PROPOSED CONSTRUCTION OF MPOPHOMENI SHOPPING CENTRE, UMGUNGUNDLOVU DISTRICT MUNICIPALITY, KZN

FOR TRIPLO4 SUSTAINABLE SOLUTIONS

DATE: 9 JANUARY 2015

By Gavin Anderson

Umlando: Archaeological Surveys and Heritage Management

PO Box 102532, Meerensee, 3901

Phone/fax: 035-7531785 Fax: 0865445631

Cell: 0836585362

TABLE OF CONTENT

TABLE OF FIGURES

INTRODUCTION

“The proposed site is situated within Mpophomeni adjacent to the R617; approximately 6 km to the southwest of Howick and access is via the R617. The proposed development falls within the Umngeni Local and Umgungungdlovu District Municipality.

Dymatron Pty Ltd proposes the construction of a Shopping Centre in Mpophomeni, Umngeni Municipality, KwaZulu-Natal, comprising of food outlets, retail stores, etc, as per the proposed layout -figure 2. The proposed development is situated on Portion 13 of the Farm Riet Vallei No. 1043 which is currently vacant land and not zoned as it is currently not within the town-planning scheme. The total size of the site is 38.9088 and the development footprint is approximately 5.5 hectares.

All bulk services (water, electricity, sewage) are available within close proximity to the site and the development will be linked with the existing infrastructure “ (Triplo4 BID).

Figures 1 – 3 show the location of the.

