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22 April 2016

Proposed Smozomeni Road upgrade

The Proponent is seeking to rehabilitate a 4.3 km segment of the Smozomeni Road (GPS Coordinates – Start: 29°54'42.51"S; 30°13'19.53"E; End: 29°53'50.64"S; 30°14'42.52"E), which is in a state of disrepair as the existing road surface continues to fail. The maintenance of this road is critical to the effective delivery of services to more than 4,000 households, situated in Richmond, KwaZulu-Natal. The project will involve the subsurface layer works preparations and subsequent re-taring of the road. Certain culverts will also be upgraded as part of the rehabilitation project.

Umlando surveyed the ePhateni water pipeline in 2012 (see appendix A). The pipeline runs adjacent to the road in several places, and the road was driven (and surveyed) for the pipeline. This is shown in figure 1.

Only one site is located near the road upgrade: EPA02. This site is a cemetery in the one corner and is unlikely to be affected (see fig. 2). The cemetery does need to be demarcated before road construction.

The road is an area of moderate palaeontological sensitivity. However, this is a road upgrade with minimal subsurface activity. The road upgrade will thus not affect any possible palaeontological sites.

I would support the notion that no further HIA work is required in relation to the road upgrade. The Smozomeni Road upgrade should be exempt from further HIA studies.

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Fig. 1: Location Of Known Heritage Sites¹



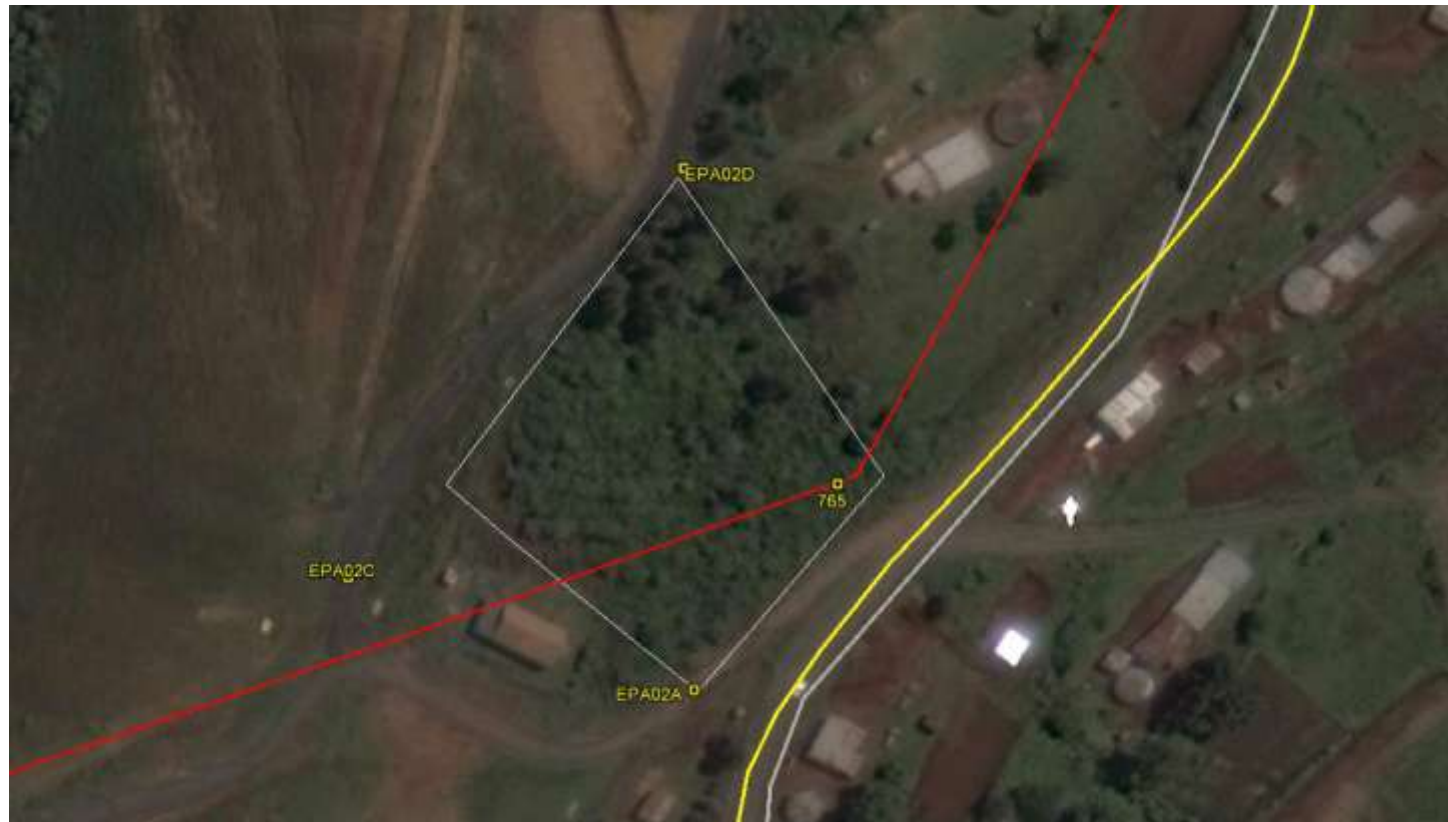
¹ Red = pipeline; yellow = road upgrade

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Fig. 2: Location Of Cemetery²



² Red = pipeline; yellow = road upgrade

Yours Sincerely

A handwritten signature in black ink, appearing to read "Gavin Anderson". The signature is stylized with a large, looped initial "G" and "A".

Gavin Anderson

**APPENDIX A
EPHATENI WATER PIPELINE**

**HERITAGE SURVEY OF THE PROPOSED EPHATHENI
REGIONAL WATER SUPPLY SCHEME, KWA-ZULU
NATAL**

FOR B'UKINDALO CONSULTANCY

DATE: 12 FEBRUARY 2012

By Gavin Anderson

**Umlando: Archaeological Tourism and Resource
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INTRODUCTION

Umlando was contracted by Bukindalo Consultancy to undertake the heritage survey of the proposed Ephatheni Water Supply Scheme, KwaZulu-Natal. The Umgungundlovu District Municipality intends to upgrade the existing Ephatheni Water Supply Scheme within the Richmond Local Municipality. The project area will include the Endaleni township and the Ephatheni and Esimozomeni tribal areas. Land within the project area, with the exception of a portion of Endaleni township, which falls under the jurisdiction of Richmond Municipality, belongs to the Ingonyama Trust and permission must be obtained from them to proceed with this development. The project area lies to the south west of Richmond and is accessed by travelling south from Richmond on the R56 main road between Pietermaritzburg and Ixopo, and then turning right onto the D59 district road, which leads to the Ephatheni area. Alternatively, Ephatheni can be accessed by travelling south from Richmond through Endaleni and Esimozomeni townships, over a distance of approximately 15km (fig. 1).

According to the BID, the impacts will be as follows:

- “The Pump Station at the Richmond Water Treatment Works will be upgraded by the replacement of pumps and other associated infrastructure.
- Water will be pumped through an existing pipeline to a new 1000m³ concrete reservoir to be constructed next to the two existing reservoirs in Endaleni township.
- A 200mm diameter uPVC / HDPE pipeline will be constructed from the new reservoir to a second 1000m³ concrete reservoir, which will be constructed just outside Ephatheni.
- The 200mm diameter pipeline will be continued from the second new reservoir into Ephatheni. It will be reduced to a 110mm diameter uPVC pipeline over the final distance of approximately one kilometre. The

total distance of this main water supply pipeline will be approximately 8.5km.

➤ Construction of 50mm to 75mm diameter uPVC / HDPE reticulation pipelines, covering a total distance of approximately 25km, will lead off the 200mm / 110mm diameter uPVC / HDPE pipeline to stand pipes in the vicinity of homesteads.

➤ Steel pipes will replace uPVC / HDPE pipes at stream crossing sites. The steel pipes will be encased in concrete within the trench in the stream bed. The necessary mitigations will be introduced to minimize impacts.

➤ Trenches will be on average 0.7m wide and 1.3m deep.

The route of the main water supply pipeline will be mainly over steeply undulating hillsides and drainage lines. Reticulation pipelines will mainly follow ridges and the higher lying areas to standpipes in the vicinity of homesteads.

