

**HERITAGE SURVEY OF THE GUNJANA WATER
SUPPLY SCHEME: PHASE 2, UMZINYATHI
DISTRICT MUNICIPALITY, KZN**

FOR TERRATEST (PTY) LTD

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Executive summary

A heritage survey was undertaken for the proposed Gunjana WSS. The project is located in the Msinga Local Municipality, within the Umzinyathi District Municipality's area of jurisdiction. The project involves supplying water to the community of Gunjana via communal standpipes and related infrastructures.

A 40m wide corridor of assessment has been implemented for the entire alignment, including both bulk rising main and reticulation pipelines, to allow for unforeseen construction deviations if required. The construction corridor is limited to 10m wide in which all machinery and soil stockpiles are to be located in during construction activities

The heritage survey desktop noted that there would be 20th century settlements within the general study area as well as archaeological sites. The PIA desktop noted that while fossil bearing deposits do occur in the area, they are unlikely to yield important fossil finds, especially in the upper weathered deposits. A Chance Find Protocol was initiated for the PIA.

The heritage survey recorded forty eight (48) heritage sites, of which most will be affected by the pipeline. These sites consisted mostly of human graves while one site was a late Iron Age/Historical Period stone walled settlement... All graves must have a 20m buffer between the edge of the grave and a development. Furthermore, all graves within 50m of a development need to be clearly demarcated before the construction begins. The demarcation needs to be 5m from the edge of the grave.

The proposed WSS has a 10m footprint, and in several instances the route needs to be aligned so as not to affect human graves. In a few instances the existing road can be used a natural buffer, provided that the pipeline footprint

does not extend into the road. Alternative realignments were noted for those areas where the pipeline could be realigned.

The aim of the mitigation is to have as little impact on heritage sites as possible. This includes the stonewalling from the settlements that are less than 60 years in age.

Abbreviations

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

INTRODUCTION

Terratest (Pty) Ltd has been appointed by JG Afrika (Pty) Ltd, on behalf the Umzinyathi District Municipality, to undertake the environmental services required for the proposed Gunjana Community Water Supply Scheme, Umzinyathi District Municipality, KwaZulu-Natal.

The project is located in the Msinga Local Municipality, within the Umzinyathi District Municipality's area of jurisdiction. The project involves supplying water to the community of Gunjana via communal standpipes and includes the following components:

- Drilling and equipping of two boreholes;
- Construction of two reservoirs (50 Kl and 300 Kl);
- 8.5km of 110mm diameter steel bulk rising main with a flow rate of approximately 5.5 l/s;
- 38km of uPVC and HDPE reticulation network with diameters ranging from 50mm to 200mm;
- Standpipes;
- Break pressure tanks;
- Air, scour and isolating valves; and
- Road and donga crossings.

A 40m wide corridor of assessment has been implemented for the entire alignment, including both bulk rising main and reticulation pipelines, to allow for unforeseen construction deviations if required. The construction corridor is limited to 10m wide in which all machinery and soil stockpiles are to be located in during construction activities" (Terratest BID 2020).

Figures 1 – 4 show the location of the development.

Umlando was subcontracted to undertake the HIA for the project.

