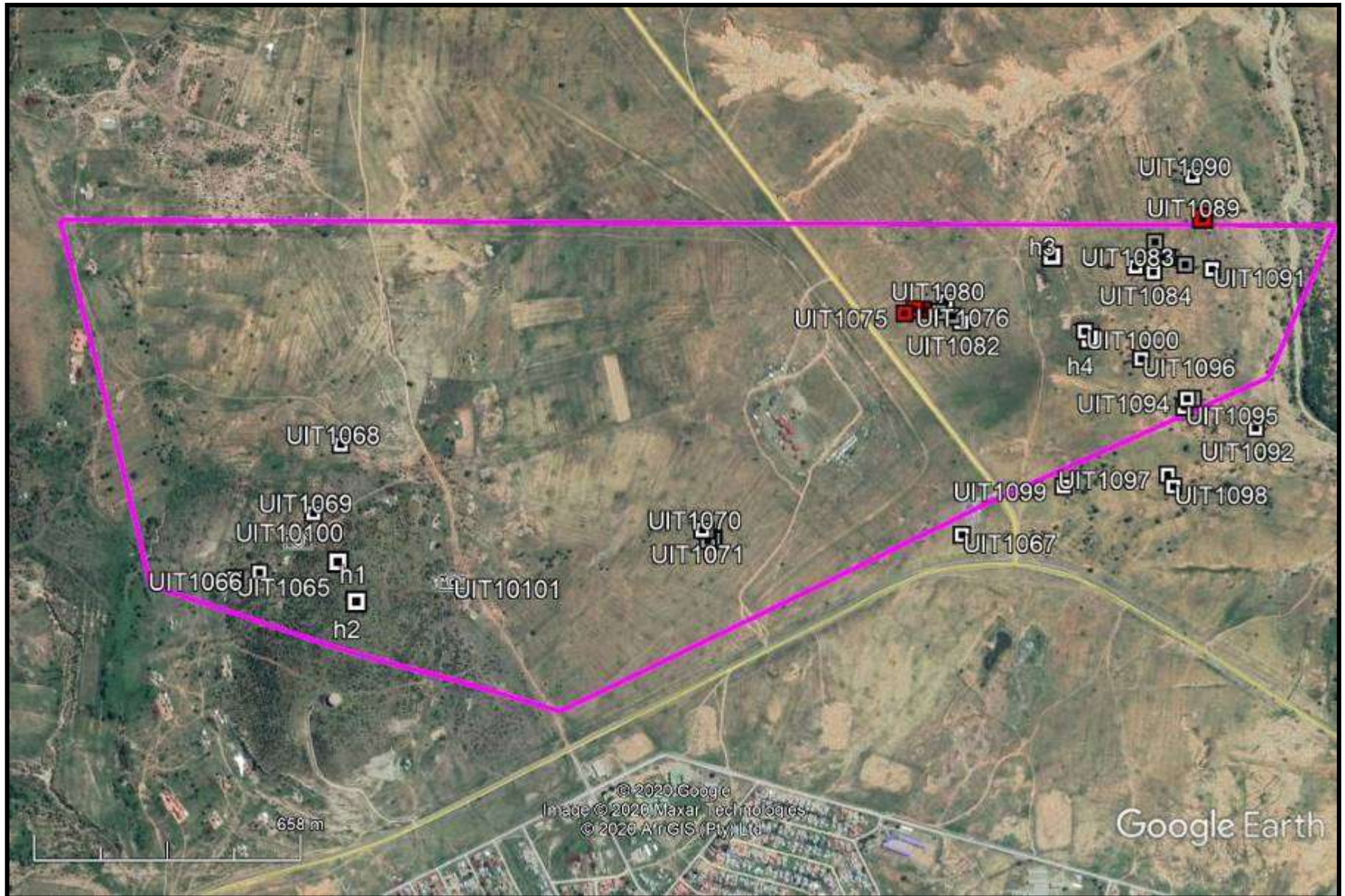


FIG 11: LOCATION OF RECORDED SITES



**UIT1065**

The site is a single grave with possible house foundations nearby (fig. 12).

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG.12: GRAVE AT UIT1065**



**UIT1066**

The site is a cemetery of 6+ graves surrounded by aloe trees and low walling (fig. 13).