The project area forms part of the Ngongoni veld vegetation Biome, which is characterized by a dense grassland dominated by the grass *Aristida junciformis*. Other common grasses are *Bothriochloa insculpta*, *Eragrostis curvula*, *Hyparrhenia hirta*, *Themeda triandra* and *Panicum maximum*. Trees are scattered throughout this grassland ecosystem and tree clumps are often associated with termite mounds. The following trees are commonly encountered: *Acacia natalitia*, *A. Nilotica*, *A. Sieberiana*, *Cussonia spicata*, *Ziziphus mucronata*, *Cordia rudis* and *Ehretia rigida*.

The project area has been mostly transformed due to overgrazing by livestock and subsistence farming. Very few trees now remain in the area, but no significantly eroded areas were noted during the inspection. Homestead development can be regarded as being of low to medium density. Subsistence farming in the area includes cattle, goats, Umadumbe's, vegetables and maize.

Pipelines will pass through a number of homestead properties and care will be taken to minimize impacts on access roads, fence lines and agricultural crops. If need be home owners will be remunerated by Umgungundlovu Municipality for any damages incurred.

In the initial stages, over the first few kilometres, the main water supply pipeline will traverse through a few scattered clumps of indigenous trees, but this will not result in the removal of or major damage to any of the trees. Trenches will be excavated by hand using local labour. On occasions tree roots will have to be cut away from the trench line, but this will not result in any significant impacts on the trees. Most of the distance traversed by the main water supply pipeline will be through grassland, either next to existing district roads or close to them (i.e within 30m).

Pollution and erosion caused by storm water runoff will be minimized by the use of sandbag berms and other engineering structures on bare areas, next to soil stockpiles and construction sites. These areas will be hydro seeded with indigenous grass seeds and further rehabilitation will be carried out where necessary after completion of the construction phase of the project. Stream and river crossing sites will be rehabilitated once the steel pipes have been encased in concrete in the trench in the stream bed. The stream bed and banks will be re-formed to the original profiles and the necessary rehabilitation carried out. The small dimensions of the trench lines (see earlier) and the use of coffer dams and sandbag bunds will mean that it will be possible to minimize environmental impacts” (Bukindalo BID 2011).

The survey located six heritage sites. These sites ranged from human graves to an historical house. Forty settlements were identified from 1937 aerial photographs and 1968 topographical maps as occurring near the line.