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT

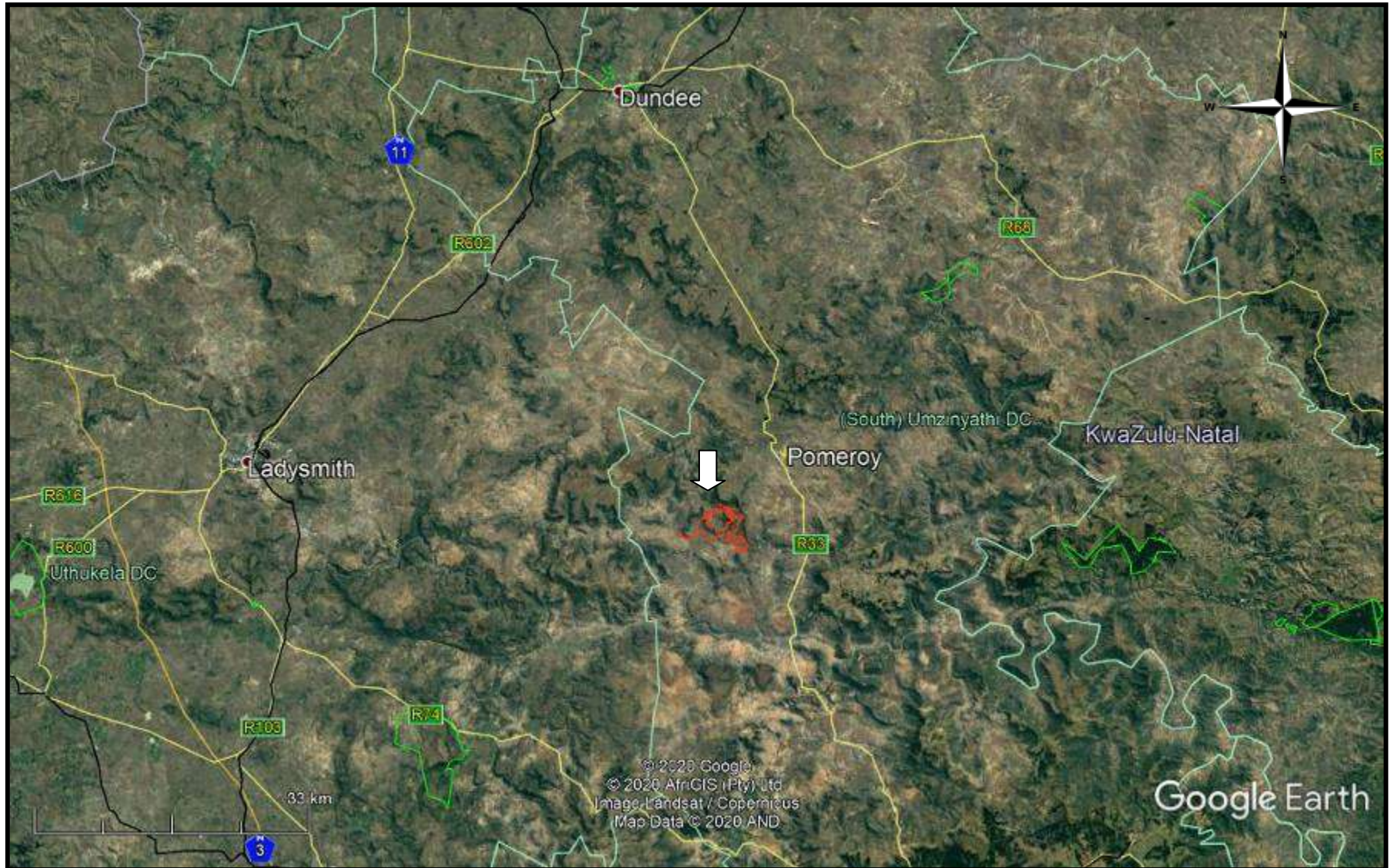


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT OF ERF 1703



FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT

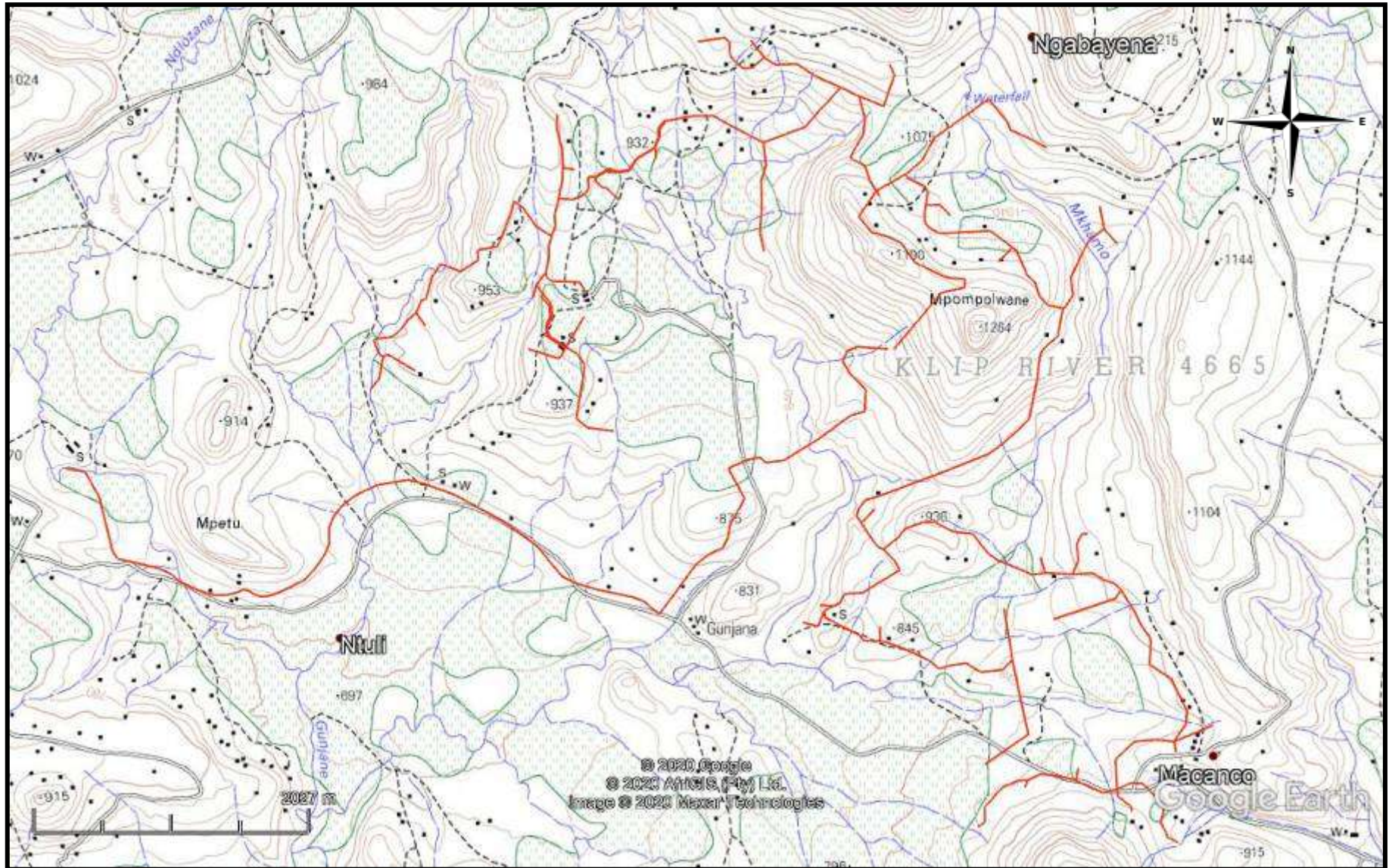


FIG. 4: SCENIC VIEWS OF THE STUDY AREA



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 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. Table 1 lists the grading system

TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES

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

RESULTS

DESKTOP STUDY

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. There have been no prior surveys in the study area. The archaeological sites tend to be open Stone Age scatters of low significance (fig. 5).

The 1937 aerial maps indicate that the area was sparsely settled but there are several large agricultural fields (fig. 6). Many of the settlements on these maps are still being used today. The pipeline does not pass through any of these 1937 settlements.

The 1965 1:50 000 topographical map indicates a similar population size and the use of land as in 1937 (fig. 7). Several settlements occur near the proposed line.

The desktop study indicates that there is a high likelihood that 20th century graves will occur along the proposed line. There is also a likelihood the Late Iron Age and Historical Period archaeological sites would occur, as well as Middle Stone Age and Late Stone Age scatters.

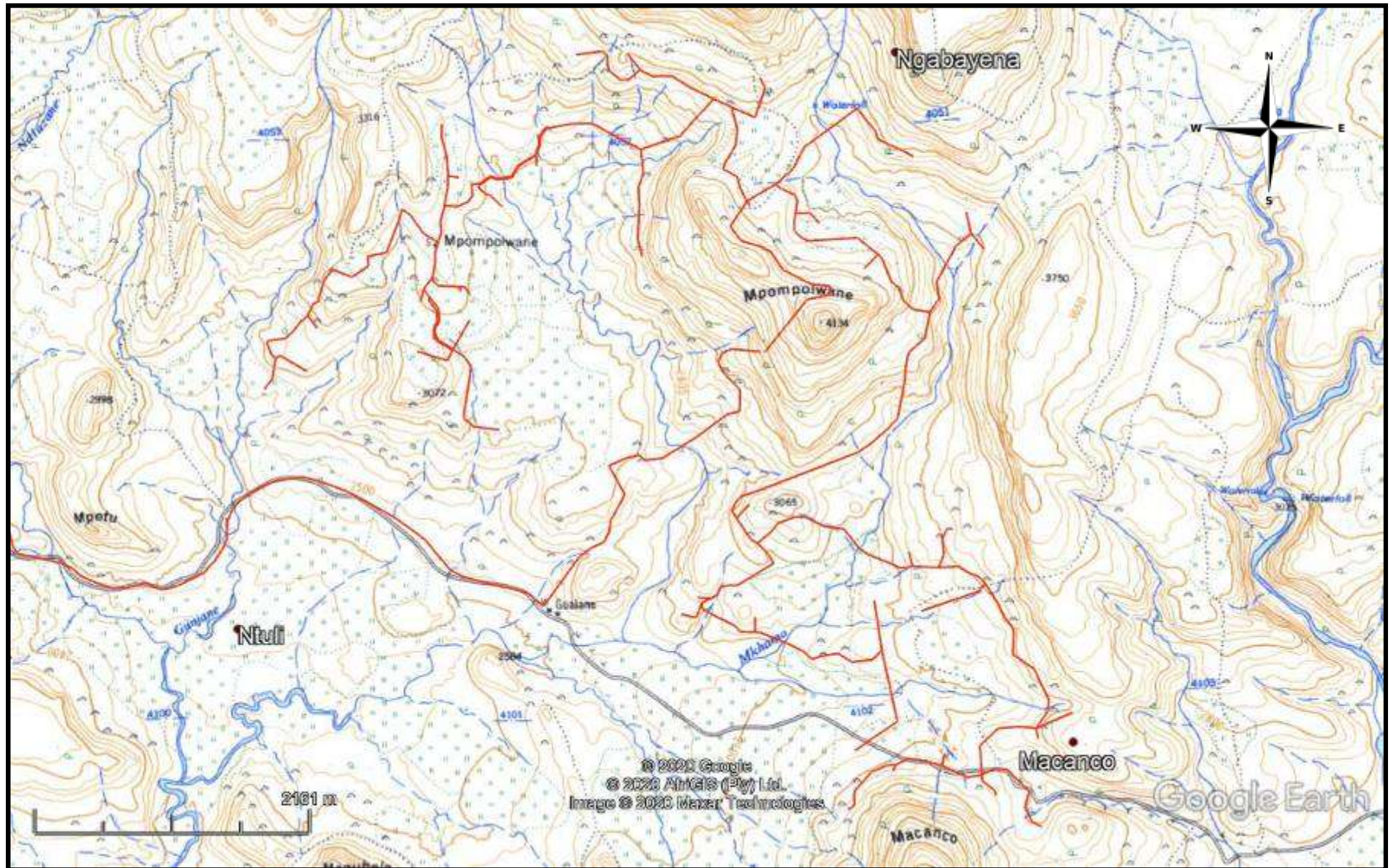
FIG. 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA