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG.13: GRAVES AT UIT1066**



**UIT1067**

The site consists of two graves 15m from the electrical substation (fig. 14). There is no record of an HIA for this substation on SAHRIS.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 14: GRAVES AT UIT1067**



**UIT1068**

The site is a disturbed stone cairn (fig. 15). The outer rocks have been moved suggesting it is older than the other graves in the area.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 15: OLD GRAVE AT UIT1068**



**UIT1069**

The site consists of several stone cairns resembling graves surrounded by razor wire (fig. 16). The cairns are to be treated as human graves

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 16: GRAVES AT UIT1069**



## UIT1070

The site consists of a sunken grave. There are several graves in the nearby vicinity (UIY1070 – UIT1074) but they are treated separately. They might be from the same family.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 17: GRAVE AT UIT1070**





## UIT1071

The site consists of a single grave, while a possible grave might occur next to it (fig. 18). There are several graves in the nearby vicinity (UIY1070 – UIT1074) but they are treated separately. They might be from the same family.

A single upper grinding stone occurs near the grave.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 18: GRAVE & UPPER GRINDING STONE AT UIT1071**



**UIT1072**

The site consists of a grave that has had the upper stone layer moved around (fig. 19). There are several graves in the nearby vicinity (UIY1070 – UIT1074) but they are treated separately. They might be from the same family.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 19: GRAVE AT UIT1072**



**UIT1073**

The site consists of a single grave. There are several graves in the nearby vicinity (UIY1070 – UIT1074) but they are treated separately. They might be from the same family.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 20: GRAVE AT UIT1073**



**UIT1074**

The site consists of a sunken grave (fig. 21). There are several graves in the nearby vicinity (UIY1070 – UIT1074) but they are treated separately. They might be from the same family.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 21: GRAVE AT UIT1074**



**UIT1075**

The site consists of a single grave (fig. 22). The grave may be part of a cluster of graves from a single settlement however; they are too far apart to be treated together. These graves may predate 1937.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 22: GRAVE AT UIT1075**



## UIT1076

The site consists of a single circular house foundation with a stone cairn in the middle. (fig. 23). The cairn should be treated as a grave. This may be part of a cluster of graves from a single settlement however; they are too far apart to be treated together. These graves may predate 1937.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 23: GRAVE AT UIT1076**



## UIT1077

The site is a rectangular kraal in front UIT1076 (fig. 24). The kraal may be part of a cluster of features from a single settlement however; they are too far apart to be treated together. These graves may predate 1937.

Significance: The kraal is of low significance.

Mitigation: No mitigation is required.

SAHRA Rating: 3C

**FIG. 24: KRAAL AT UIT1077**



**UIT1078 & UIT1079**

UIT1078 is a rectangular kraal with an associated human grave labelled UIT1079 (fig. 25).

Significance: The grave is of high significance. The kraal is of high significance due to its association with the grave.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 25: GRAVE AT UIT1078**





**UIT1080**

The site is a single grave slightly larger than the other graves in the area (fig. 26).

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 26: GRAVE AT UIT1080**



**UIT1081**

The site consists of three graves next to each other (fig. 27).

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 27: GRAVE AT UIT1081**



**UIT1082**

The site consists of two graves next to each other, while three other graves occur a few meters to the west (fig. 28). This is a probably family. There are house foundations nearby.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 28: GRAVE AT UIT1082**



**UIT1083**

The site consists of two graves besides each other.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG .29: GRAVES AT UIT1083**



**UIT1084**

The site consists of three graves adjacent to each other (fig. 30).

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 30: GRAVES AT UIT1084**



**UIT1085**

The site consists of a grave (fig. 31). The grave has an *Acacia spp.* tree growing in the middle of it, while the other grave has a sisal plant on it.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 31: GRAVE AT UIT1085**



**UIT1086**

The site consists of a single grave with a sisal plant growing on it (fig. 32).

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 32: GRAVES AT UIT1086**



**UIT1087**

The site consists of two graves adjacent to each other.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 33: GRAVES AT UIT1087**





**UIT1088**

This feature is not a grave, but was recorded to illustrate how sometimes other features can look like graves (fig. 34). The feature is a large circle of stone with sand in the middle. This is often used to store sand when building houses.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 34: FEATURE AT UIT1088**



**UIT1089**

The site is just outside of the study area but within 100m. The site consists of the foundations of a house (fig. 35). These foundations may predate 1937.