FIG. 1 GENERAL LOCATION OF THE PROPOSED MFINIZO LINE

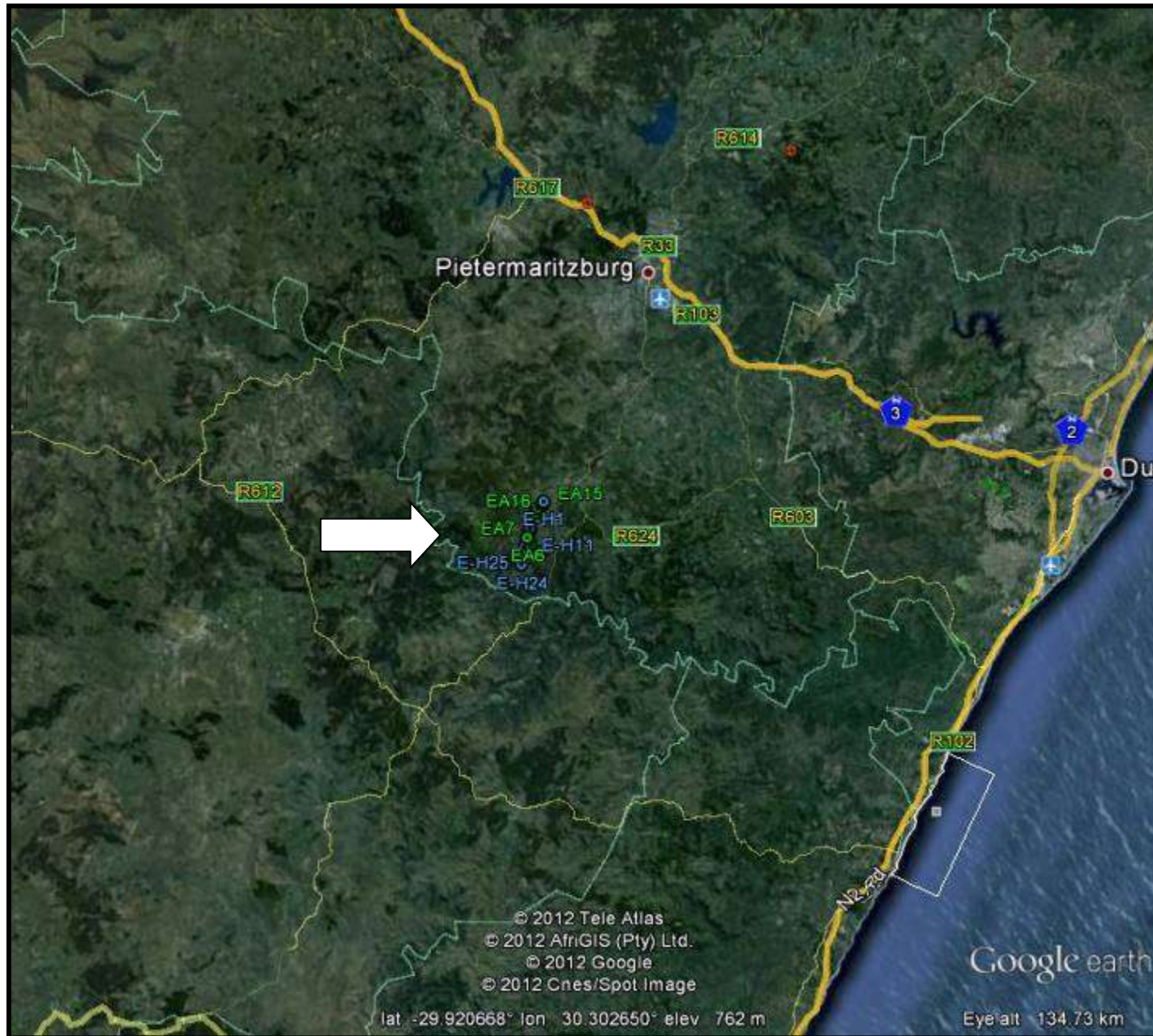


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED MFINIZO LINE

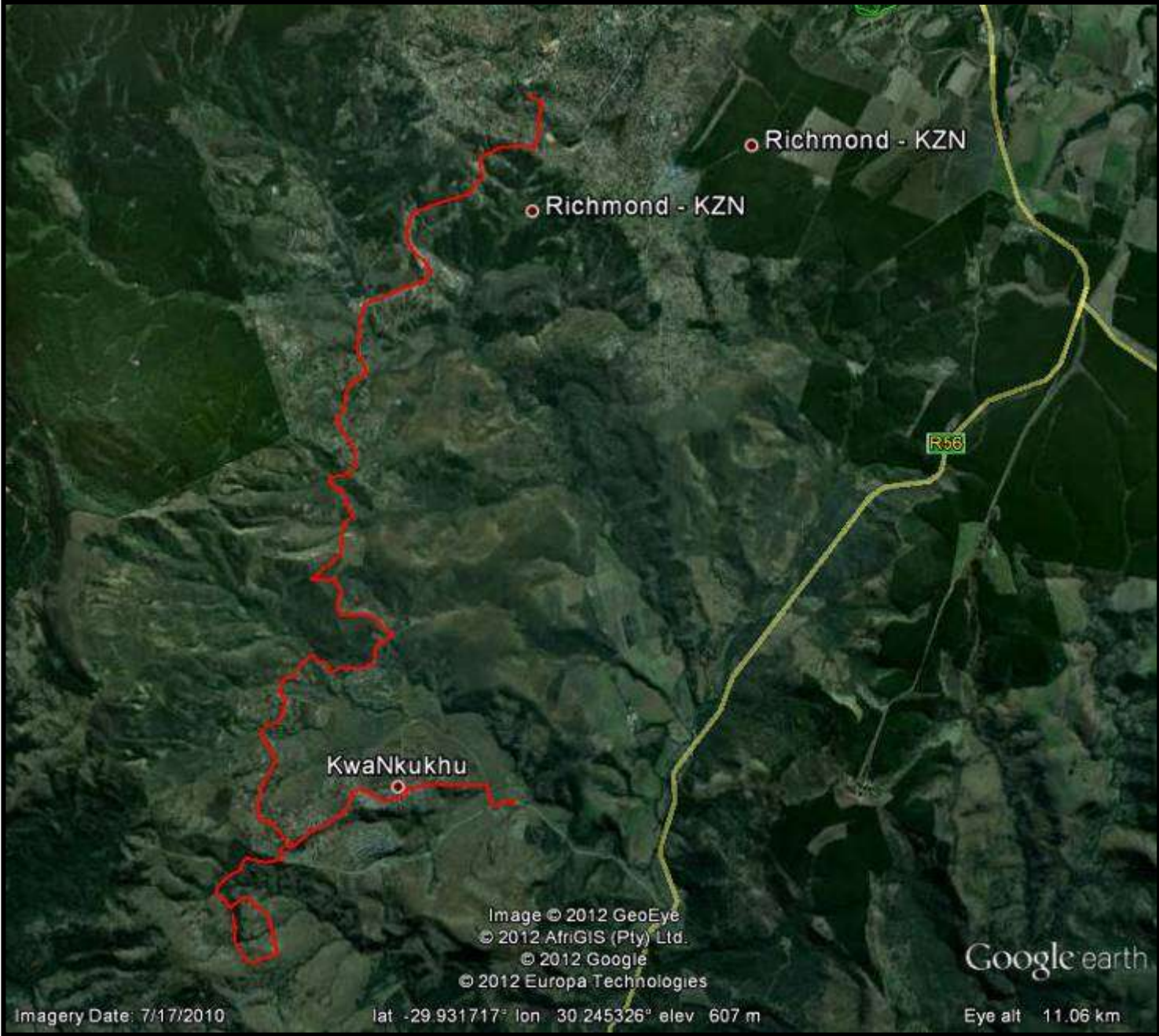
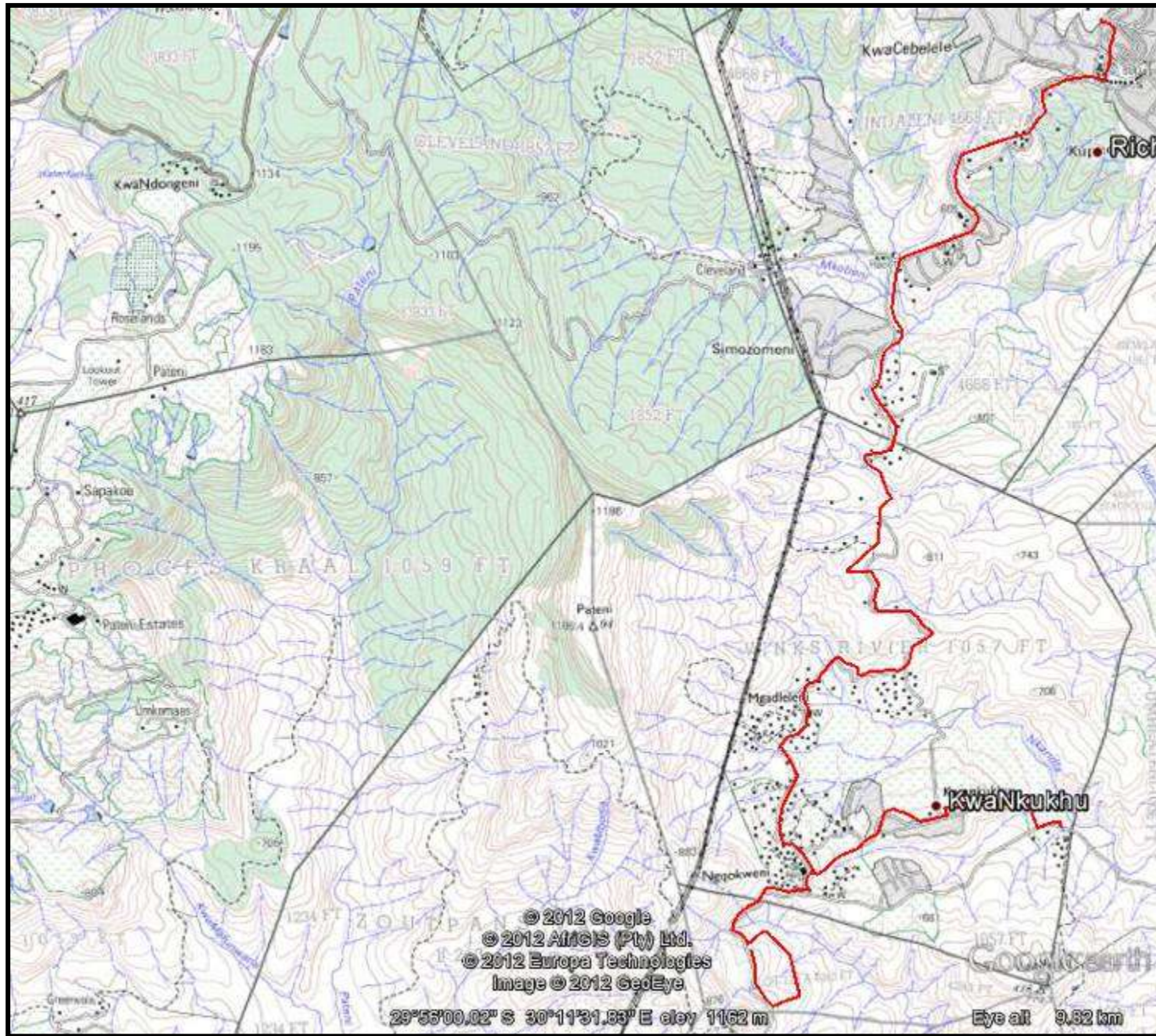


FIG. 3: TOPOGRAPHICAL MAP OF THE NORTHERN SECTION OF THE PROPOSED MFINIZO LINE



KWAZULU-NATAL HERITAGE ACT NO. 4 OF 2008

1. “ General protection: Structures.—
 - a. 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.
 - b. 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.
2. The Council may, by notice in the *Gazette*, exempt—
 - a. a defined geographical area; or
 - b. 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.
 - c. A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.
3. General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—
 - a. the grave of a victim of conflict;
 - b. a cemetery made up of such graves; or
 - c. 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.
4. General protection: Traditional burial places.—
 - a. No grave—
 - b. not otherwise protected by this Act; and
 - c. 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.

5. The Council may only issue written approval once the Council is satisfied that—
 - a. the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
 - b. the applicant and the relevant communities or individuals have reached agreement regarding the grave.
 - c. 36. General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—
6. 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.
7. 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.
8. 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.
9. 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.

10. 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.
11. 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.” (KZN Heritage Act of 2008)

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 database 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.

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. The 1937 aerial photograph (fig. 4 and TABLE 1) indicated sixteen settlements near the line. These settlements probably had human remains that are now below the surface. These graves would be protected by the KZN Heritage ACT.