FIG. 6: LOCATION OF PROPOSED DEVELOPMENT IN 1937



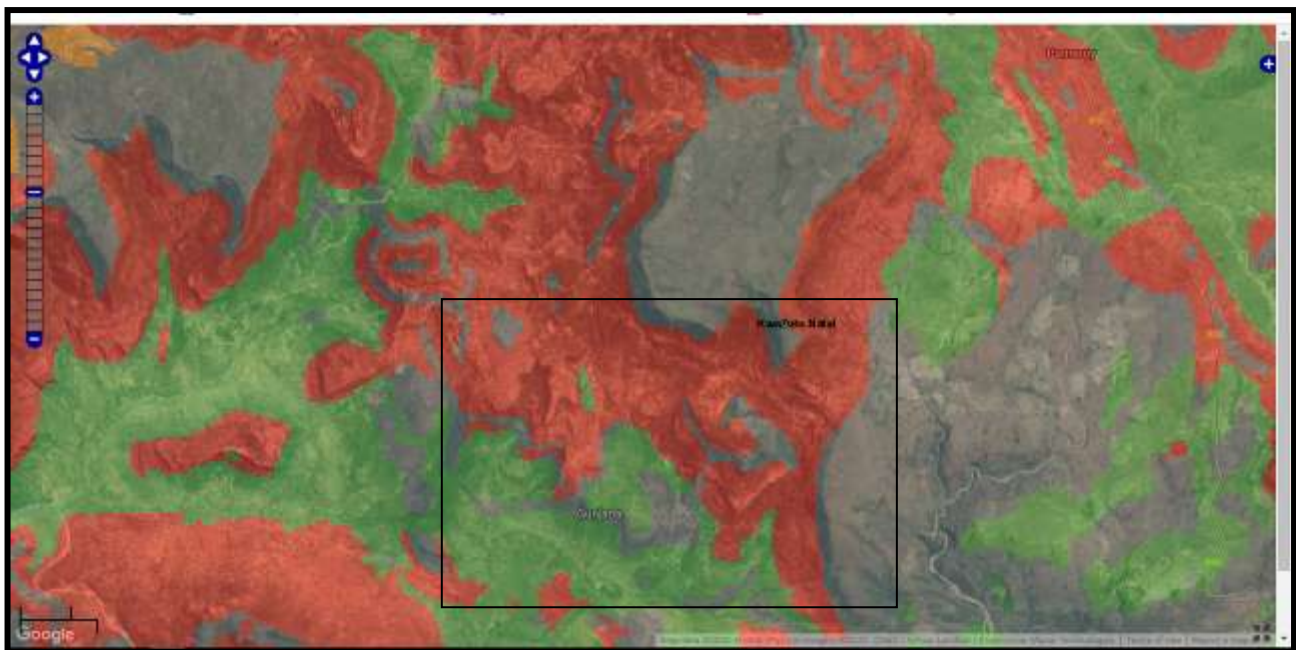
FIG. 7: LOCATION OF PROPOSED DEVELOPMENT IN 1965



PALAEONTOLOGICAL SENSITIVITY

The area is of low to moderate palaeontological sensitivity (fig. 10). Dr A. Smith undertook a PIA desktop for the study area. He states that the area is on Vryheid Formation, Pietermaritzburg Formations and Dolerite. These Formations have low significance and a low chance of finding fossils in the weathered deposits. A Chance Find Protocol has been inserted in case fossils are found during excavation. Should this take place then a Palaeontologist must be called to inspect the discovery.

FIG. 8: PALAEONTOLOGICAL SENSITIVITY MAP



FIELD SURVEY RESULTS

Ground visibility was very good throughout the most of the project area; however, some areas were inaccessible due to steep inclines or non-useable roads. Steep hills were not surveyed as they would not have human settlements and were covered in thickets. One area had very dense vegetation and it was not possible to survey it accurately. This area might need to be rerouted and/or can be resurveyed after vegetation clearance. This is the area to the west of GUNJ014 that was a large settlement.

In some locations, the proposed pipeline follows the existing water pipeline and is in an already disturbed area (i.e. reticulation pipe constructed under Phase 1 of the development).

Stone Age tools were noted throughout the study area. These were not recorded as they were isolated occurrences and do not constitute a site. They form part of the generic stone tools found in KZN.

I had a community member as a guide for the areas north of Mpompolawane. This assisted in terms of speaking to community members regarding graves along the line that was inaccessible, as well as locating routes to get to the pipeline.

On several occasions, the proposed route will go through the remains of settlements, or affect a small section of it. The more recent settlements are not protected by legislation, apart from the graves; however, the route should strive for minimal impact wherever it can. I have suggested alternative routes for these settlements and supplied the rerouting in Google Earth Format. In a few instances, the pipeline will have no choice but to damage post 1960s walling and terracing. These areas are noted in the report.

The location of the recorded sites are shown in fig. 9 and listed in Table 3.