Significance: The foundations are of low significance.

Mitigation: No further mitigation is required.

SAHRA Rating: 3C

**FIG. 35: FOUNDATIONS AT UIT1089**



## **UIT1090**

The site consists of an abandoned settlement(s) and at least thirteen graves at various parts of the settlement (fig. 36). The site is 120m outside of the study area; however, it is close enough to be affected by the development.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

FIG. 36: GRAVES & FOUNDATIONS AT UIT1090



## UIT1091

The site consists of the remains of house foundations (fig. 37). No graves were noted in direct association with this site.

Significance: The foundations are of low significance.

Mitigation: No further mitigation is required.

SAHRA Rating: 3A

**FIG. 37: FOUNDATIONS AT UIT1091**



**UIT1092**

The site consists of a single grave 100m outside of the study area (fig. 38).

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 38: GRAVE AT UIT1092**



### **UIT1093 – UIT1095**

The site consists of a number of house foundations and single graves in a 50m radius. It is not possible to associate a specific grave with a house and I have thus collated them into one site. Table 2 will have the individual grave co-ordinates. Fig. 39 shows various features.

There are at least four graves and three house foundations.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

FIG. 39: SELECTED FEATURES AT UIT1093 - 1095





## UIT1096

The site consists of two sets of graves near each other (fig. 40). The one set of graves are three graves. The other set of graves are 8m to the northeast and consists of the outline of four rectangular graves.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 40: GRAVES AT UIT1096**



**UIT1097**

The site occurs 100m – 160m south of the study area. The site consists of three groups of graves near each other (fig. 41). The one group has three graves, while the other two have single graves.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed if affected.

SAHRA Rating: 3A

**FIG. 41: GRAVES AT UIT1097**



**UIT1098**

The site consists of two graves adjacent to each other (fig. 42)

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 42: GRAVES AT UIT1098**



**UIT1099**

The site consists of two graves adjacent to each other. The graves are 35m outside of the study area and may be affected by the development.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG.43: GRAVES AT UIT1099**



**UIT10000**

The site is an old *Euphorbia ingens* (fig. 44). These Euphorbia species are usually associated with human graves in the more traditional burials. That is a sapling would be planted on a grave, and then when the tree is much older it will be surrounded by a ring of stones. The older trees should be treated as graves, as all cairns are.

Significance: The grave is of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG.44: GRAVE AT UIT10000**



**UIT10001**

The site consists of several stone cairns and house foundations (fig. 45). The cairns should be treated as a grave.

Significance: The graves are of high significance.

Mitigation: Protocols relating to human graves are to be followed.

SAHRA Rating: 3A

**FIG. 45: GRAVES AT UIT10001**



## STONE AGE MATERIAL

Isolated stone tools from the Middle and Late Stone Ages occur sparsely on the site. These are more visible in the erosion gullies and sand winnowing areas. Fig. 46 shows such an area and a unifacial point (a type of spear point) from the Middle Stone Age