FIG. 4: LOCATION OF SETTLEMENTS ALONG THE MFINIZO LINE IN 1937

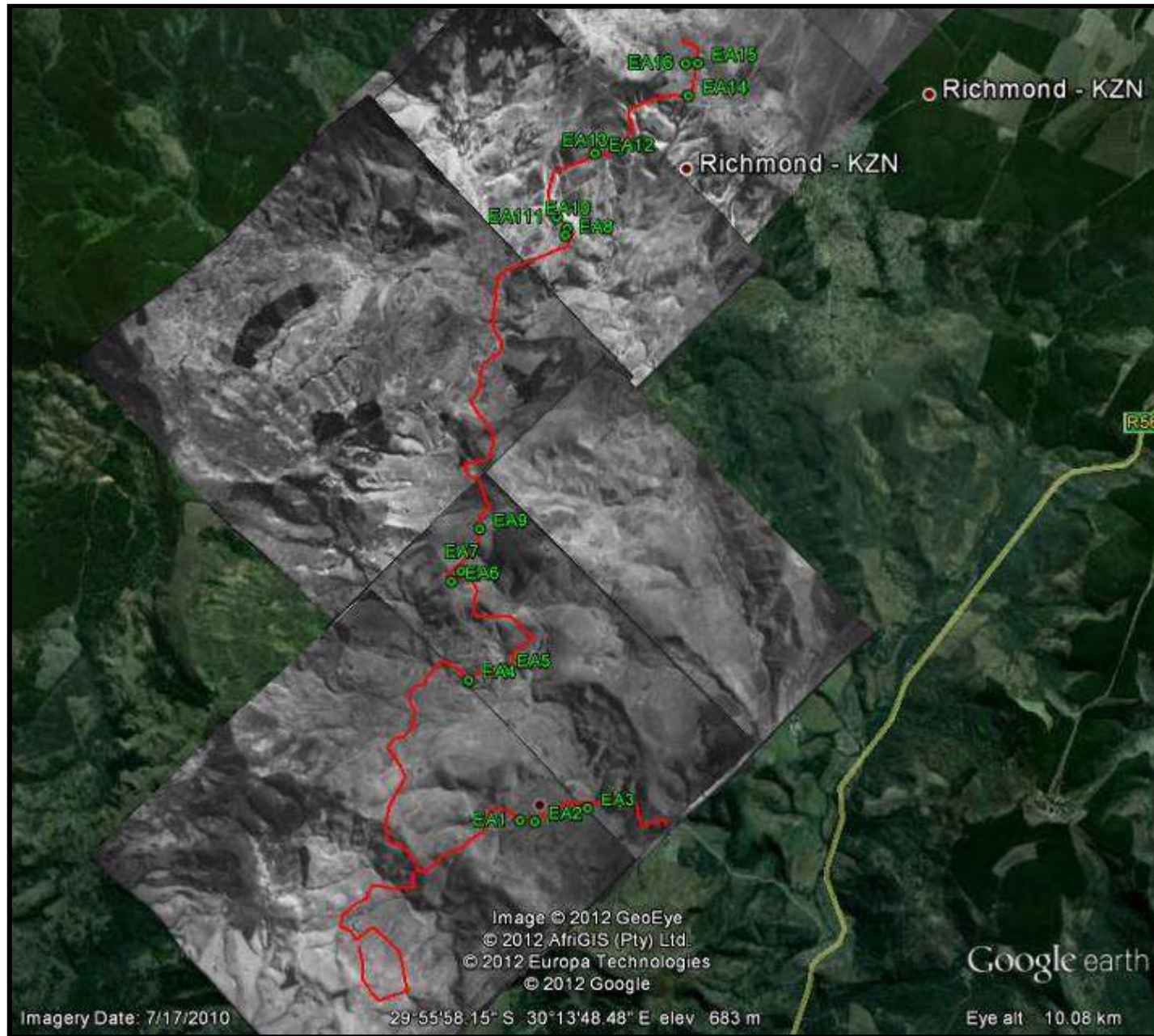


FIG.5: LOCATION OF SETTLEMENTS ALONG THE MFINIZO LINE IN 1980

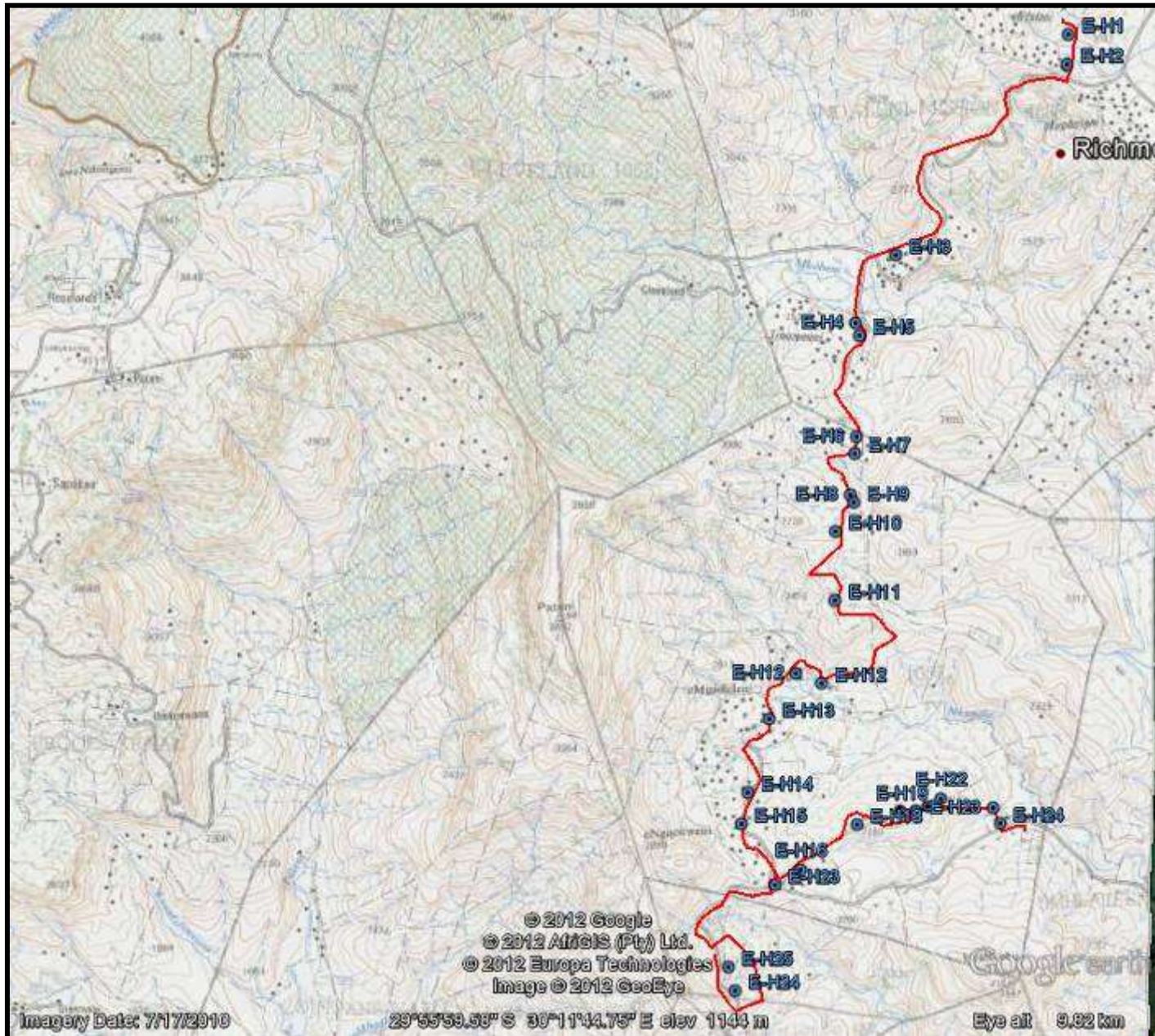


TABLE 1: LOCATION OF SETTLEMENTS IN 1937

NAME	LATITUDE	LONGITUDE	DESCRIPTION
EA1	-29.9579476	30.2234587	Settlement
EA3	-29.9570265	30.2300736	Settlement
EA2	-29.9580663	30.2248865	Settlement
EA4	-29.9460802	30.2184634	Settlement
EA5	-29.9451443	30.2218622	Settlement
EA6	-29.9376184	30.2170281	Settlement
EA7	-29.9367601	30.2179597	Settlement
EA9	-29.9332335	30.2197255	Settlement
EA8	-29.9086942	30.2281228	Settlement
EA10	-29.9081145	30.2283102	Settlement
EA111	-29.9071925	30.227303	Settlement
EA12	-29.9021887	30.2309946	Settlement
EA13	-29.9017924	30.2334492	Settlement
EA14	-29.8975227	30.2399302	Settlement
EA15	-29.8948663	30.2408156	Settlement
EA16	-29.8948926	30.2396805	Settlement

The 1963 1:50 000 topographical maps indicated that there were 27 settlements, or buildings, near the line (TABLE 2 and Fig. 5). One of these buildings is a farmhouse, while the others are all settlements. These settlements may also contain now unmarked, graves.

A comparison of the earlier sites, on Google Earth indicates that most of these older settlements have been removed, or renovated. That is, there are new houses over the older houses. The only exception is the farmhouse E-H24.

The smaller water reticulation pipes go through existing settlements and thus there will be a low, if any, impact, on older settlements.