FIG. 1 GENERAL LOCATION OF THE STUDY AREA

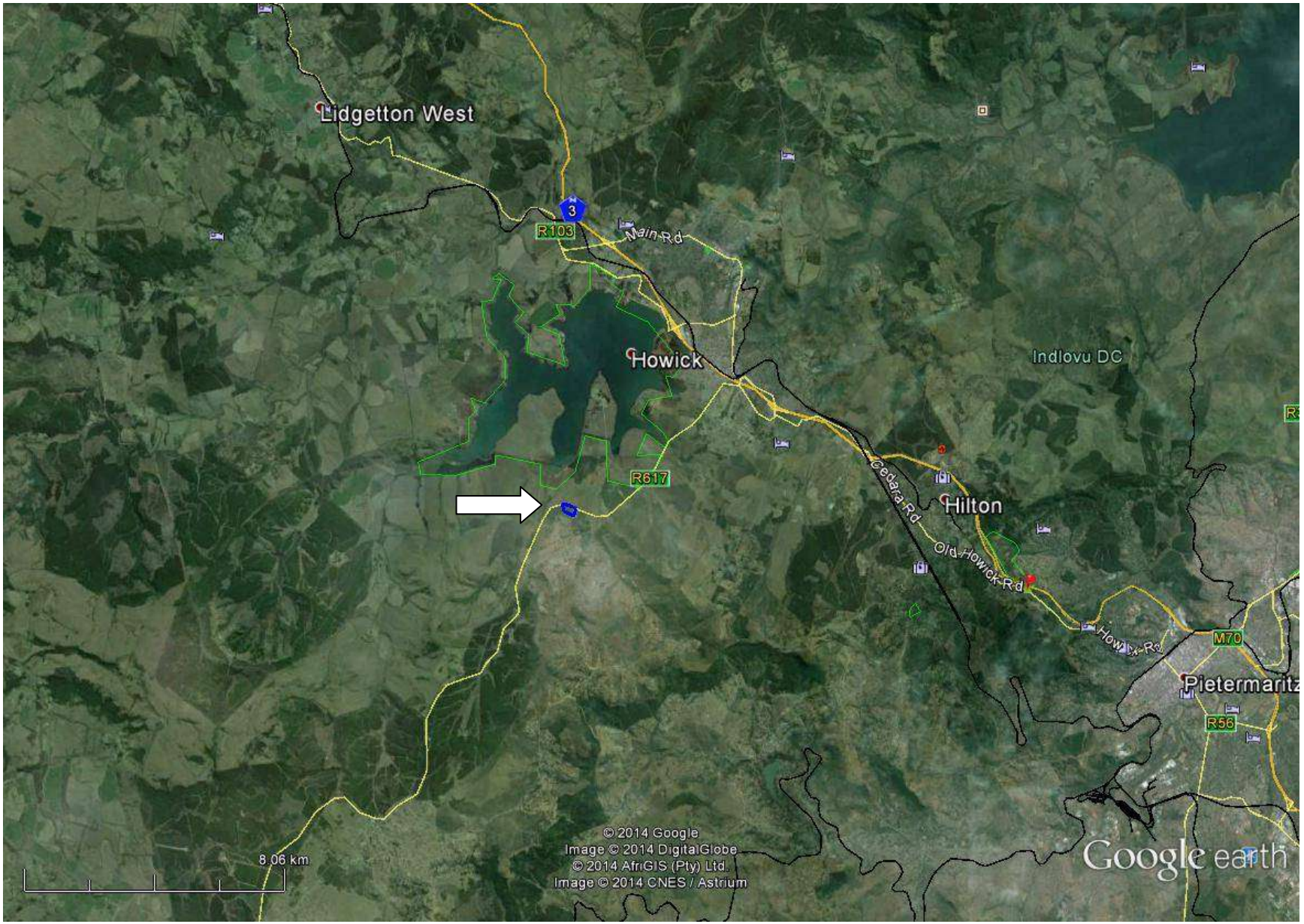
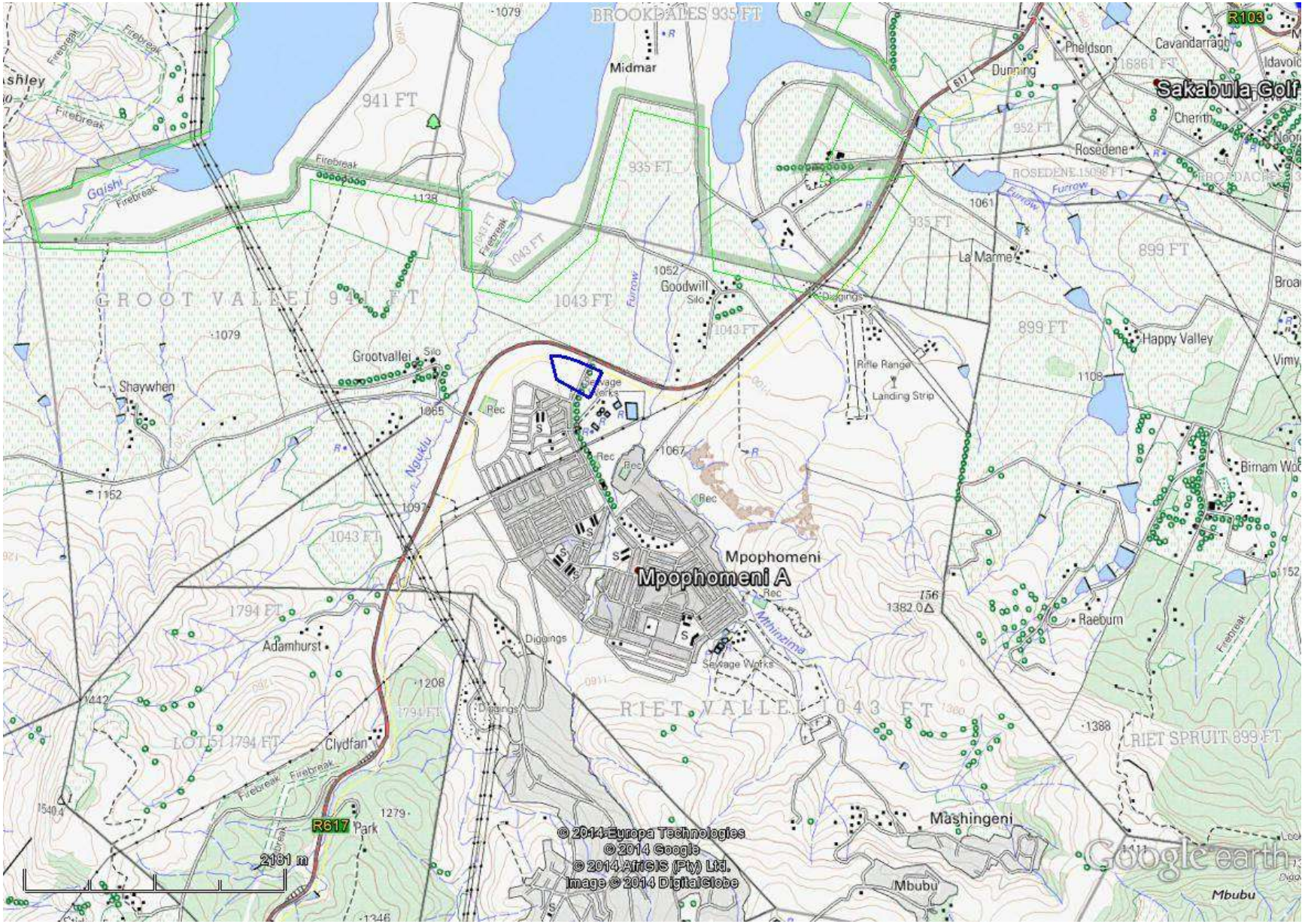


FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA

FIG. 3: TOPOGRAPHICAL MAP OF THE STUDY AREA



KWAZULU-NATAL HERITAGE ACT NO. 4 OF 2008

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

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

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

Defining significance

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

These criteria are:

1. State of preservation of:

1.1. Organic remains:

1.1.1. Faunal

1.1.2. Botanical

1.2. Rock art

1.3. Walling

1.4. Presence of a cultural deposit

1.5. Features:

1.5.1. Ash Features

1.5.2. Graves

1.5.3. Middens

1.5.4. Cattle byres

1.5.5. Bedding and ash complexes

2. Spatial arrangements:

2.1. Internal housing arrangements

2.2. Intra-site settlement patterns

2.3. Inter-site settlement patterns

3. Features of the site:

3.1. Are there any unusual, unique or rare artefacts or images at the site?

3.2. Is it a type site?

3.3. Does the site have a very good example of a specific time period, feature, or artefact?

4. Research:

4.1. Providing information on current research projects

4.2. Salvaging information for potential future research projects

5. Inter- and intra-site variability

5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?