**FIG. 45: MIDDLE STONE AGE HORIZON AND TOOL**



FIG. 46: LOCATION OF RECORDED FINDS

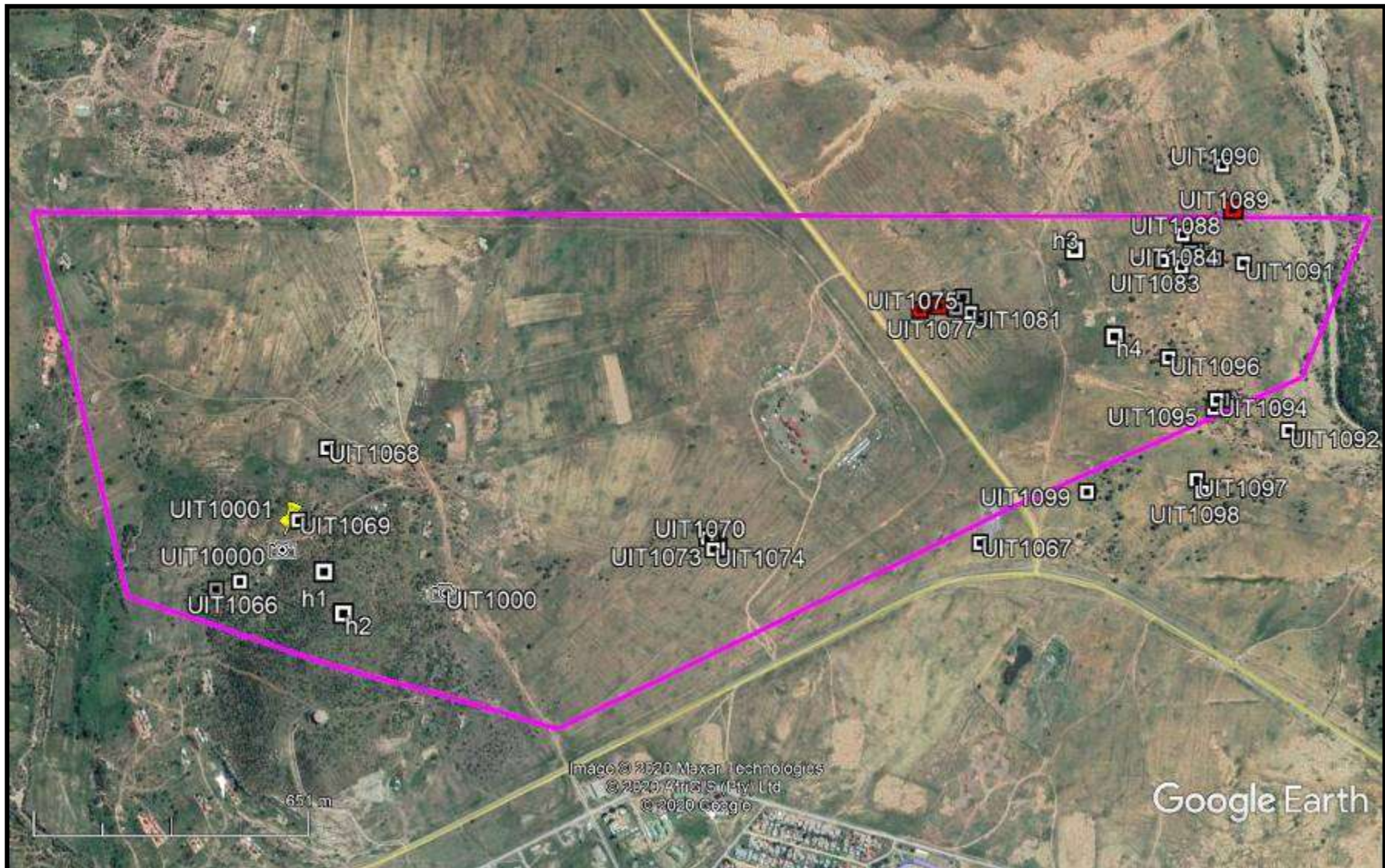




TABLE 2: LOCATION AND SIGNIFICANCE OF RECORDED SITES.