TABLE 2: LOCATION OF SETTLEMENTS AND FARM BUILDINGS IN 1963

NAME	LATITUDE	LONGITUDE	DESC
E-H1	-29.8941016	30.2400207	Settlements
E-H2	-29.89643	30.2399748	Settlements
E-H3	-29.9112868	30.2247073	Settlements and workshops
E-H5	-29.9178255	30.221334	Settlements
E-H6	-29.9261281	30.2208671	Settlements
E-H7	-29.9274958	30.2207219	Settlements
E-H8	-29.9308388	30.2203687	Settlements
E-H9	-29.9314437	30.2206953	Settlements
E-H4	-29.9167815	30.2210054	Settlements
E-H10	-29.9338066	30.2189654	Settlements
E-H11	-29.9393906	30.2188878	Settlements
E-H12	-29.9462998	30.2179616	Settlements
E-H12	-29.9454797	30.2155184	Settlements both sides of road
E-H13	-29.9491987	30.2129791	Settlements both sides of road
E-H14	-29.9552527	30.2109593	Settlements both sides of road
E-H15	-29.9577802	30.2103178	Settlements both sides of road
E-H16	-29.961587	30.2159548	Settlements
E-H18	-29.9578591	30.221285	Church
E-H19	-29.9569429	30.2255524	Settlements
E-H20	-29.956777	30.2269175	Settlements
E-H21	-29.9564194	30.2280699	Settlements
E-H22	-29.9558079	30.2293295	Settlements
E-H23	-29.9567681	30.2346474	Settlements
E-H24	-29.958195	30.235898	buildings
E-H25	-29.9627125	30.2134466	buildings and settlements
E-H26	-29.9694945	30.2090863	Settlements
E-H27	-29.9714147	30.2097231	Settlements

FIELD SURVEY

A total of six heritage sites were located during the survey. TABLE 3 and Figure 6 shows the locations of the various sites. As noted previously many of the older buildings etc. no longer exist. Each of the 42 older sites (from the maps) were surveyed, and those that still existed were noted.

I used road cuttings and erosion gullies to note the occurrence of stone tools.

TABLE 3: LOCATION OF RECORDED HERITAGE SITES

NAME	LATITUDE	LONGITUDE	DESCRIPTION
EPA01A	-29.892632	30.238893	Cemetery start
EPA01B	-29.8935	30.239972	Cemetery end
EPA02A	-29.910086	30.227829	Cemetery corner
EPA02B	-29.909695	30.228139	Cemetery corner
EPA02C	-29.909876	30.227068	Cemetery corner
EPA02D	-29.909121	30.227812	Cemetery corner
SENSITIVE	-29.931675	30.220508	Sensitive area
EPA03	-29.942738	30.225034	Grave
EPA04	-29.957891	30.224603	Grave
EPA05	-29.957867	30.22473	Grave
EPA06	-29.958378	30.235021	Grave ?
E-H24	-29.958074	30.235384	Historical house

EPA01

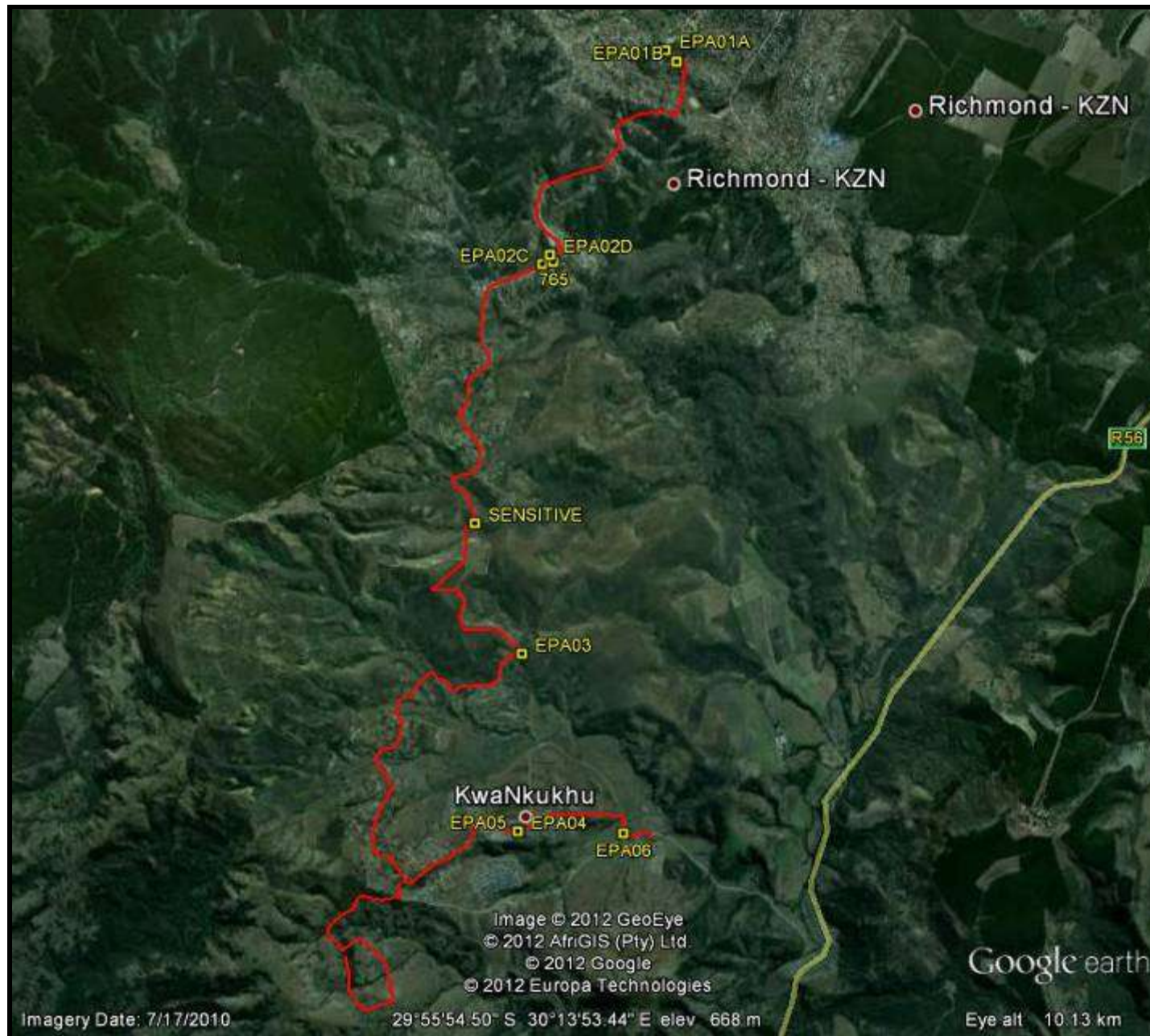
EPA01 is located near the edge of the planned treatment facility. The site consists of a small scatter of Middle/Late Stone Age tools (fig. 7) that have washed down the hill and erosion gully (fig. 8).

The tools are mostly flakes and show evidence of utilisation. The one MSA tool has been reworked in the LSA.

Significance: the site is of low significance as the tools are few in number and a secondary context.

Mitigation: No further mitigation is required.

FIG. 6: LOCATIONS OF RECORDED SITES ALONG THE NORTHERN PART OF THE MFINIZO LINE



According to the heritage legislation, all graves require to be fenced off if they occur within 50m of a development. The grave requires a 5m buffer zone between the edge of the grave and the fence, and there needs to be an access gate. Furthermore, no development is allowed to occur within 20m of a grave. We follow this protocol for all graves regardless of their age.

EPA01

EPA01 is located across the of the pump station. The site is a cemetery of many human graves that runs for 150m along the road (fig. 7). Most of the graves do not have headstones, and some occur on the edge of the road. The area is overgrown with vegetation, making many of the graves difficult to see.

Significance: The site is of high significance.

Mitigation: The cemetery will need to be fenced off on the roadside and clearly demarcated before the construction phase. This is especially important during the expansion of the pumpstation as there will be an increase in heavy vehicles traffic.

EPA02

EPA02 is located near the Sekusile Crèche and the Esimozomeni School. The site is a large cemetery that appears to have been in use for several years, and there are few recent graves. The graves are difficult to observe due to the dense vegetation (fig. 8). The cemetery is ~120m x 80m in size, at the maximum distances. The proposed line current cuts through the cemetery.

Significance: The site is of high significance.

Mitigation: The cemetery will need to be fenced off on the roadside and clearly demarcated before the construction phase. This is especially important

during the expansion of the pump station as there will be an increase in heavy vehicles traffic. The pipeline will need to be realigned remain at least 50m away from the cemetery. I surveyed additional areas for the realignment, and the options are indicated in fig. 9.