FIG. 9: LOCATION OF RECORDED SITES

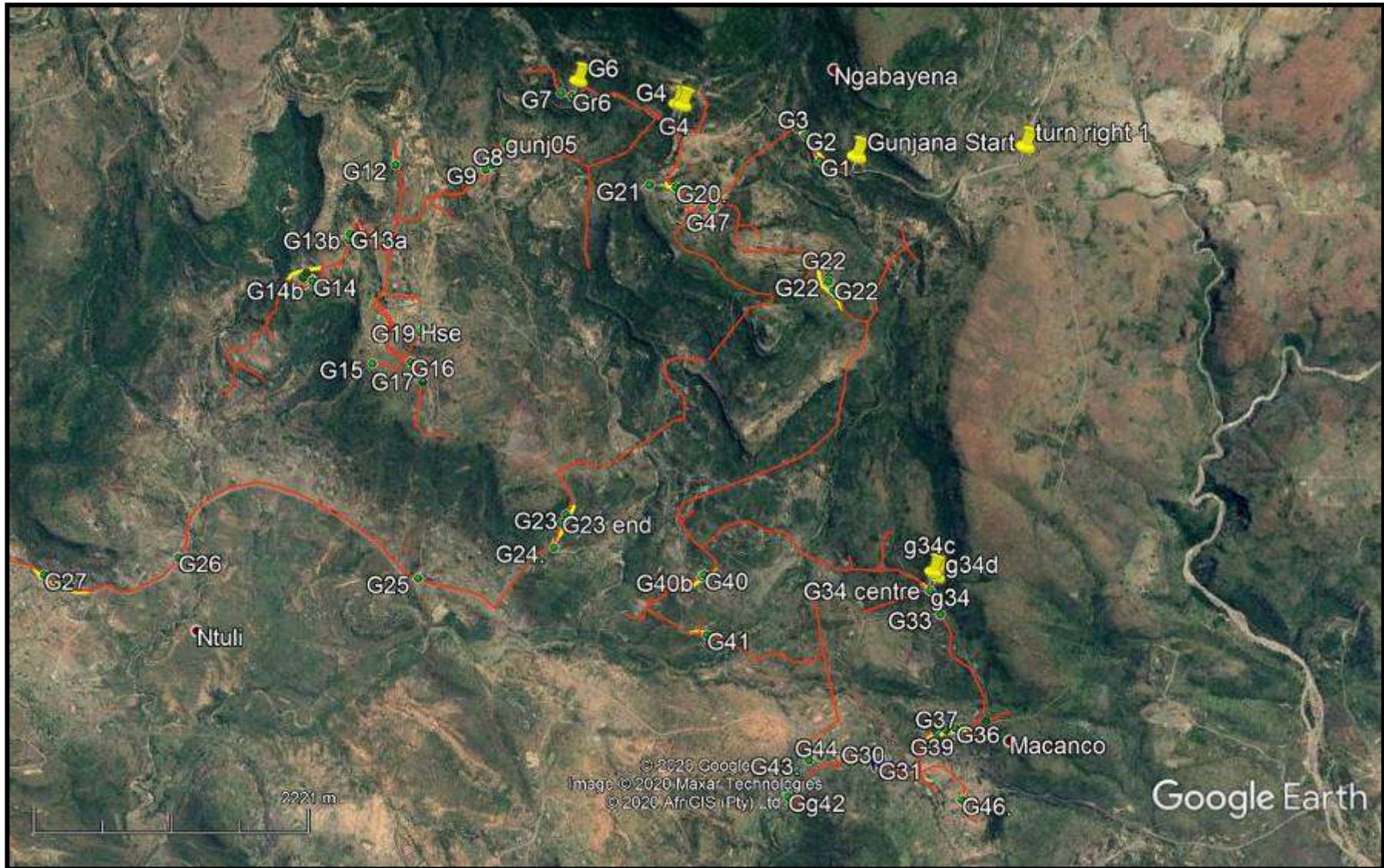


TABLE 3: LOCATION OF RECORDED SITES AND THEIR SENSITIVITY

NAME	LATITUDE	LONGITUDE	DESCRIPTION	Sensitivity	Requires Route Realignment
GUNJ001	-28.612674600	30.377214944	3X grave and houses	High	Yes
GUNJ002	-28.610847000	30.376027000	Terrace	Low	Yes
GUNJ003	-28.610330000	30.375430000	Grave	High	Yes
GUNJ004	-28.609722222	30.365555556	grave	High	N
GUNJ004	-28.609805556	30.365972222	grave	High	N
GUNJ005	-28.611164000	30.352098000	Walling	Low	N
GUNJ006	-28.608055556	30.357694444	Central	N	Yes
GUNJ006	-28.608095592	30.357659351	Grave	High	Yes
GUNJ006	-28.620527778	30.335763000	Walling	Low	Yes
GUNJ006	-28.608086111	30.357550000	4 graves	High	Yes
GUNJ006	-28.620576000	30.335814000	Grave	High	Yes
GUNJ007	-28.607883000	30.356686000	2 grave	High	Yes
GUNJ008	-28.612630000	30.350997000	3 graves	High	N
GUNJ009	-28.612938000	30.350459000	Walling	Low	N
GUNJ010	-28.613398000	30.349563000	Kraal	Low	Yes
GUNJ011	-28.613111737	30.348589749	Shembe	High	N
GUNJ012	-28.612681000	30.343306000	Graves	High	N
GUNJ013a	-28.617480000	30.339598000	Grave	High	Yes
GUNJ013b	-28.617913000	30.339512000	Grave 5	High	Yes
GUNJ014	-28.620510000	30.335692000	3 x grave	High	Yes
GUNJ014	-28.620811000	30.336561000	Pottery	Low	Yes
GUNJ014	-28.620231000	30.336069000	Grave? x2	High	Yes
GUNJ014b	-28.621057000	30.336544000	grave	High	Yes
GUNJ015	-28.626631000	30.341325000	Grave	High	N
GUNJ016	-28.626561811	30.344263426	Grave	High	N
GUNJ017	-28.627448000	30.345380000	Grave 10	High	Yes
GUNJ018	-28.627917000	30.345307000	Cemetery	High	Yes
GUNJ019a	-28.624056000	30.345493000	Grave	High	N

NAME	LATITUDE	LONGITUDE	DESCRIPTION	Sensitivity	Requires Route Realignment
GUNJ019b	-28.622123004	30.344708237	Graves	High	N
GUNJ020.	-28.614519000	30.365785000	walling	Low	Yes
GUNJ020b	-28.614574000	30.365964000	Walling	Low	Yes
GUNJ020c	-28.614405000	30.366327000	Grave	High	Yes
GUNJ021	-28.614459084	30.363750078	Grave	High	N
GUNJ022	-28.621015000	30.377859000	3x grave	High	Yes
GUNJ022	-28.620752778	30.377886111	walling	Low	Yes
GUNJ022	-28.620153000	30.377838000	Cairn	High	Yes
GUNJ022	-28.621653000	30.378256000	grave;	High	Yes
GUNJ023	-28.637330000	30.356838000	Grave 3	High	Yes
GUNJ023 end	-28.637997582	30.356481153	End of settlement	N/A	Yes
GUNJ024.	-28.639261252	30.355794247	Grave by house	High	Yes
GUNJ025	-28.641986000	30.344586000	Grave	High	N
GUNJ026	-28.640495000	30.324815000	Grave 2	High	Yes
GUNJ027	-28.641769000	30.313760000	Graves x2	High	Yes
GUNJ028	-28.642706236	30.314896149	Grave 8	High	Yes
GUNJ029	-28.653870000	30.378316000	Cemetery	High	N
GUNJ030	-28.654884240	30.381348070	Wall	Low	Yes
GUNJ031	-28.655062146	30.382112862	Grave 2	High	Yes
GUNJ032	-28.652017000	30.390689000	General	N/A	Yes
GUNJ032b	-28.651899000	30.390759000	graves	High	Yes
GUNJ033	-28.644334000	30.387091000	grave	High	Yes
GUNJ033b	-28.644311000	30.387016000	grave	High	Yes
GUNJ033c	-28.644389000	30.387036000	grave	High	Yes
GUNJ034	-28.642682000	30.386268000	Grave?	High	Yes
GUNJ034 centre	-28.642630000	30.386147000	General	N/A	Yes
GUNJ034c	-28.642361111	30.386111111	Grave	High	Yes
GUNJ034d	-28.642694444	30.386388889	grave	High	Yes
GUNJ035a	-28.652558000	30.387607000	Grave	High	Yes
GUNJ035b	-28.652334000	30.387759000	Grave	High	Yes
GUNJ035c	-28.652332000	30.387805000	Grave	High	Yes
GUNJ035d	-28.652160000	30.387897000	Grave	High	Yes

NAME	LATITUDE	LONGITUDE	DESCRIPTION	Sensitivity	Requires Route Realignment
GUNJ036	-28.652445000	30.388351000	Grave	High	Yes
GUNJ037	-28.652410000	30.387191000	Grave	High	Yes
GUNJ037b	-28.652243000	30.386971000	Grave	High	Yes
GUNJ038	-28.652468000	30.386670000	Grave	High	Yes
GUNJ039	-28.652721000	30.386810000	Grave	High	Yes
GUNJ040	-28.641631000	30.368059000	Grave	High	Yes
GUNJ040b	-28.641768000	30.367844000	Grave	High	Yes
GUNJ041	-28.645978000	30.368252464	Cemetery	High	Yes
GUNJ042	-28.657385000	30.374844000	Grave	High	N
GUNJ043.	-28.654813000	30.376552000	Cemetery	High	N
GUNJ044	-28.654548000	30.377505000	Stone walling	Low	N
GUNJ045	-28.653188000	30.386818000	Shembe shrine;	High	N
GUNJ046.	-28.657596008	30.388912475	playground	Low	Yes
GUNJ047	-28.615851000	30.368686000	Grave	High	N
GUNJ048	-28.642636871	30.315868414	Grave x2	High	Yes

GUNJ01

The site is located adjacent to the main access road (fig. 10). The site consists of a terrace that has the remains of at least three houses and three graves over an area of 100m x 20m. The site post-dates the 1960s

The pipeline currently affects the northwest corner of the settlement and some walling. The route should be moved slightly northwards.