NAME	LATITUDE	LONGITUDE	DESC	Significance	Requires mitigation
MSA	-28.453077461	30.168069154	MSA tools	Low	No
h1	-28.456402895	30.146720957	House	1967 map: not locate	Mark as sensitive area
h2	-28.457255007	30.147199427	House	1967 map: not locate	Mark as sensitive area
h3	-28.449694689	30.164517583	House	1967 map: not locate	Mark as sensitive area
h4	-28.451514707	30.165473391	House	1967 map: not locate	Mark as sensitive area
UIT1000	-28.456890765	30.149512766	Graves	High	Grave protocol
UIT10000	-28.455704405	30.145711599	Euphorbia ingens/ Grave	High	Grave protocol
UIT10001	-28.455993001	30.145669001	Graves and foundations	High	Grave protocol
UIT1065	-28.456792000	30.144083000	Grave	High	Grave protocol
UIT1066	-28.456632393	30.144666881	Graves with aloes	High	Grave protocol
UIT1067	-28.455842000	30.162224000	2 graves	High	Grave protocol
UIT1068	-28.453858000	30.146737000	old grave	High	Grave protocol
UIT1069	-28.455356000	30.146057000	2 graves	High	Grave protocol
UIT1070	-28.455729000	30.155730000	Grave	High	Grave protocol
UIT1071	-28.455741000	30.155815000	2 graves	High	Grave protocol
UIT1072	-28.455896000	30.156013000	Grave	High	Grave protocol
UIT1073	-28.455950000	30.155986111	Grave	High	Grave protocol
UIT1074	-28.455968000	30.155868000	Grave	High	Grave protocol
UIT1075	-28.450969000	30.160802000	Grave	High	Grave protocol
UIT1076	-28.450872000	30.161049000	1 grave on house foundation	High	Grave protocol
UIT1077	-28.450890000	30.161268000	Kraal	Low	None
UIT1078	-28.450931000	30.161663000	Kraal	Low	None
UIT1079	-28.450937000	30.161664000	Grave	High	Grave protocol
UIT1080	-28.450700000	30.161835000	Grave	High	Grave protocol

<b>UIT1081</b>	-28.451028000	30.162007000	3 Graves	High	Grave protocol
<b>UIT1082</b>	-28.451160000	30.162228000	5 Graves and house foundations	High	Grave protocol
<b>UIT1083</b>	-28.449924000	30.166625000	2 Graves	High	Grave protocol
<b>UIT1084</b>	-28.450045000	30.167081000	3 Graves	High	Grave protocol
<b>UIT1085</b>	-28.449738000	30.167303000	Grave	High	Grave protocol
<b>UIT1086</b>	-28.449716000	30.167430000	Grave	High	Grave protocol
<b>UIT1087</b>	-28.449877000	30.167887000	2 Graves	High	Grave protocol
<b>UIT1088</b>	-28.449376000	30.167122000	Sand feature	Low	None
<b>UIT1089</b>	-28.448831000	30.168345000	Foundations	Low	None
<b>UIT1090</b>	-28.447908000	30.168091000	13 Graves	High	Grave protocol
<b>UIT1091</b>	-28.449973000	30.168576000	Foundations	Low	None
<b>UIT1092</b>	-28.453495000	30.169691000	Grave	High	Grave protocol
<b>UIT1093</b>	-28.452839000	30.168089000	4 graves and foundations	High	Grave protocol
<b>UIT1094</b>	-28.452840000	30.167946000	Grave	High	Grave protocol
<b>UIT1095</b>	-28.453023000	30.167879000	Grave and foundations	High	Grave protocol
<b>UIT1096</b>	-28.451964000	30.166773000	7 Graves	High	Grave protocol
<b>UIT1097</b>	-28.454523000	30.167455000	5 Graves	High	Grave protocol
<b>UIT1098</b>	-28.454783000	30.167598000	2 Graves	High	Grave protocol
<b>UIT1099</b>	-28.454781000	30.164796000	2 Graves	High	Grave protocol

## MANAGEMENT PLAN

Each grave is required to have a 20m buffer between it and the development. These buffers need to be clearly marked preferably with fencing if there will be high development. These buffers are no-go areas and the development needs to consider the impact it will have on the overall graves. Grave relocation is an option. Grave relocation is however a lengthy and expensive process.

### GRAVES

The developer must follow the guidelines mentioned below otherwise the project may be brought to halt.

The process of grave removals is a complex one that requires community consultation, advertisements, several permits, and finally reburial. Moreover, those graves older than 60 years require a qualified archaeologists to undertake the entire process. This process is summarised as follows<sup>1</sup>:

In terms of the National Heritage Resources Act (No. 25 of 1999), and KZN Amafa and Research Institute Act 5 of 2018, graves older than 60 years (not in a municipal graveyard) are protected. Human remains younger than 60 years should be handled only by a registered undertaker or an institution declared under the Human Tissues Act. Anyone who wishes to develop an area where there are graves older than 60 years is required to follow the process described in the legislation (section 36 and associated regulations). The specialist will require a permit from the heritage resources authority:

- Determine/ confirm the presence of the graves on the property. Normally the quickest way to proceed is to obtain the service of a professional archaeologist accredited to undertake burial relocations. The archaeologist

---

<sup>1</sup> Information supplied by SAHRA, and it applies to KZN, although falling under the KZN Heritage Act.

will provide an estimate of the age of the graves. There may be a need for archival research and possibly test excavations (permit required).