FIG. 7 CEMETARY AT EPA01



FIG. 8: CEMETERY AT EPA02



FIG. 9 PROPOSED ROUTE REALIGNMENT FOR THE PIPELINE³



Following the yellow line will make it parallel to an existing water line.

EPA03

EPA03 is a site of religious importance to the local community. The circle occurs ~50m from the proposed pipeline and is already fenced off (fig. 10)

Significance: The site is of high significance to the local community who practice their religion at this place.

Mitigation: No further mitigation is required as the site is fenced off and is unlikely to be affected by the pipeline..

FIG. 10: RELIGIOUS SHRINE AT EPA03



EPA04

EPA04 is a grave located near the edge of the garden property and a road (fig. 11). The grave is recent and fenced off. However, the edge of the grave occurs within 5m of the road

Significance: The site is of high significance.

Mitigation: Since the grave is so close to the road (within 5m), there is a chance of human remains being unearthed if the pipeline is kept on the southern side of the road. The pipeline will need to be moved to the opposite, or northern, side of the road.

FIG. 11: GRAVE AT EPA04



EPA05

EPA05 is a grave located near the edge of the garden property and a road and ~12m from EPA04 – the photograph was deleted accidentally after the field trip. The grave is recent and fenced off. However, the edge of the grave occurs within 5m of the road

Significance: The site is of high significance.

Mitigation: Since the grave is so close to the road (within 5m), there is a chance of human remains being unearthed if the pipeline is kept on the southern

side of the road. The pipeline will need to be moved to the opposite, or northern, side of the road.

EPA06

EPA06 is located near the site E-H24. The site consists of a stone cairn that resembles a grave (fig. 12). There is also a metal and wooden pole on the one side of the edge of the cairn. The site is probably related to E-H24, where EPA05 are the remains of labourers' houses, and E-H24 is a colonial farmhouse.

Significance: The site is of high significance unless the cairn is proved not to be a grave. Until such time it should be treated as a human grave..

Mitigation: The cairn will need to be fenced off and clearly demarcated before the construction phase. The demarcation will need to follow the protocols and be supervised.

FIG. 12: POSSIBLE GRAVE AT EA06



E-H24

E-H24 is located at the base of a hill, and in a small valley. The site appears to be a colonial farmhouse that is now possibly abandoned, or has new

occupants (fig. 13). The buildings occur on the 1968 maps, but not the 1937 maps. The one side of the buildings are demarcated with exotic trees forming a row. The line will not affect this site, however care must be taken not to impact on any of the ruins.

Significance: The site is of unknown significance, as it needs to be assessed by an architect historian. This is only required if it is to be affected.

Mitigation: No mitigation is required provided that the existing house and associated ruins are not affected.

FIG. 13: FARMHOUSE AND RUINS AT E-H24



PALAEONTOLOGICAL IMPACT ASSESSMENT

The PIA noted that the area had low potential for palaeontological remains. There is a chance that trace fossils may occur in a limited area along the pipeline.

“The desktop survey indicates that the planned pipeline development is on a hill slope underlain by sedimentary rocks of the Pietermaritzburg shale and Dwyka Formations. The ECO must be informed of the possible occurrence of trace fossils.

The igneous character of the Dolerite Sill has no significance for palaeontological finds and no management measures for the preservation or rescue of palaeontological data are needed” (see Appendix A)

MANAGEMENT PLAN

All human graves need to be managed if they occur within 50m of the development. Graves, and cemeteries, require a fence with an access gate, and there needs to a 5m buffer between the edge of the grave, or cemetery, and the fencing. No development should occur within 20m of this fence. The fencing needs to be supervised by a heritage practitioner, especially when the graves occur under dense vegetation, or have sunken into the sand.

All graves that need to be fenced off also require permission from the living descendants. If it is a communal cemetery then the Ward councillor(s) may be approached. If the grave occurs within the grounds of a house, then the family needs to be approached.

Five sites require the above management, and/or for the line to be moved more than 20m from the required fencing.

The realignments will need to be assessed in terms of the Heritage Impact Assessment.

Photographs must be taken to prove that the management was undertaken.

If any palaeontological material is uncovered during construction phase, then it needs to be reported to the ECO and Amafa KZN.

CONCLUSION

A heritage survey was undertaken for the proposed Ephatheni Water Supply Scheme. The line mainly follows an existing road, although it does cut across some areas. The survey noted several potential heritage sites from historical maps. These sites no longer existed at the time of the survey. The survey did record seven heritage sites of which most of these were human graves or cemeteries.

Five of the sites will require the line to be rerouted so that it is at least 25m from a grave/cemetery.

APPENDIX A
PALAEONTOLOGICAL DEKSTOP REPORT

**PALAEONTOLOGICAL ASSESSMENT OF
EPHATENI PIPELINE DEVELOPMENT**

FOR

Umlando

DATE: 27 FEBRUARY 2012

By

Gideon Groenewald

**Metsi Metseng Geological and Environmental
Services**

Fax: 086 619 2136

Cell: 082 829 4978

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EXECUTIVE SUMMARY

The planned EPHATHENI PIPELINE DEVELOPMENT is located on a hill slope that is underlain mainly by the Pietermaritzburg Formation of the Ecca Group, a small section of the Dwyka Formation of the Karoo Supergroup as well as a small section of a Dolerite Sill.

Trace fossils can occur in the sedimentary shale sequences of the Pietermaritzburg and Dwyka Formations. It is recommended that the ECO of the project be informed of the possible occurrence of trace fossils if bedrock is exposed during the excavations for the pipeline. If fossil material is discovered during the construction phase, it must be appropriately protected and the discovery reported to a palaeontologist for the removal thereof as per SAHRA legislation.

The igneous character of the Dolerite Sill has no significance for palaeontological finds.

INTRODUCTION

Metsi-Metseng Geological Services CC was appointed to undertake a desktop survey, assessing the potential palaeontology impact of the EPHATHENI DEVELOPMENT in KwaZulu Natal.

SAHRA ACT OR KWAZULU-NATAL HERITAGE ACT NO. 4 OF 2008

The National Heritage Resources Act of 1999 (pp 12-14) and the KwaZulu heritage Act of 2008 protects a variety of heritage resources. These resources are defined as follows:

1. “For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.
2. Without limiting the generality of subsection (1), the national estate may include -
 - 2.1. Places, buildings, structures and equipment of cultural significance;
 - 2.2. Places to which oral traditions are attached or which are associated with living heritage;
 - 2.3. Historical settlements and townscapes;
 - 2.4. Landscapes and natural features of cultural significance;
 - 2.5. Geological sites of scientific or cultural importance;
 - 2.6. Archaeological and palaeontological sites;
 - 2.7. Graves and burial grounds, including—
 - 2.8. Ancestral graves;
 - 2.9. Royal graves and graves of traditional leaders;
 - 2.10. Graves of victims of conflict;

- 2.11. Graves of individuals designated by the Minister by notice in the Gazette;
- 2.12. Historical graves and cemeteries; and
- 2.13. Other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
3. Sites of significance relating to the history of slavery in South Africa;
 - 3.1. Movable objects, -
4. Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - 4.1. Objects to which oral traditions are attached or which are associated with living heritage;
 - 4.2. Ethnographic art and objects;
 - 4.3. Military objects;
 - 4.4. objects of decorative or fine art;
 - 4.5. Objects of scientific or technological interest; and
 - 4.6. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).
5. Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—
 - 5.1. Its importance in the community, or pattern of South Africa's history;
 - 5.2. Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
 - 5.3. Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;

- 5.4. Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- 5.5. Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- 5.6. Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- 5.7. Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- 5.8. Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- 5.9. sites of significance relating to the history of slavery in South Africa"

METHODOLOGY

The potential palaeontology of a rock unit relates directly to the geology of the area. The desktop survey includes the comparison of relevant referenced geological maps and locality maps and/or waypoints provided for the development project. The potential impact and significance of the palaeontology for a specific rock unit is determined through comparison of existing geological and palaeontology database information.

The only limitation on this methodology is the scale of mapping, which restricts comparison of the geology to a scale of 1:250 000. This restriction only applies in areas where major changes in the geological character of the area occur over very short distances.