5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

6. Archaeological Experience:

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

7. Educational:

7.1. Does the site have the potential to be used as an educational instrument?

7.2. Does the site have the potential to become a tourist attraction?

7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

8. Other Heritage Significance:

8.1. Palaeontological sites

8.2. Historical buildings

8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites

8.4. Graves and/or community cemeteries

8.5. Living Heritage Sites

8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

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

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 archaeological database indicates that there are archaeological sites in the general area (fig. 4). These sites include all types of Stone Age and Iron Age sites. No sites occur in the study area. I have personally noted isolated LSA tools on the northern side of the Midmar Dam.

No national monuments, battlefields, or historical cemeteries are known to occur in the study area. There are several cemeteries outside of the study area. Many of the farm houses probably originate with the first farms of the area. Any building, even the foundations, would need to be assessed if disturbed by any development.

The first Surveyor General map of the area dates to 1849 (fig. 5). This shows no buildings in the study area. Likewise, the 1937 aerial photographs indicate that the land is under cultivation (fig. 6). This theme is repeated in the 1972 (fig. 7) and 2000 (fig. 3) 1:50 000 topographical maps.

The Google Earth aerial photographs indicate that there were more recent structures in the western corner of the study area. If any graves do occur here, they would be marked and probably known to the community.

The desktop study thus indicates that the area is of very low heritage significance, and is unlikely to yield in situ artefacts.

PALEONTOLOGICAL IMPACT ASSESSMENT

The full PIA is given in Appendix A. The study area is underlain by Permian aged rocks of the Volksrust Formation, Ecca Group, of the Karoo Supergroup. This formation may yield significant fossils and thus requires additional survey work where fresh bedrock is exposed, e.g. trenches deeper than 2m.

Management Plan

The EAP and ECO of the project must be informed of the fact that mainly trace fossils have been described from the Volksrust Formation that underlies the development site.

All sections of the development where bedrock is exposed due to erosion or where geotechnical surveys indicate that bedrock will be exposed during excavation, must be inspected by the ECO and if fossils are recorded, a professional Palaeontologist must be appointed to record and collect the fossils according to SAHRA and AMAFA specifications as part of a Phase 1 Palaeontological Impact Assessment.