- The preferred decision is to move the development so that the graves may remain undisturbed. If this is done, the developer must satisfy SAHRA/KZN Heritage that adequate arrangements have been made to protect the graves on site from the impact of the development. This usually involves fencing the grave(yard) and setting up a small site management plan indicating who will be responsible for maintaining the graves and how this is legally tied into the development. It is recommended that a distance of 10-20 m is left undisturbed between the grave and the fence around the graves.

- If the developer wishes to relocate or disturb the graves:
  - A 60-day public participation (social consultation) process as required by section 36 (and regulations - see attachment), must be undertaken to identify any direct descendants of those buried on the property. This allows for a period of consultation with any family members or community to ascertain what their wishes are for the burials. It involves notices to the public on site and through representative media. This may be done by the archaeologist, who can explain the process, but for large or sensitive sites, a social consultant should be employed. Archaeologists often work with undertakers, who rebury the human remains.
  - If as a result of the public participation, the family (where descendants are identified) or the community agree to the relocation process then the graves may be relocated.
  - The archaeologist must submit a permit application to SAHRA/KZN Heritage for the disinterment of the burials. This must include written approval of the descendants or, if there has not been success in identifying direct descendants, written documentation of the social consultation process, which must indicate to SAHRA's satisfaction, the efforts that have been made to locate them. It must also include details of the exhumation process and the place to which the burials are to be relocated. (There are regulations regarding creating new cemeteries and so this usually means that relocation must be to an established communal rural or formal municipal cemetery.)

- Permission must be obtained before exhumation takes place from the landowner where the graves are located, and from the owners/managers of the graveyard to which the remains will be relocated.
- Other relevant legislation must be complied with, including the Human Tissues Act (National Department of Health) and any ordinances of the Provincial Department of Health). The archaeologist can usually advise about this.

To remove a human grave from an archaeological site requires a permit from KZAN Amafa. This will only be given to a qualified archaeologist who has experience in removing human remains. These sites tend to be older than 100 years and there are few direct claims to the remains. Direct claims tend to occur to with known historical people only. However, communities may claim ancestral remains in general if the remains are to be removed. These claims will need to be lodged with Amafa KZN.

The development may need to remove the more central graves.

## CONCLUSION

A heritage impact assessment was undertaken for the proposed Ekuvukeni B Service Site project, Ward 33. The project intends to develop 500 sites and a shopping centre. Much of the land has been under cultivation for decades. In more recent times, some of the area has been used for domestic houses. Most of the existing houses occur around the base of the dolerite hill and these tend to have graves. There are several abandoned houses that are now just ruins and/or foundations. Most of these have human graves. There are thirty-three (33) groups of human graves. These groups consist of 1 – 7 human graves, although most are in groups of two.

The human graves require a 20m buffer around the edge of each grave, and these would need to be physically demarcated with fencing, due to the nature of the development. No development activity may occur within these 20m. These graves will affect the development. Most of the graves occur on the eastern and

western parts of the study area, with a few in a well-defined area in the central part.

Grave relocation is an option, but it will require a full Public Participation Process focusing specifically on human graves. Some of the graves are older than 60 years in age and would require an archaeologists on site.

## REFERENCES

### Maps

2830AC 1966, 1981 Wasbank

GV28f39

66\_031\_00952 - 66\_031\_00954

### Database

KZN Museum Database

SAHRA Database

Umlando Database

### Literature


Anderson, G. 2015. Survey Of The Ekuvukeni Shopping Centre, KwaZulu-Natal. For Triplo4

### **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 'Gavin Anderson', with a horizontal line underneath.

Gavin Anderson  
Archaeologist/Heritage Impact Assessor

**APPENDIX A**  
**PALAEONTOLOGICAL DESKTOP STUDY**



**EKUKUVENI LOW-COST HOUSING: DESK-TOP  
PALAEOLOGY REPORT:**

**FOR**

**UMLANDO: Archaeological Surveys & Heritage Management**

**PO Box 102532, Meerensee, KwaZulu-Natal 3901**

**phone (035)7531785**

**cell: 0836585362 / 0723481327**

**Email:umlando@gmail.com**

**by**

**Dr Alan Smith**

**Alan Smith Consulting**

29 Browns Grove, Sherwood, Durban, 4091, South Africa

Telephone: 031 208 6896

[asconsulting@telkomsa.net](mailto:asconsulting@telkomsa.net)