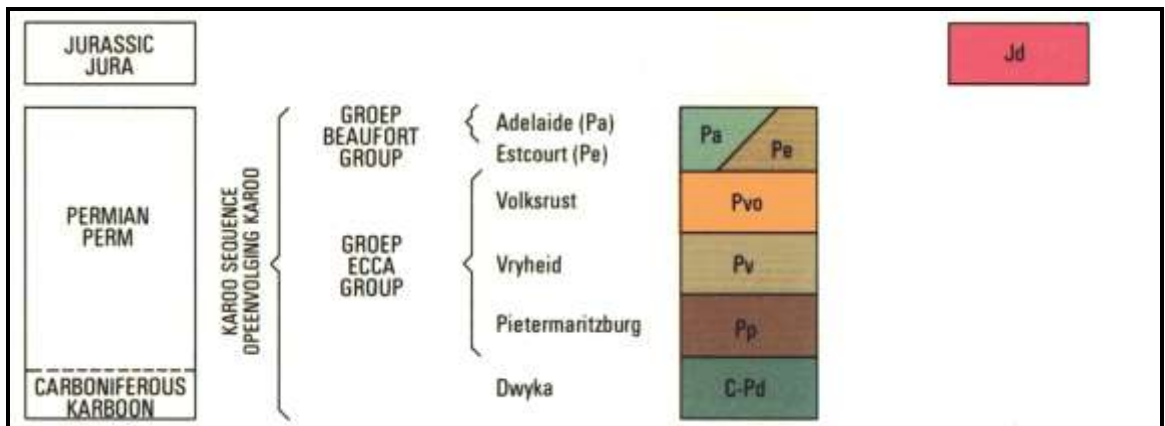
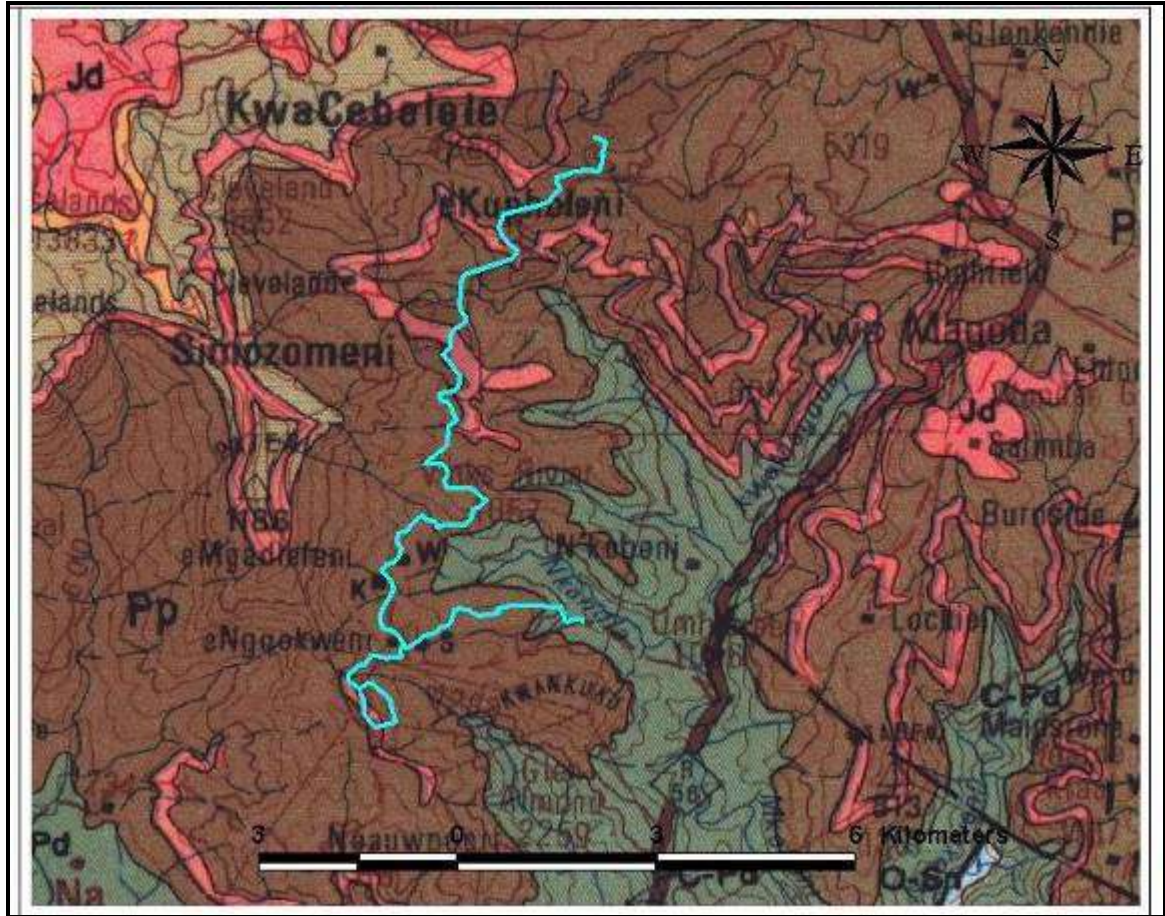
RESULTS

The Permian Pietermaritzburg Formation (Brown Areas Figure 1) of the Ecca Group mainly underlies the proposed Ephateni Pipeline Development. The Carboniferous Dwyka Formation (Grey Areas Figure 1) and Jurassic Dolerite Sill (Red Areas Figure 1) underlie small sections of the development. The Ecca Group and Dwyka Formation is part of the Karoo Supergroup.

/

The Pietermaritzburg Formation consists primarily of dark grey shale, siltstone and subordinate sandstone. The Dwyka Formation consists of diamictite, subordinate varved shale and boulder shale.

**FIG. 1 GEOLOGY OF THE EPHATHENI PIPELINE DEVELOPMENT
(Geomap 2930 Durban)**



DISCUSSION

The desktop survey indicate that the proposed development is mainly underlain by shale deposits of the Pietermaritzburg Formation. Two very short sections of the route cut through a Dolerite Sill and part of the Dwyka Formation. No significant fossil material has been recorded from either the Pietermaritzburg or the Dwyka Formations.

However, trace fossils have been recorded from these sedimentary sequences in other parts of the Karoo Basin but it is unlikely that significant exposures of these structures will be found during excavations for the pipeline.

The Jurassic Dolerite Sill will have no fossil material due to its igneous character.

MANAGEMENT PLAN

The desktop survey indicates that the planned pipeline development is on a hill slope underlain by sedimentary rocks of the Pietermaritzburg shale and Dwyka Formations. The ECO must be informed of the possible occurrence of trace fossils.

The igneous character of the Dolerite Sill has no significance for palaeontological finds and no management measures for the preservation or rescue of palaeontological data are needed.

If fossil material is discovered during the construction phase, it must be appropriately protected and the discovery reported to a palaeontologist for the removal thereof as per SAHRA legislation.

CONCLUSION

The planned EPHATHENI PIPELINE DEVELOPMENT is located on a hill slope that is underlain by the Pietermaritzburg Formation of the Ecca Group and the Dwyka Formation. No significant fossils are expected in these sediments. The ECO must however be made aware of possible trace fossils in the shale outcrops and a palaeontologist must be informed if any trace fossils are recorded

The igneous character of the dolerite has no significance for palaeontological finds.

REFERENCES

Bamford M 2011. Desktop study Palaeontology Ermelo to Empangeni – Eskom powerline. Internal report BPI Palaeontology, WITS University.

Johnson MR , Anhaeusser CR and Thomas RJ (Eds) (2006). The Geology of South Africa. GSSA, Council for Geoscience, Pretoria.

QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Gideon Groenewald has a PhD in Geology from the Nelson Mandela Metropolitan University (1996) and the National Diploma in Nature Conservation from the University of South Africa (1990). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

Declaration of Independence

I, Gideon Groenewald, 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 palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

A handwritten signature in black ink, reading "Gideon Groenewald", with a horizontal line underneath.

Dr Gideon Groenewald
Geologist

APPENDIX B
SITE RECORD FORMS

UMLANDO ARCHAEOLOGICAL SITE RECORD FORM**SITE CATEGORY:** (X where applicable)

Stone Age:
 Early Iron Age:
 Late Iron Age
 Historical Period:

Recorder's Site No.: EPA02

Official Name:

Local Name:

Map Sheet:

GPS reading: S29 54.605 E30 13.670 774 m

**DIRECTIONS TO SITE: SKETCH OR DESCRIPTION.**

From the P121/P8-1 intersection, drive south on the P8-1 for 960m. Turn left onto the unpaved road and drive for 1.6km before turning right onto an unpaved road. Follow this road for 1.7km, then turn right onto an unpaved road. EPA02 is 2.8km further, near the Sekusile Crèche and the Esimozomeni School.