FIG. 4: LOCATION OF KNOWN HERITAGE SITES NEAR THE STUDY AREA

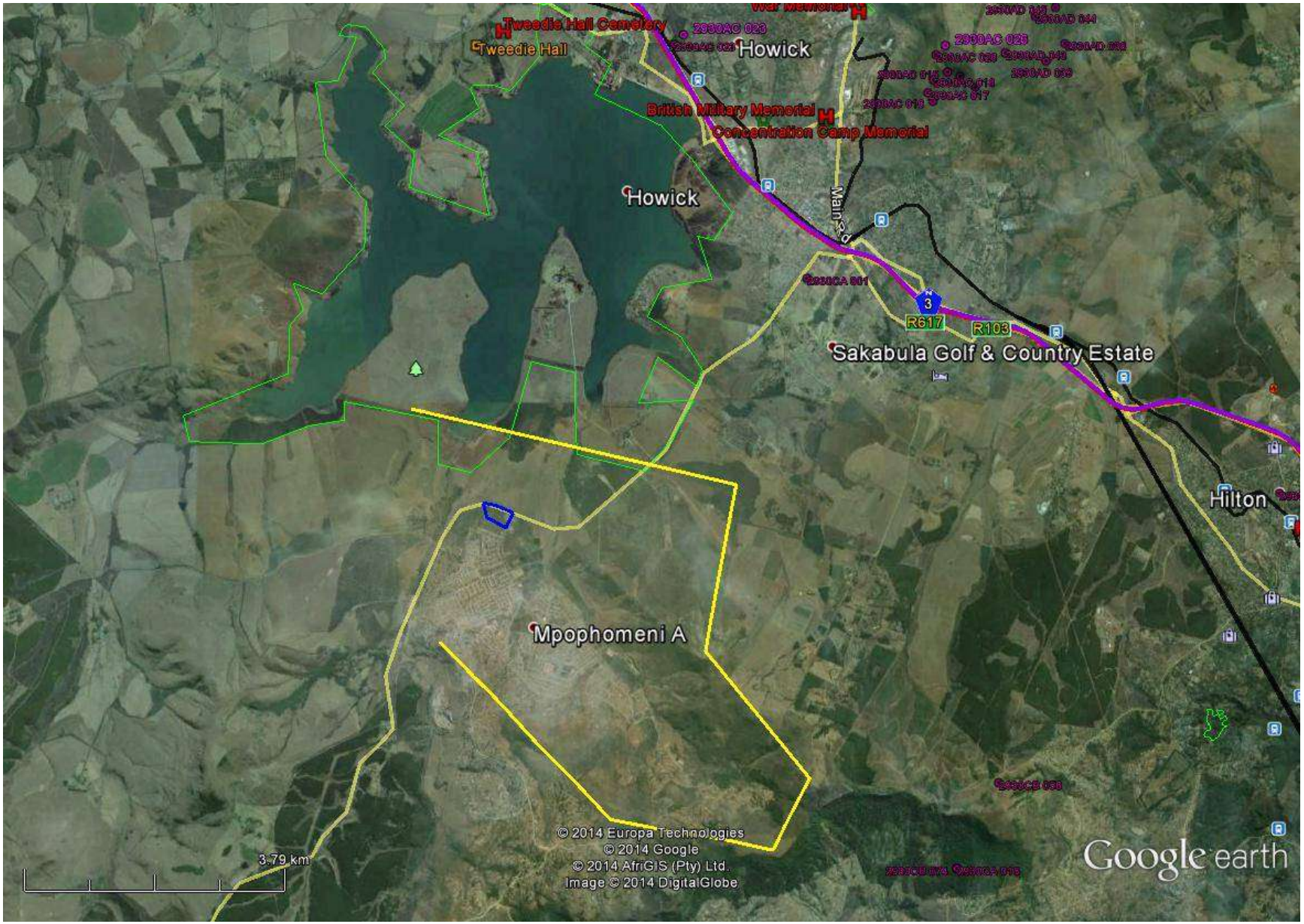


FIG. 5: STUDY AREA IN 1849 – SURVEYOR GENERAL MAP

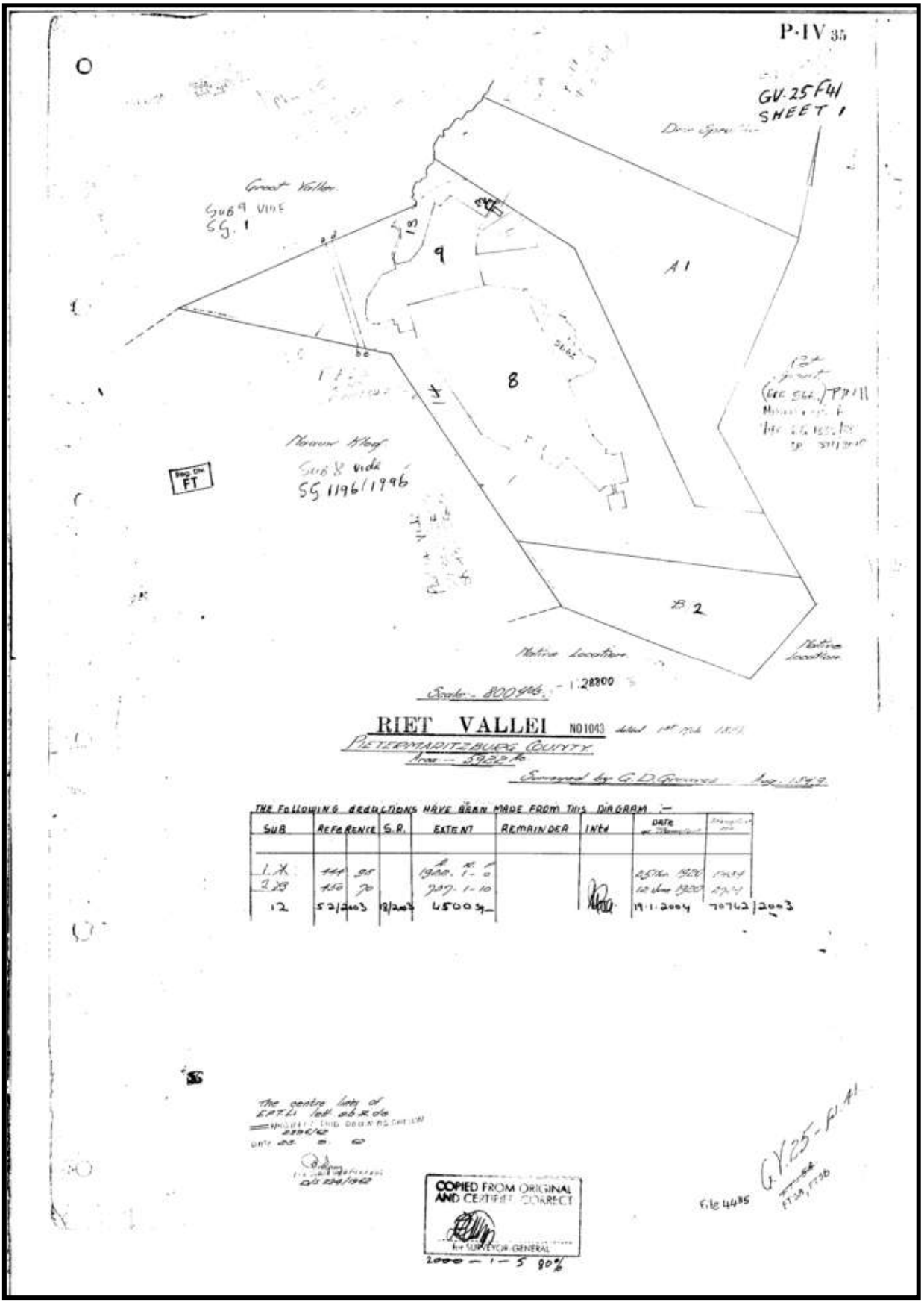
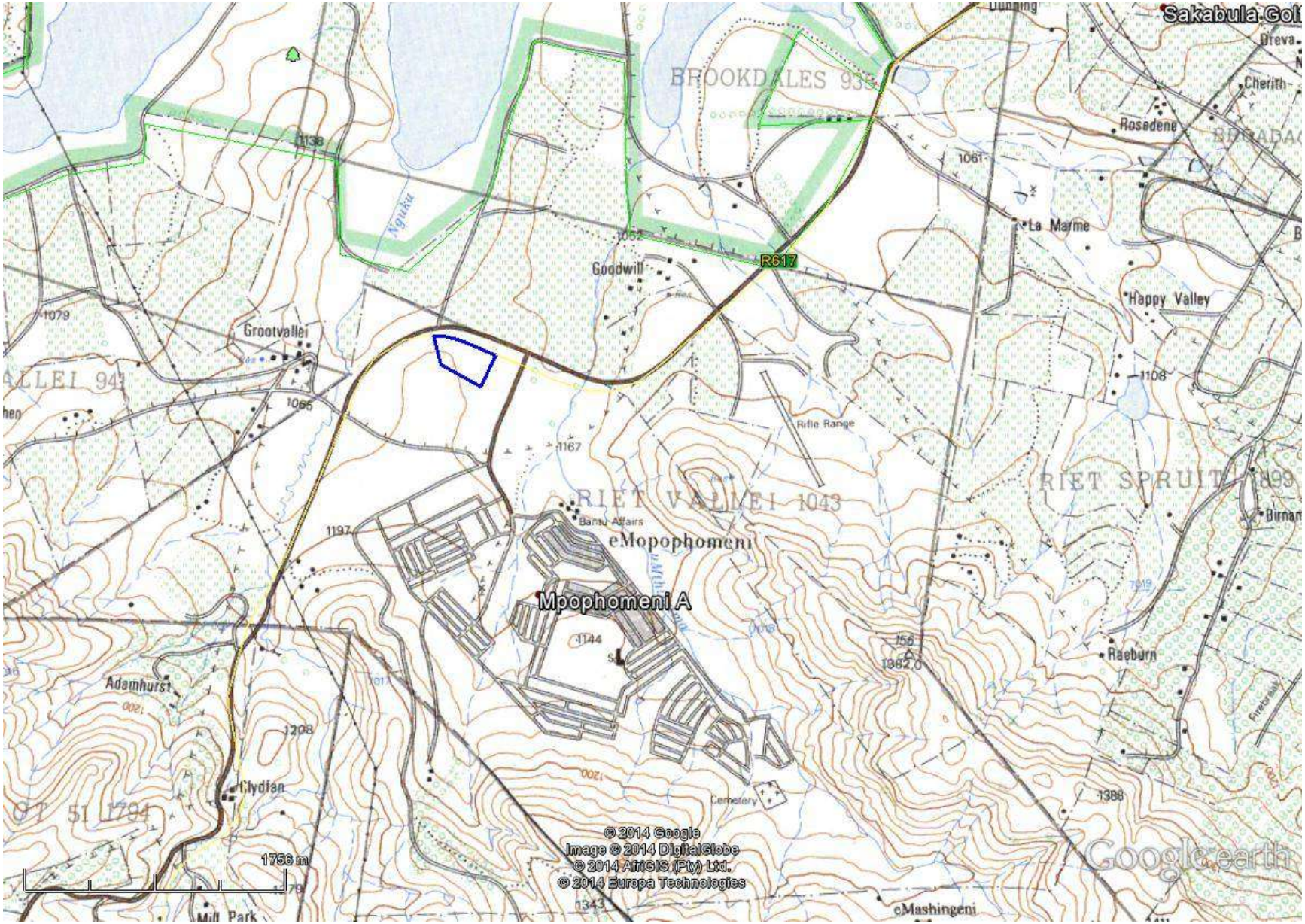


FIG. 6: STUDY AREA IN 1937

FIG. 7: STUDY AREA IN 1968



CONCLUSION

A heritage desktop survey was undertaken for the proposed Mpophomeni shopping centre. The area has been under cultivation for several decades and has been affected by road works and (in)formal settlements. The historical maps suggest that there are no buildings and foundations in the study area. Archaeological sites that have been noted in the general area tend to be open isolated artefacts or scatters of artefacts in secondary contexts. These tools are part of the general stone tools of the ESA, MSA and LSA and have no further value.

The palaeontology, on the other hand, indicated that the area is of medium palaeontological significance. If the development exposes fresh bedrock, then a palaeontologist will need to inspect the site. The fresh bedrock is expected to occur ~2m below the current surface. The development will need to provide information regarding the depth of its foundations.