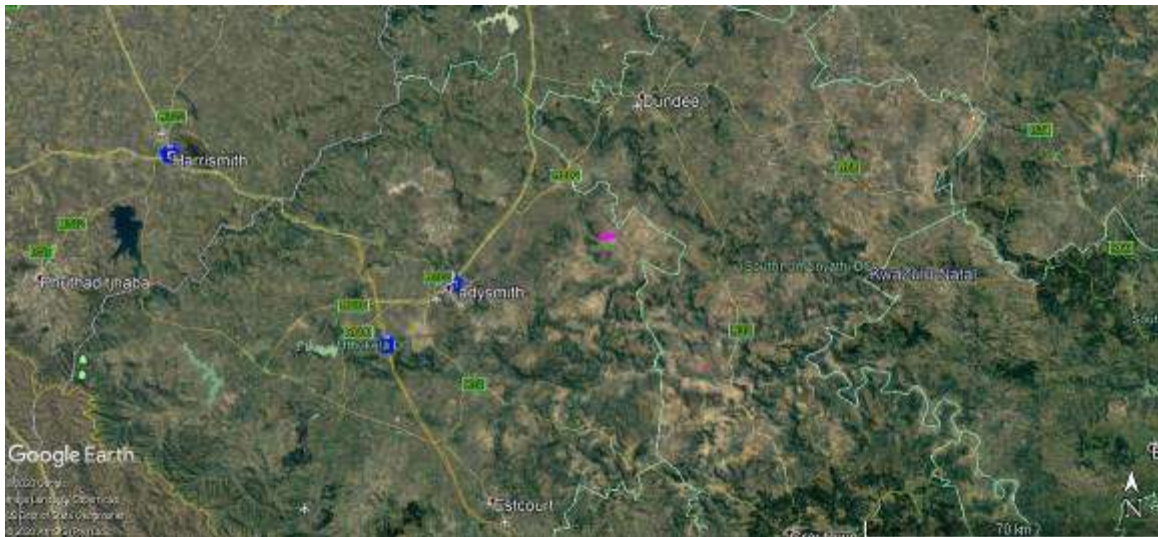
**4 November 2020**

## EXECUTIVE SUMMARY

The chances of a **Significant Paleaeo Material Find** is low but not zero. A “Chance Find Protocol” has been inserted in case of a chance find. No further **Palaeontological Work** is required.

## 1.BACKGROUND AND PROPOSED PROJECT

The Alfred Duma Local Municipality has through the IDP process identified the need to develop a Township Establishment that will provide 500 Serviced Residential Stands/sites including a shopping centre/ mall) and other additional sites (44 stands) that will cater for a variety of land uses including commercial, recreational, health, social and community facilities as part of the Integrated Residential Development Programme (IRDP) (previously known as the Project Linked Subsidy) within its area of jurisdiction to ensure a holistic and sustainable community. Such a process was initiated as a means to address the Municipality's housing backlog and as a matter of urgency in order to facilitate the process of giving people security of tenure (title deeds) through creating integrated and sustainable human settlements that will improve the living conditions and quality of life in its rural communities.



*Figure 1: Location map source Google Earth).*

This is not an ordinary Housing Project, but it is a Ministerial Priority Project. As a first step in the realization of this objective, the municipality has with the assistance and guidance of the Department of Human Settlement proceeded to advertise and procure the services of suitably qualified/experienced Project Managers (PM's), Implementing Agents (IA's) and Professional Services Providers in terms of their preferential procurement policy. The purpose of which was to assist Council with planning activities and servicing of 500 residential sites including a shopping centre/ mall and other additional sites (stands) for a variety of land uses as part of the Ekuvukeni B Phase 1 Serviced Sites Project within Ward 33 of the Alfred Duma Local Municipality. Council has subsequently appointed Siyathuthu Developments CC trading as Inzuzo YeSizwe Development Consultants during June 2019 to act as a qualified/experienced Project Manager (PM), Implementing Agent and Professional Service Provider of the Ekuvukeni B Serviced Sites Project, which is geographically located within Ward 33 of the Alfred Duma Local Municipality within the Uthukela District Municipality in the KwaZulu Natal Province.