Significance: The graves are of high significance.

Mitigation: The route should be moved slightly northwards

SAHRA Rating: 3A for the graves

FIG. 10: GUNJ01



GUNJ02

The site is located to the north of the main access road. The site consists of terracing for houses (fig. 11). No graves were noted. A lower grinding stone made from dolerite was recorded.

Significance: The site is currently of low significance

Mitigation: The line should be moved slightly southwards to avoid the walling at GUNJ02 and to realign for GUNJ03.

SAHRA Rating: 3C

FIG. 11: GUNJ02



GUNJ03

The site is located to the north of the main access road. The site consists of terracing for houses and a single grave (fig. 12). The line currently occurs 2m south of the grave.

Significance: The grave is of high significance

Mitigation: The line needs to be moved southwards and across the road.

SAHRA Rating:

FIG. 12: GUNJ03



GUNJ04

The site is located to the north of the main access road near the base of the hill. The site consists of at least five terraces for houses, stone walling, and at least three graves on the lower terrace (fig.13).

Significance: The graves are of high significance.

Mitigation: No mitigation is required as the line currently avoids the sites.

SAHRA Rating: 3A

FIG. 13: GUNJ04



GUNJ05

The site is located on the top of small hill overlooking the valley to the west.

The site consists of a recently abandoned settlement (fig. 14). No graves were visible.

The pipeline occurs to the south of GUNJ05 and does not affect the site.

Significance: The site is of low significance

Mitigation: No further mitigation is required.

SAHRA Rating: 3C

FIG.14: GUNJ05



GUNJ06

The site is located to the north of the existing road near the base of the hill. The site consists of three terraces and at least four graves over an area of 40m x 70m (fig. 15). The line currently occurs 7m south of the graves.

Significance: The graves are of high significance.

Mitigation: The line needs to move south of the road.

SAHRA Rating: 3A

FIG.15: GUNJ06



GUNJ07

The site is located south of the road and 7m from the line. The site consists of two graves that are probably related to the settlement to the north of the road (fig. 16).

Significance: The graves are of high significance.

Mitigation: The line needs to move north to the other side of the road.

SAHRA Rating: 3A

FIG.16: GUNJ07



GUNJ08

The site is located on the east side of the road. The site consists of three recent graves that have been cordoned off with a wall (fig. 17). The line occurs on the opposite side of the road.

Significance: The graves are of high significance.

Mitigation: No mitigation currently required

SAHRA Rating: 3A

FIG. 17: GUNJ08



GUNJ09

The site is located besides an *Acacia spp.* tree 15m from the line. The site consists of small circular stone walling (fig. 18).

Significance: The site is of low significance.

Mitigation: No mitigation is required.

SAHRA Rating: 3C

FIG. 18: GUNJ09



GUNJ010

The site is located 100m SW of GUNJ09 and besides Acacia spp. trees. The site consists of a large low stone walled circle ~8m in diameter (fig. 19). The footprint of the line will affect the walling.

Significance: The walling is of low significance.

Mitigation: The line should move to the opposite side of the fence by the agricultural field, and use the fence as a buffer line.

SAHRA Rating: 3C

FIG. 19: GUNJ010



GUNJ011

The site is located ~100m from the line. The site consists of a Shembe Shrine ~25m in diameter (fig. 20).

Significance: Places of worship are considered to have high significance.

Mitigation: No mitigation is required.

SAHRA Rating: 3B

FIG. 20: GUNJ011



GUNJ012

The site is located to the west of an access road. The site consists of three to four graves that are probably related to the settlement next to it (fig. 21). The access road acts as a buffer between the line and the graves.

Significance: The graves are of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3A

FIG. 21: GUNJ012



GUNJ013a-b

The site is located to the west of the existing access road. The site consists of graves and an existing settlement next to each other (fig. 22). GUNJ013a consists of one recent grave, while GUNJ013b consists of five graves. The current line occurs on the west side of the road.

Significance: The Graves are of high significance.

Mitigation: The line needs to move to the east of the road.

SAHRA Rating: 3A

FIG. 22: GUNJ013a-b



GUNJ014

The site is located halfway up a hill and extends for ~100m northwards. The site consists of a main settlement of house floors on the hill and then several stone walled structures at the base of the hill (fig. 23A). The site appears to be a multicomponent site of which some may date to the HP and/or LIA. A range of pottery occurs on the surface as well as upper grinding stones. At least ten graves occur in an area 150m x 150m in size. More graves could occur in the more dense bushes. Some of the trees have been utilised for *muthi* for several years. Some of graves could occur underneath the *Euphorbia ingens* that occur on the site (Fig. 24B).

The current line passes between graves and then runs along the base of the hill parallel to the old houses and thus affects the site. If the current line is located, in any part of the site, it will affect an archaeological deposit and/or graves and this will require further mitigation. The vegetation to the west of this site was too dense to survey.

I suggest the following:

- The line is moved northwards closer to the erosion gully
- The final desktop route is re-analysed.
- The final route (for this area) is revisited with the surveyor to ensure that it is not near any new sites

Significance: The site is of medium to high significance. The archaeological component would need test pits and/or monitoring during construction. The graves cannot be affected and the route footprint will always be within 20m of the grave.

Mitigation: The line should be rerouted northwards and ground truthed after the final design.

SAHRA Rating: 3A

FIG. 23A: GUNJ014



FIG. 23B: GUNJ014



GUNJ015

The site is located top the south of the current access road. The site consists of a large *Euphorbia ingens* with a stone cairn at the base (fig. 24). The cairn is a grave. No obvious settlement occurred near the grave.

The pipeline is currently 20m from the grave and to the north of the access road.

Significance: The grave is of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3A

FIG. 24: GUNJ015



GUNJ016

The site is located on the south side of the access road. The site consists of a grave in front of the main house (fig. 25). The pipeline occurs to the north of the road and will not affect the grave.

Significance: The grave is of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3A

FIG. 25: GUNJ016



GUNJ017

The site is located to the east of the road and 5m from the pipeline. The site consists of a cemetery of 10+ graves that probably relate to the existing settlement to the east (fig. 26).

The current pipeline will affect the cemetery and needs to be moved westwards between the road and the house.

Significance: The graves are of High significance.

Mitigation: The line needs to be moved

SAHRA Rating: 3A

FIG.26: GUNJ017



GUNJ018

The site is located to the east of the road and 10m from the pipeline. The site consists of a cemetery of 10+ graves that probably relate to the existing settlement to the east (fig. 27).

The current pipeline will affect the cemetery and needs to be moved westwards between the road and the house.

Significance: The graves are of High significance.

Mitigation: The line needs to be moved

SAHRA Rating: 3A

FIG. 27: GUNJ018



GUNJ019a-b

The site is located on an open field. The GUBNJ019a consists of a single grave 30m from the line (fig. 28), while GUNJ019b consist of three – five graves near the school entrance (the photograph was accidentally deleted after the survey). The pipeline will currently not affect the graves. I spoke to a community member who informed me that these were the only graves in the immediate area.

Significance: The graves are of high significance

Mitigation: No further mitigation is required.

SAHRA Rating: 3A

FIG. 28: GUNJ019A



GUNJ020

The site is located at the base of a hill and extends over an area of 115m x 110m. The site consists of several large stone walled circles, archaeological deposit and graves (fig. 29). The site dates from the LIA, HP, and these features appear to have been re-used in times that are more recent. The entrances to the kraals vary in location, and some kraals are nearly full with deposit, while others are partially full. The kraals do not appear to have been used for some time.