I would suggest that the proposed development be exempt from a Phase 1 heritage survey. Furthermore, the development should provide plans regarding the depth of the foundations. These would then decide on the necessity of further paleontological surveys.

APPENDIX A

DESKTOP PIA

DESKTOP PALAEONTOLOGICAL ASSESSMENT FOR THE PROPOSED MPHOPHOMENI SHOPPING CENTRE WITHIN THE UMGENI LOCAL MUNICIPALITY UMGUNGUNDLOVO DISTRICT MUNICIPALITY, KWAZULU-NATAL PROVINCE.

FOR

Umlando

DATE: 17 December 2014

By

Gideon Groenewald

Cell: 082 339 9202

EXECUTIVE SUMMARY

. Gideon Groenewald was appointed to undertake a desktop survey, assessing the potential Palaeontological Impact of the proposed construction of the Mphophomeni Shopping Centre at Mphophomeni in the uMgeni Local Municipality, UMgungundlovo District Municipality in the KwaZulu-Natal Province.

This Palaeontological Assessment forms part of the Heritage Impact Assessment (HIA) and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999 as well as the KwaZulu-Natal Heritage Act No 4 of 2008. In accordance with Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), a HIA is required to assess any potential impacts to palaeontological heritage within the development footprint.

The footprint of the proposed construction of the Mphophomeni Shopping Centre in the Umgeni Local Municipality of the UMgungunglovu District Municipality in KwaZulu-Natal is underlain by Permian aged shale of the Volksrust Formation, Ecca Group of the Karoo Supergroup. Although rare, significant fossils have been described from the Volksrust Formation, with specific reference to trace fossils. Recording of fossils from the construction site will contribute significantly to our understanding of the palaeo-environments that existed in this part of the Karoo basin during the Permian.

It is expected that excavations for the foundations of buildings will be deeper than 2 m, and it is likely that fresh bedrock will be exposed. A Moderate Palaeontological Sensitivity is allocated to the development site.

Recommendations:

1. The EAP and ECO of the project must be informed of the fact that mainly trace fossils have been described from the Volksrust Formation that underlies the development site.

2. All sections of the development where bedrock is exposed due to erosion or where geotechnical surveys indicate that bedrock will be exposed during excavation, must be inspected by the ECO and if fossils are recorded, a professional Palaeontologist must be appointed to record and collect the fossils according to SAHRA and AMAFA specifications as part of a Phase 1 Palaeontological Impact Assessment.

TABLE OF CONTENT

TABLE OF FIGURES

LIST OF TABLES

INTRODUCTION

Gideon Groenewald was appointed to undertake a desktop survey, assessing the potential Palaeontological Impact of the proposed construction of the Mphophomeni Shopping Centre at Mphophomeni in the uMgeni Local Municipality, UMgungundlovo District Municipality in the KwaZulu-Natal Province