## 2. GEOLOGY

Perusal of the Dundee (2830) 1: 250 000 geological map (Fig. 2) indicated that there should be Vryheid Formation sandstone and Karoo Dolerite at this locality.



**Figure 2: Extract from the Dundee 2830 1: 250 000 scale Geological Map. Red is dolerite, brown is the Vryheid Formation and orange the Masotcheni Formation.**

The Vryheid Formation is the central part of the Upper Permian Ecca Group (Fig. 2). The total duration of the Vryheid Formation was from ~290 Ma to 265 Ma (Hastie et al., 2019). The Vryheid Formation is a fluvio-deltaic sequence deposited in the northeastern extremity of the Karoo Basin (Ryan, 1967). It was formed by rivers flowing into the Karoo Sea (Fig. 3). In addition to sandstone there could be silt, mudstone or thin coal seams. The Masotcheni Formation comprises a basal boulder bed with yellow-brown sandy clay.



***Figure 3: Example of what the Vryheid Formation looks like. Here a river channel is cutting down into interchannel sediment.***

The dolerite is part of the Karoo Large Igneous Province, which is Lower Jurassic in age (about 183 million years)(Hastie et al., 2014).

### 3. PALAEOLOGY

The SAHRIS Palaeosensitivity Map of the area (Fig. 4), which is based on the SA Council for Geosciences 1:250 000 map, indicated a “very high” sensitivity rating (red), owing to the fact that the Vryheid Formation is identified on site. This sandstone was originally deposited as a high energy deposit and unlikely to be fossiliferous. The siltstone and mudstone may contain trace fossils or botanical fossils. The botanical fossils are important for dating but are very common. Coal, if present, is totally comprised of botanical fossils. Again this is common. Vertebrate fossils are possible but these are exceedingly rare. The Masotcheni Formation is unlikely to be fossiliferous, but has a very low chance of including reworked (and probably damaged fossils). The Karoo Dolerite is an igneous intrusion and non-fossiliferous.

A “Chance Find Protocol” has been included to cater for unlikely events. No further Palaeontological Work required.



**Figure 4:** Extract from SAHRIS Palaeosensitivity Map (<https://sahris.sahra.org.za/map/palaeo>). Areas shaded red are assigned a “very high” sensitivity rating (in this case due to the geological map indicating Vryheid Fm), orange is “high” (in this case Quaternary Masotcheni Fm), while grey is “insignificant/zero (in this case dolerite),

#### 4. CHANCE FIND PROTOCOL

As this site includes areas flagged red on the SAHRIS Palaeosensitivity Map (Fig. 3), a “Chance Find Protocol” is **Recommended**.

In the case of any unusual finds, 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, 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.

## 5. CONCLUSIONS

Significant **Palaeontological Material** is unlikely to be encountered. Although the chances are low they are not zero, consequently a “Chance Find Protocol” has been inserted.

## 6. REFERENCES

Dundee (2830) 1: 250 000 geological map, Council for Geosciences, Pretoria.

Hastie, WW; Watkeys, MK; Aubourg, C (2014). Magma flow in dyke swarms of the Karoo LIP: Implications for the mantle plume hypothesis. *Gondwana Research* 25 (2014) 736–755.

Hastie, W.W., Watkeys, M.K., Smith, A.M. (2019). Tectonic significance of the sedimentary and palaeocurrent record at the eastern edge of the Karoo Basin, *Journal of African Earth Sciences*, 158, 103543.

<https://sahris.sahra.org.za/map/palaeo>

Ryan, P.J., 1967. Stratigraphic and Palaeocurrent Analysis of the Ecca and Lowermost Beaufort Beds in the Karoo Basin of South Africa. PhD Thesis (unpubl.). University of the Witwatersrand, Johannesburg 210 pp.



## 7. 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 more than 50 journal articles with 360 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.
- 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.