The pottery is thin-walled and undecorated and there appears to be an archaeological deposit. Parts of the site will require archaeological excavation and mapping of features, while the graves and walling cannot be moved.

The pipeline and its footprint will affect the site in any direction it is moved. I suggest the route in this area is realigned and moved ~150m north and east of the existing location.

Significance: The site is of high significance

Mitigation: The line needs to be moved 150m away from its current position; otherwise, archaeological excavations, and permit, will be required.

SAHRA Rating: 3A

FIG. 29: GUNJ020



GUNJ021

The site is located halfway up a hill on terracing. The site consists of terracing and a recent grave (fig. 30).

The pipeline is currently 130m from the grave.

Significance: The grave is of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3C

FIG. 30: GUNJ021



GUNJ022

The site is located at the base of the main hill. It consists of several agricultural fields, stone walled circles, living areas and graves (fig. 31). The site covers an area of 250m x 120m. The site appears to be 20th century in age. Five graves and one stone cairn were noted during the survey.

The current pipeline goes through the middle of the site.

Significance: The graves are of high significance.

Mitigation: The line needs to be moved north or south of the site.

SAHRA Rating: 3A

FIG. 31: GUNJ022



GUNJ023

The site is located on a terrace to the west of the main access road. It consists of six house remains and three graves (fig. 32). The houses were recently abandoned. The graves are located next to the road and uphill of the houses.

The pipeline currently goes through the site and is 10m from the graves.

Significance: The graves are of high significance.

Mitigation: The pipeline should move to the east of the road.

SAHRA Rating: 3A

FIG. 32: GUNJ023



GUNJ024

The site is located uphill to the west of the road. It consists of an existing settlement and a grave in front of the houses (fig. 33).

The current line passes within 10m of the grave.

Significance: The grave is of high significance.

Mitigation: The line should be moved to the east of the road.

SAHRA Rating: 3A

FIG. 33: GUNJ024



GUNJ025

The site is located to the north of the road in a cleared area. The site consists of a single grave and a scatter of MSA flakes (fig. 34). No settlements are directly associated with the grave. The pipeline occurs within 10m of the grave.

Significance: The grave is of high significance, while the stone tools are of low significance.

Mitigation: The line needs to move south so as not to affect the grave footprint. The 20m buffer for the grave may decrease for this section.

SAHRA Rating: Grave: 3A, MSA: 3C

FIG. 34: GUNJ025



GUNJ026

The site is an existing settlement located to the north of the road. The site consists of houses and two grave in the front (fig. 35).

The pipeline occurs within 5m of the grave.

Significance: The grave is of high significance.

Mitigation: The pipeline needs to move south of the road, or to the border of the road.

SAHRA Rating: 3A

FIG. 35: GUNJ026



GUNJ027

The site is located to the north of the road and in the footprint of the line.

The site consists of an existing settlement and two graves in front of the house (fig. 36).

The centre of the line occurs within 2m of the graves

Significance: The graves are of high significance.

Mitigation: The line needs to move south of the road.

SAHRA Rating: 3A

FIG.36: GUNJ027



GUNJ028

The site is located to the south of the road on a flat, cleared area. The site consists of eight graves (fig. 37).

The line is currently to the north of the road and does not affect the graves.

Significance: The graves are of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3A

FIG. 37: GUNJ028



GUNJ029

The site is located to the north of the road amongst wattle trees. The site consists of a cemetery of 10+ graves (fig. 38).

The line is ~140m northwest and does not affect the cemetery.

Significance: The cemetery is of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3A

FIG. 38: GUNJ029



GUNJ030

The site is located to the south of the road in an old agricultural field. The site consists of a large stone walled feature (fig. 39).

The pipeline footprint will affect the walling and the alignment should be readjusted and moved slightly northwards.

Significance: The walling is of low significance.

Mitigation: The pipeline needs to move a few meters northwards

SAHRA Rating: 3C

FIG. 39: GUNJ030



GUNJ031

The site is located to the south of the road below the existing houses. The site consists of an existing settlement with two graves (fig. 40).

The pipeline will occur 17m north of the graves; however, the existing cattle byre will form part of a buffer for the graves. The pipeline footprint should also be decreased near the grave and moved a few meters northwards.

Significance: The grave is of high significance.

Mitigation: The pipeline needs to be moved a few meters northwards.

SAHRA Rating: 3A

FIG. 40: GUNJ031



GUNJ032

The site is located to the east of the access road and halfway up the hill on a terrace. The site consists of an abandoned settlement with several stone walled features and at least three graves (fig. 41).

The pipeline will go through the middle of the site, stonewalling and graves. The line needs to be moved northwards

Significance: The graves are of high significance.

Mitigation: The line needs to be moved northwards away from the settlement.

SAHRA Rating: 3A

FIG. 41: GUNJ032



GUNJ033

The site is located to the west of the access road amongst the dense vegetation. The site consists of three graves (fig. 42). I did not observe any settlements associated with the graves. Only one grave is an obvious cairn. The two other graves are much older and have sunken into the soil.

The current line goes through all of the graves.

Significance: The graves are of high significance.

Mitigation: The line needs to be moved at least 20m westwards or to the east of the road.

SAHRA Rating: 3A

FIG.42: GUNJ033



GUNJ034

The site is located on both sides of the road with the main buildings and features uphill of the road. The site consists of a recently abandoned settlement with extensive stone walling and at least three graves (fig. 43). All three graves are “attached” to the cattle byre walling. The area to the west appears to be for agricultural fields.

The pipeline goes through the agricultural fields and some of the lower walling.

Significance: The graves are of high significance.

Mitigation: The pipeline needs to be moved 30m downhill, or westwards. Alternatively, the pipeline should be moved to just west of the road and the footprint needs to be decreased to 5m to minimise the impact on the lower stone walling.

SAHRA Rating: 3C

FIG. 43: GUNJ034



GUNJ035 – GUNK039

The sites are located to the north of an access road. The area consists of five sites of different ages within a 175m x 60m area (44). The red line in fig. 44 is the current line; while the yellow line is an alternative. The groups of graves represent different settlements at different times. Each site consists of the following (fig. 45):

- GUN035: four graves
- GUN036: one grave and current settlement
- GUN037: two graves
- GUN038: one grave
- GUN039: one grave

The current pipeline goes through the middle of the cluster of graves.

Significance: The graves are of high significance.

Mitigation: The pipeline needs to be moved eastwards to the opposite side of the access road.

SAHRA Rating: 3A

FIG. 44: GUNJ035 – GUN039



FIG. 45: GRAVES AT THE GUNJO35 – GUNJ039 CLUSTER



GUNJ040

The site is located to the west of an access road in a previously used agricultural field. The site consists of two graves 25m apart from each other (fig. 46). No other features were directly associated with the graves.

The pipeline currently passes through each grave.

Significance: The graves are of high significance.

Mitigation: The pipeline needs to move eastwards across the road. The pipeline is also in an Eskom servitude.

SAHRA Rating: 3A

FIG.46: GUNJ040



GUNJ041

The site is located to the south of the road in a small dip in the land. The site consists of a cemetery of 10+ graves (fig. 47).

The pipeline currently passes through the cemetery.

Significance: The graves are of high significance.

Mitigation: The pipeline needs to be moved northwards across the road.

SAHRA Rating: 3A

FIG.47: GUNJ041



GUNJ042

The site is located at the base of the hill to the east of the road. The site consists of a single grave in front of an old settlement (fig. 48).

The grave will not be affected by the pipeline, but might be affected by an access point.

Significance: The grave is of high significance.

Mitigation: If the access road occurs near the grave then it needs to be clearly demarcated.