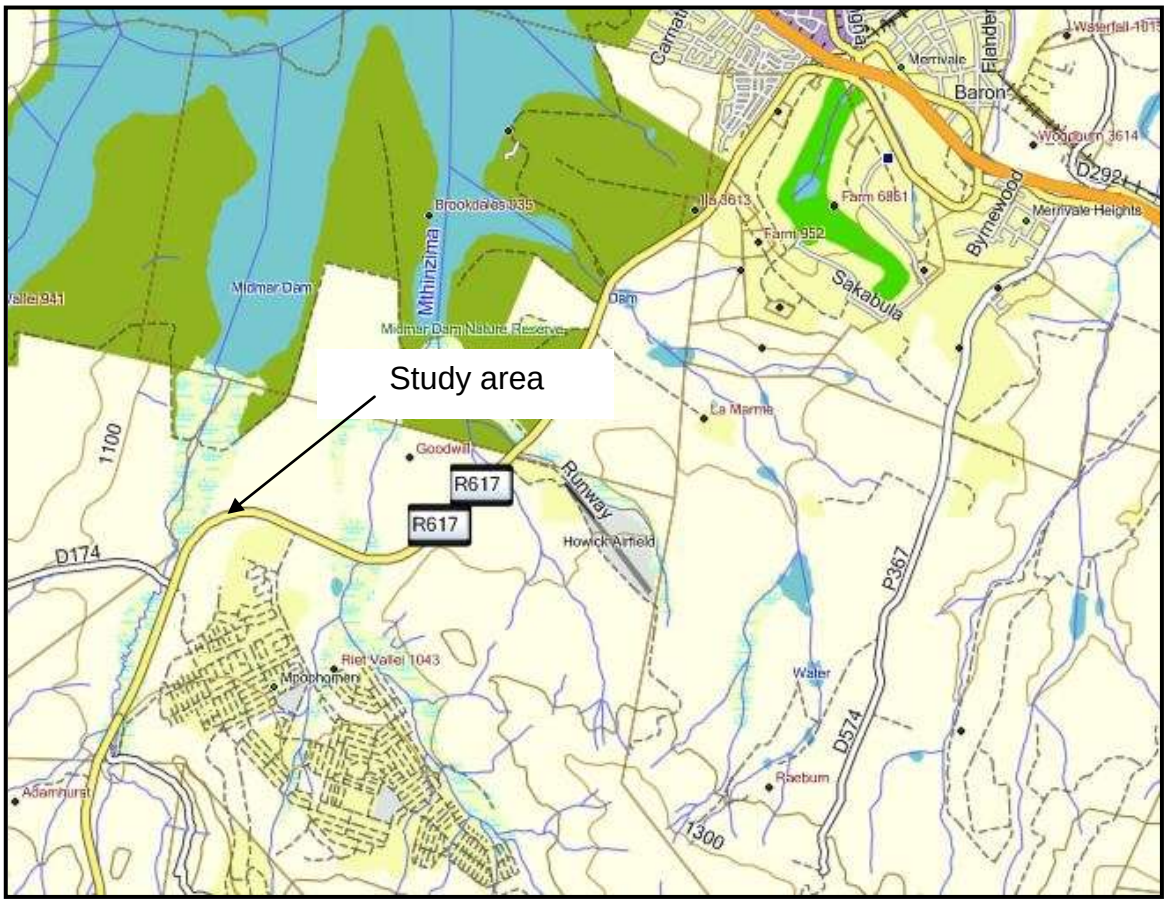


Figure 1 Locality of the proposed Mphophomeni Study Site

(Figure 1).

SOUTH AFRICAN NATIONAL HERITAGE RESOURCE ACT NO 25/1999 AND KWAZULU-NATAL HERITAGE ACT NO 4/2008

This Palaeontological Assessment forms part of the Heritage Impact Assessment (HIA) and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999 as well as the KwaZulu-Natal Heritage Act No 4 of 2008. In accordance with Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), a HIA is

required to assess any potential impacts to palaeontological heritage within the development footprint.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

METHODOLOGY

Following the "SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports" the aims of the palaeontological impact assessment are:

- to identify exposed and subsurface rock formations that are considered to be palaeontologically significant;
- to assess the level of palaeontological significance of these formations;
- to comment on the impact of the development on these exposed and/or potential fossil resources and
- to make recommendations as to how the developer should conserve or mitigate damage to these resources.

In preparing a palaeontological desktop study the potential fossiliferous rock units (groups, formations etc) represented within the study area are determined from geological maps and Google Earth imagery. The known fossil heritage within each rock unit is inventoried from the published scientific literature,

previous palaeontological impact studies in the same region and the author's field experience.

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained in Table 1 below.

Table 1 Palaeontological sensitivity analysis outcome classification

Sensitivity	Description
Low Sensitivity	Areas where there is likely to be a negligible impact on the fossil heritage. This category is reserved largely for areas underlain by igneous rocks. However, development in fossil bearing strata with shallow excavations or with deep soils or weathered bedrock can also form part of this category.
Moderate Sensitivity	Areas where fossil bearing rock units are present but fossil finds are localised or within thin or scattered sub-units. Pending the nature and scale of the proposed development the chances of finding fossils are moderate. A field-based assessment by a professional palaeontologist is usually warranted.
High Sensitivity	Areas where fossil bearing rock units are present with a very high possibility of finding fossils of a specific assemblage zone. Fossils will most probably be present in all outcrops and the chances of finding fossils during a field-based assessment by a professional palaeontologist are very high. Palaeontological mitigation measures need to be incorporated into the Environmental Management Plan

When rock units of moderate to high palaeontological sensitivity are present within the development footprint, a field-based assessment by a professional palaeontologist is usually warranted.

The key assumption for this desktop study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and, without supporting field assessments, may lead to either:

an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or

an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering, or are buried beneath a thick mantle of unfossiliferous “drift” (soil, alluvium etc).

GEOLOGY

The study area is underlain by Permian aged rocks of the Volksrust Formation, Ecca Group, of the Karoo Supergroup, (Figure 2).