SITE DESCRIPTION:

Type of Site: Cemetary
 Merits conservation: Yes
 Threats: Yes
 What threats: Ephatheni water pipeline

RECORDING:

Graphic record: Yes

Digital pictures: x

Tracings :

Re-drawings:

Recorder/Informant: Name: Gavin and Louise Anderson

Address: PO Box 102532, Meerensee, 3901

Date: 20/01/2012

Owner:

References:

Description of site and artefactual content.

The site is a large cemetery that appears to have been in use for several years, and there are few recent graves. The graves are difficult to observe due to the dense vegetation. The cemetery is ~120m x 80m in size, at the maximum distances. The proposed line currently cuts through the cemetery.

UMLANDO ARCHAEOLOGICAL SITE RECORD FORM**SITE CATEGORY:** (X where applicable)

Stone Age:
 Early Iron Age:
 Late Iron Age:
 Historical Period:

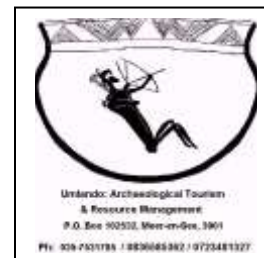
Recorder's Site No.: EPA03

Official Name:

Local Name:

Map Sheet:

GPS reading: S29 56.564 E30 13.502 719 m

**DIRECTIONS TO SITE: SKETCH OR DESCRIPTION.**

From the P121/P8-1 intersection, drive south on the P8-1 for 960m. Turn left onto the unpaved road and drive for 1.6km before turning right onto an unpaved road. Follow this road for 1.7km, then turn right onto an unpaved road. Drive along for 3.4km then turn left onto an unpaved road. EPA03 is 4.7km further.

SITE DESCRIPTION:

Type of Site: Religious
 Merits conservation: Yes
 Threats: Yes
 What threats: Ephatheni water pipeline

RECORDING:

Graphic record: Yes

Digital pictures: x

Tracings :

Re-drawings:

Recorder/Informant: Name: Gavin and Louise Anderson

Address: PO Box 102532, Meerensee, 3901

Date: 20/01/2012

Owner:

References:

Description of site and artefactual content.

EPA03 is a site of religious importance to the local community. The circle occurs ~50m form the proposed pipeline and is already fenced off

UMLANDO ARCHAEOLOGICAL SITE RECORD FORM**SITE CATEGORY:** (X where applicable)

Stone Age:
 Early Iron Age:
 Late Iron Age:
 Historical Period:

Recorder's Site No.: EPA04

Official Name:

Local Name:

Map Sheet:

GPS reading: S29 57.473 E30 13.476 675 m

**DIRECTIONS TO SITE: SKETCH OR DESCRIPTION.**

From the P121/ P8-1 intersection, drive east. After 2.6km turn right onto the P95. Turn right onto the R56 after 446m. Follow the R56 for 12.6km then turn right onto an unpaved road. Turn right after 4.0km, right after 687m, right after 165m and right again after 357m. Follow this road for 109m to EPA04

SITE DESCRIPTION:

Type of Site: Grave
 Merits conservation: Yes
 Threats: Yes
 What threats: Ephatheni water pipeline

RECORDING:

Graphic record: Yes

Digital pictures: x

Tracings :

Re-drawings:

Recorder/Informant: Name: Gavin and Louise Anderson

Address: PO Box 102532, Meerensee, 3901

Date: 20/01/2012

Owner:

References:

Description of site and artefactual content.

EPA04 is a grave located near the edge of the garden property and a road. The grave is recent and fenced off. However, the edge of the grave occurs within 5m of the road.

UMLANDO ARCHAEOLOGICAL SITE RECORD FORM**SITE CATEGORY:** (X where applicable)

Stone Age:
 Early Iron Age:
 Late Iron Age
 Historical Period:

Recorder's Site No.: EPA05

Official Name:

Local Name:

Map Sheet:

GPS reading: S29 57.472 E30 13.484 674 m

**DIRECTIONS TO SITE: SKETCH OR DESCRIPTION.**

From the P121/ P8-1 intersection, drive east. After 2.6km turn right onto the P95. Turn right onto the R56 after 446m. Follow the R56 for 12.6km then turn right onto an unpaved road. Turn right after 4.0km, right after 687m, right after 165m and right again after 357m. Follow this road for 121m to EPA05

SITE DESCRIPTION:

Type of Site: Grave
 Merits conservation: Yes
 Threats: Yes
 What threats: Ephatheni water pipeline

RECORDING:

Graphic record: Yes

Digital pictures: x

Tracings :

Re-drawings:

Recorder/Informant: Name: Gavin and Louise Anderson

Address: PO Box 102532, Meerensee, 3901

Date: 20/01/2012

Owner:

References:

Description of site and artefactual content.

EPA05 is a grave located near the edge of the garden property and a road and ~12m from EPA04 – the photograph was deleted accidentally after the field trip. The grave is recent and fenced off. However, the edge of the grave occurs within 5m of the road

UMLANDO ARCHAEOLOGICAL SITE RECORD FORM**SITE CATEGORY:** (X where applicable)

Stone Age:
 Early Iron Age:
 Late Iron Age:
 Historical Period:

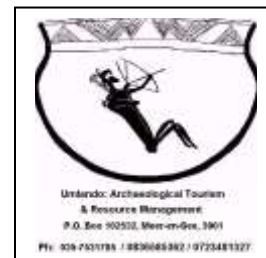
Recorder's Site No.: EPA06

Official Name:

Local Name:

Map Sheet:

GPS reading: S29 57.503 E30 14.101 562 m

**DIRECTIONS TO SITE: SKETCH OR DESCRIPTION.**

From the P121/ P8-1 intersection, drive east. After 2.6km turn right onto the P95. Turn right onto the R56 after 446m. Follow the R56 for 12.6km then turn right onto an unpaved road. EPA06 is 2.5km from here.

SITE DESCRIPTION:

Type of Site: Stone cairn/ grave
 Merits conservation: Yes
 Threats: Yes
 What threats: Ephatheni water pipeline

RECORDING:

Graphic record: Yes

Digital pictures: x

Tracings :

Re-drawings:

Recorder/Informant: Name: Gavin and Louise Anderson

Address: PO Box 102532, Meerensee, 3901

Date: 20/01/2012

Owner:

References:

Description of site and artefactual content.

EPA06 is located near the site E-H24. The site consists of a stone cairn that resembles a grave. There is also a metal and wooden pole on the one side of the edge of the cairn. The site is probably related to E-H24, where EPA05 are the remains of labourers' houses, and E-H24 is a colonial farmer's house.

UMLANDO ARCHAEOLOGICAL SITE RECORD FORM**SITE CATEGORY:** (X where applicable)

Stone Age:
 Early Iron Age:
 Late Iron Age:
 Historical Period:

Recorder's Site No.: E-H24
 Official Name:
 Local Name:
 Map Sheet:
 GPS reading: S: 29°57'29.5 E: 30°14'09.2

**DIRECTIONS TO SITE: SKETCH OR DESCRIPTION.**

From the P121/ P8-1 intersection, drive east. After 2.6km turn right onto the P95. Turn right onto the R56 after 446m. Follow the R56 for 12.6km then turn right onto an unpaved road. E-H24 is 2.5km from here.

SITE DESCRIPTION:

Type of Site: Historical farmhouse
 Merits conservation: Yes
 Threats: Yes
 What threats: Ephatheni water pipeline

RECORDING:

Graphic record: Yes
 Digital pictures: x

Tracings :

Re-drawings:

Recorder/Informant: Name: Gavin and Louise Anderson
 Address: PO Box 102532, Meerensee, 3901
 Date: 20/01/2012
 Owner:
 References:

Description of site and artefactual content.

E-H24 is located at the base of a hill, and in a small valley. The site appears to be a colonial farmhouse that is now possibly abandoned, or has new occupants. The buildings occur on the 1968 maps, but not the 1937 maps. The one side of the buildings are demarcated with exotic trees forming a row. The line will not affect this site, however care must be taken not to impact on any of the ruins.