SAHRA Rating: 3A

FIG. 48: GUNJ042



GUNJ043

The site is located amongst a wattle plantation south of the access road. The site consists of a cemetery (fig. 49). The pipeline route will not affect the cemetery.

Significance: The cemetery is of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3A

FIG. 49: GUNJ043



GUNJ044

The site is located to the south of the road underneath an old *Acacia spp.* tree. The site consists of a low stone walled circle that is probably a cattle byre (fig. 50).

The pipeline will not affect the walling.

Significance: The site is of low significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3C

FIG. 50: GUNJ044



GUNJ045

The site is located to the east of the road amongst sparse *Acacia spp.* trees. The site consists of a Shembe Temple (fig. 51).

The current or realigned pipeline will not affect the site.

Significance: Places of worship are considered to have high significance.

Mitigation: No mitigation is required.

SAHRA Rating: 3B

FIG. 51: GUNJ045



GUNJ046

The site is located to the east of the existing access road on a bare shale horizon. The site consists of a playground for children and thus falls under living heritage status (fig. 52). The playground appears to consist of a recreation of various settlements and their walk paths in the area.

The current pipeline route will remove the playground.

Significance: The playground in terms of general heritage is of low significance. However, it may have higher significance for the people of the area.

Mitigation: If possible, the line should be moved so as not to destroy it.

SAHRA Rating: 3C

FIG. 52: GUNJ046



GUNJ047

The site is located between an access road and an agricultural field near the base of a hill. The site consists of a single grave (fig. 53).

The current line will not affect the grave.

Significance: The grave is of high significance.

Mitigation: No mitigation is currently required.

SAHRA Rating: 3A

FIG. 53: GUNJ047



GUNJ048

The site is located between the main road and an existing settlement.
The site consists of two graves in front of the main house (fig. 54).

The current pipeline footprint will affect the grave.

Significance: The grave is of high significance.

Mitigation: The pipeline needs to be moved southwards, preferably across the road.

SAHRA Rating: 3A

FIG. 54: GUNJ048



MANAGEMENT PLAN

The main concern for this project is the location of graves near the pipeline footprint. The pipeline footprint is 10m wide, and in many instances, this overlaps with the required 20m buffer for human graves. That is no development may occur within 20m of a grave. All development within 50m of a grave requires that grave to be clearly demarcated prior to construction with a 5m buffer between the barricade and the edge of the grave.

Where there is a road between the grave and the footprint, and if the road will not be affected, then the buffer may be decreased as the road itself is a barricade. Only in exceptional circumstances, can the buffer decrease to 5m, i.e. where there is no option for realignment. This also requires the pipeline footprint to decrease. These will need to be dealt with on an individual basis. Figures 55 – 66 show the various realignments that are required in terms of the heritage. In these figures, the red line is the current alignments, while the yellow line is the suggested realignment. The final route alignment can be viewed at a desktop level.

While it is highly unlikely that palaeontological fossils will be found during construction, a Chance Find Protocol has been initiated.