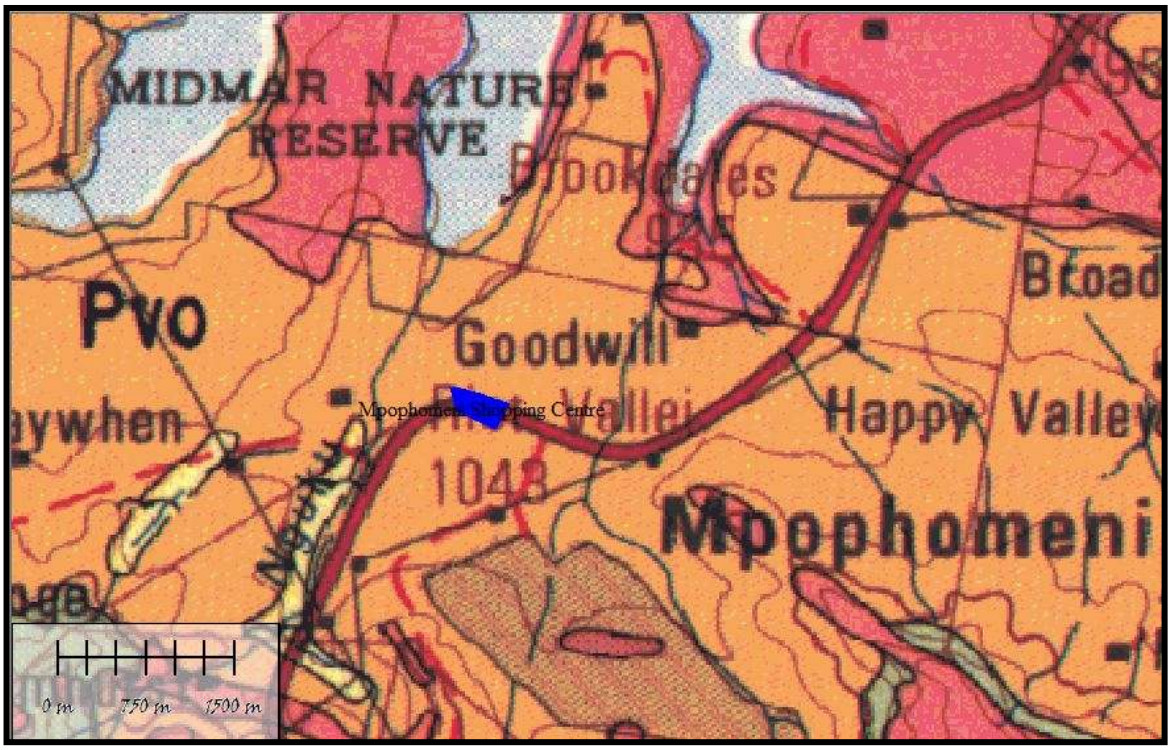


Figure 2 The study area is underlain by rocks of the Volksrust Formation (PVo)

Volksrust Formation (PVo)

The Permian aged Volksrust Formation is an assemblage of fine-grained sediments, consisting mainly of dark grey mudstone and shale. The deposits represent Permian aged marine deposits in this part of Gondwanaland (Johnson et al, 2006). Basinal dark mudrocks with phosphatic / carbonate / sideritic concretions and minor coals can be present.

Offshore shelf, but possibly also nearshore / lacustrine / lagoonal deposits.

PALAEONTOLOGY

Volksrust Formation (PVo)

Well defined, low-diversity marine to non-marine trace fossil assemblages have been described from the upper layers of the Formation.

Other fossils include rare, temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic

microfossils (acritarchs). The upper layers of the Formation might be associated with Late Permian *Cistecephalus* Assemblage Zone biotas.

The bivalve Megadesmus is described from the Late Permian Volksrust Shale Formation in the north-eastern Karoo Basin, South Africa; this is the first reported discovery of this genus in Africa. The fossil is large, 9 cm dorsally and 8.4 cm laterally, and both valves are articulated indicating minimum transport after death. The bivalve was encased in interbedded siltstone-shale that constitutes the distal sediments of a prograding delta at the Beaufort –Ecca Group boundary. Megadesmus is known from other continents (Australia, India, Siberia, South America and Tasmania) where its presence indicates exclusively marine conditions. The implication for the northeastern Karoo Basin during the Late Permian is that a marine enclave still existed in this geographic area and that terrestrial conditions did not yet prevail as in the southern basin region.

DISCUSSION

The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews. Although fossils are rarely recorded from the Voksrust Formation, the recording of fossils recording of trace fossils and other fossils from this part of the Ecca Basin will contribute significantly to our understanding of the palaeo-environments that existed during the Permian.

MANAGEMENT PLAN

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained in Table 1.

The palaeontological sensitivity of the development is related to the specific geology that underlies the development footprints. For the sake of this desktop survey it is assumed that there are no significant outcrops on site, but that trenching of up to 2m depth will in fact expose fresh bedrock of the Volksrust Formation during the construction phase. Due to the fact that the recording of fossils will have a significant impact on our understanding of the palaeo-environments in this part of the basin, a Moderate Palaeontological sensitivity is allocated to the study site.

The palaeontological sensitivity of the study area is shown in Figure 3.

Figure 3 A Moderate Palaeontological sensitivity is allocated to the site

CONCLUSION AND RECOMMENDATIONS

The footprint of the proposed construction of the Mphophomeni Shopping Centre in the Umgeni Local Municipality of the UMgungunglovu District Municipality in KwaZulu-Natal is underlain by Permian aged shale of the Volksrust Formation, Ecca Group of the Karoo Supergroup. Although rare, significant fossils have been described from the Volksrust Formation, with specific reference to trace fossils. Recording of fossils from the construction site will contribute significantly to our understanding of the palaeo-environments that existed in this part of the Karoo basin during the Permian.

It is expected that excavations for the foundations of buildings will be deeper than 2 m, and it is likely that fresh bedrock will be exposed. A Moderate Palaeontological Sensitivity is allocated to the development site.

Recommendations:

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REFERENCES

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 University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeo-ecological 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.

Dr Gideon Groenewald

Geologist