FIG. 55: ROUTE REALIGNMENT AT GUNJO01 – GUNJ03

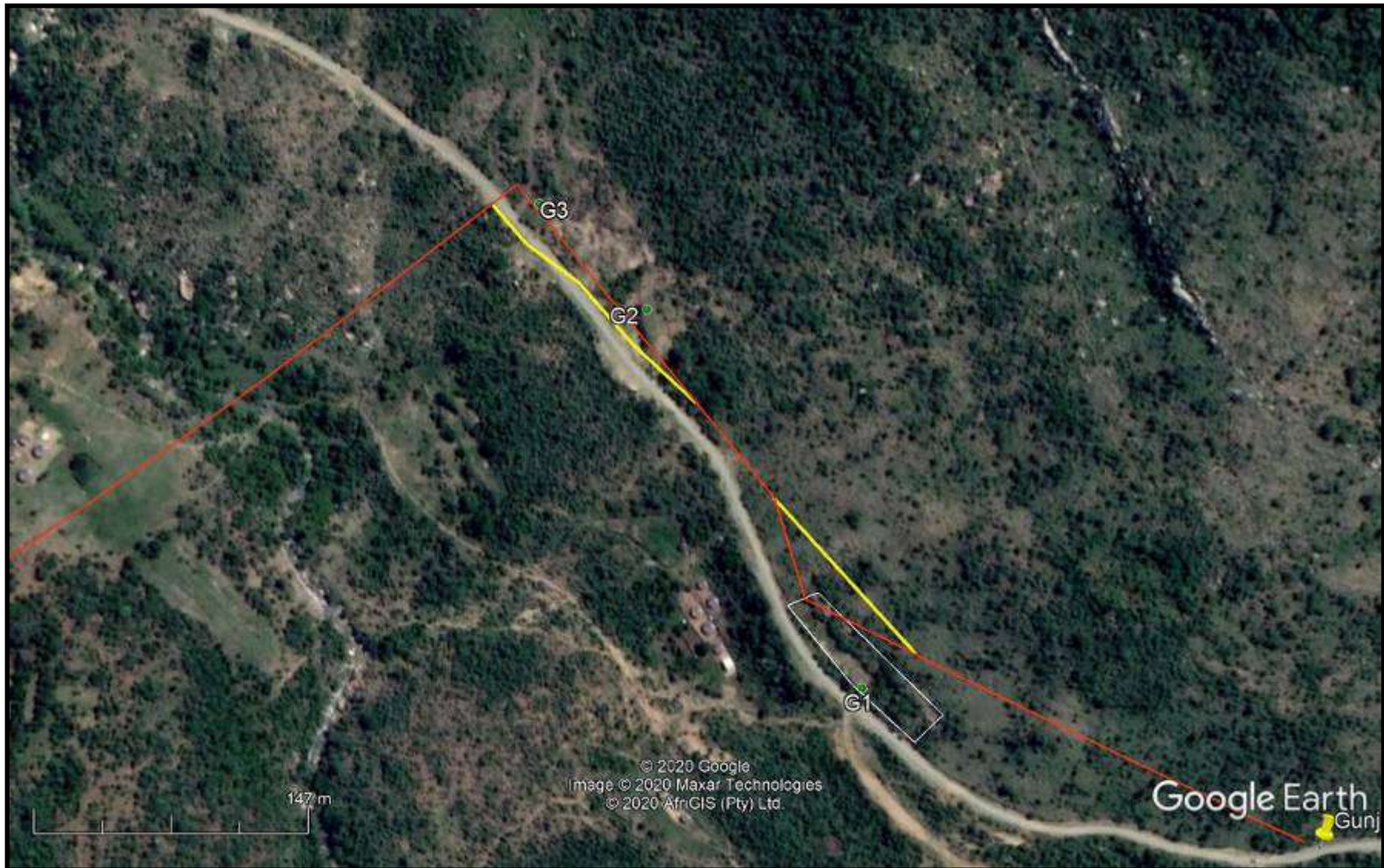


FIG. 56: ROUTE REALIGNMENT AT GUNJO06 – GUNJ07



FIG. 57: ROUTE REALIGNMENT AT GUNJO013 – GUNJ014



FIG. 58: ROUTE REALIGNMENT AT GUNJO017 –GUNJ018

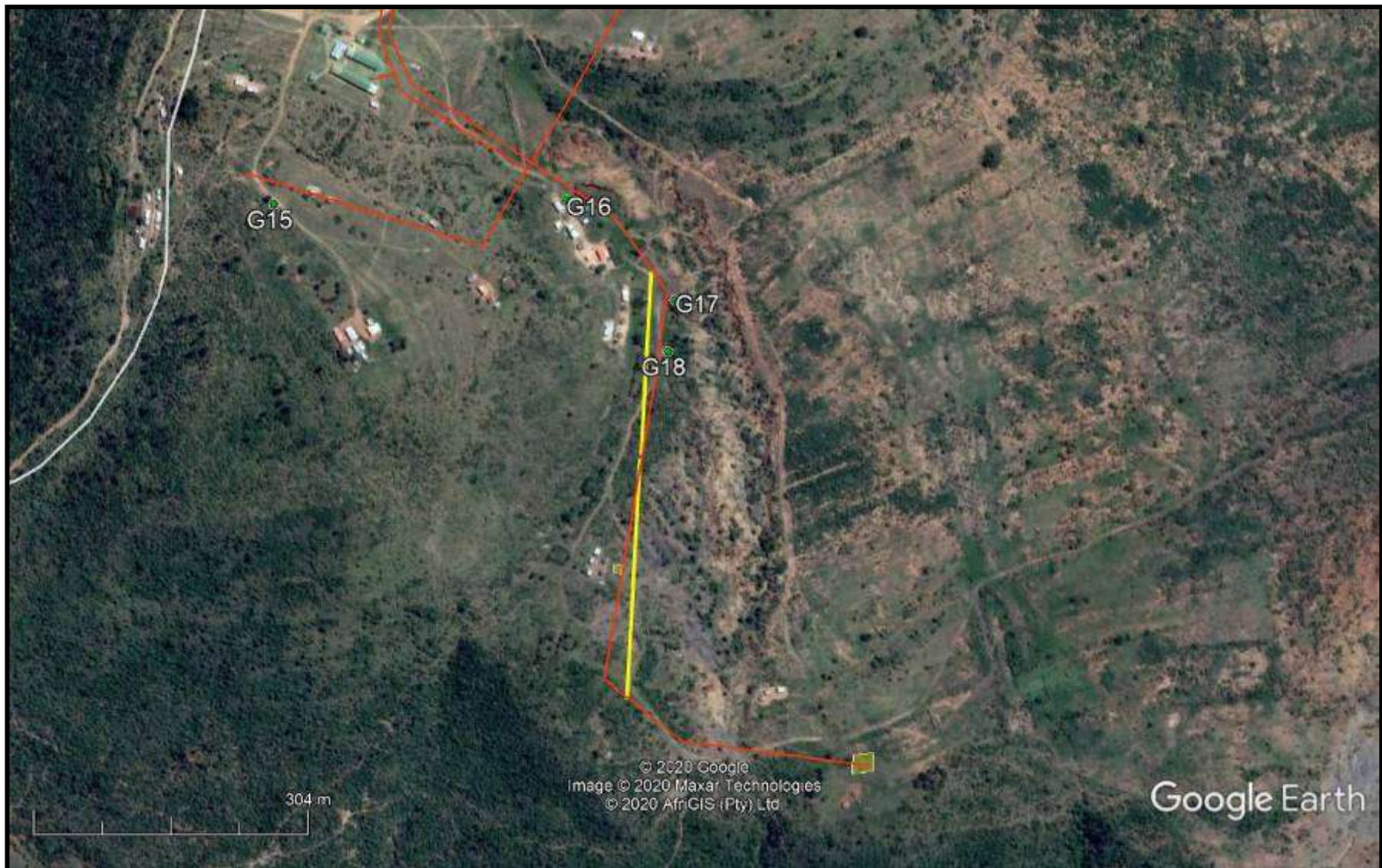


FIG. 59: ROUTE REALIGNMENT AT GUNJO020



FIG. 60: ROUTE REALIGNMENT AT GUNJO022



FIG. 61: ROUTE REALIGNMENT AT GUNJO023 – GUNJ024



FIG. 62: ROUTE REALIGNMENT AT GUNJOO

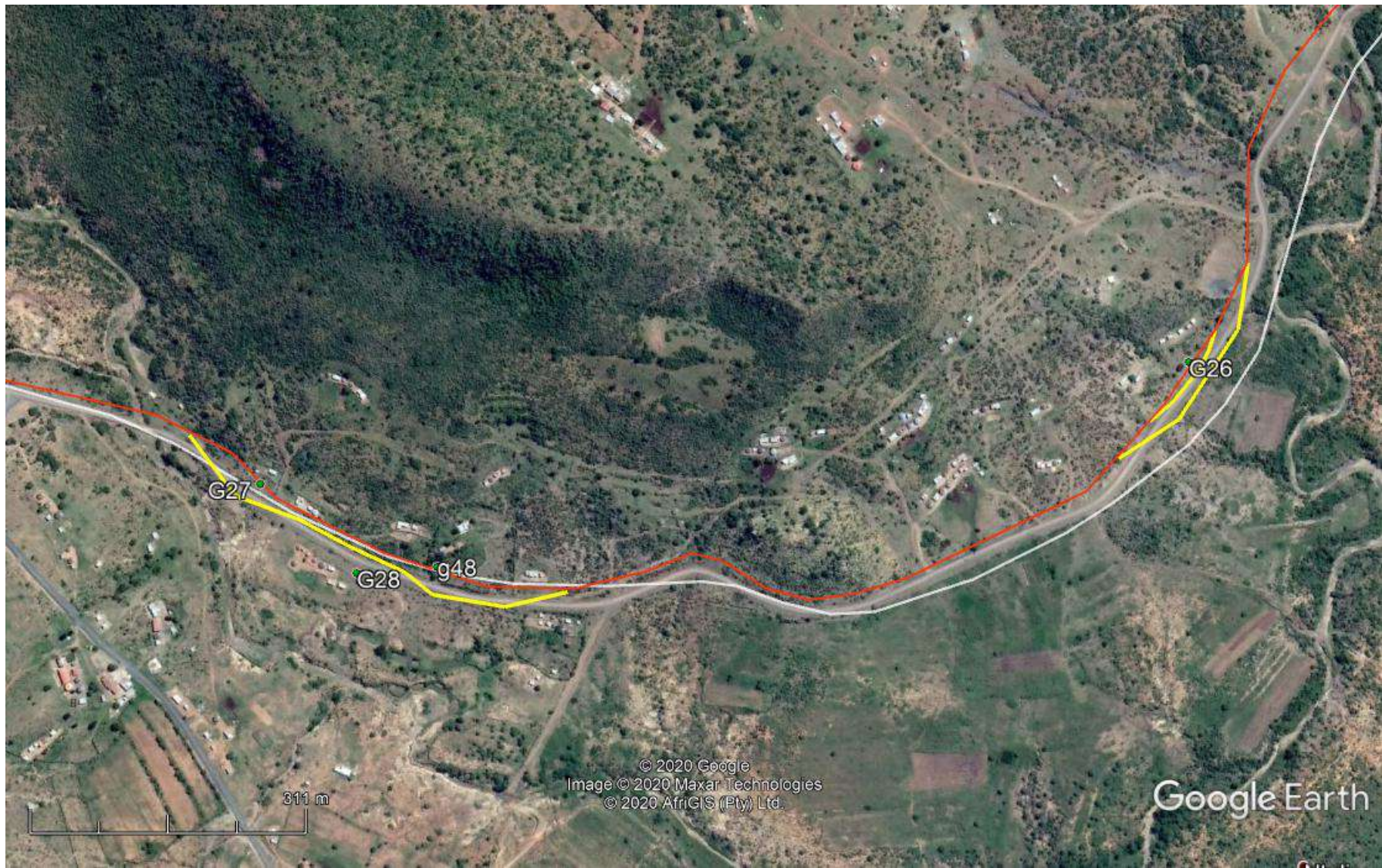


FIG. 63: ROUTE REALIGNMENT AT GUNJO026 – GUNJ028 & GUNJ048

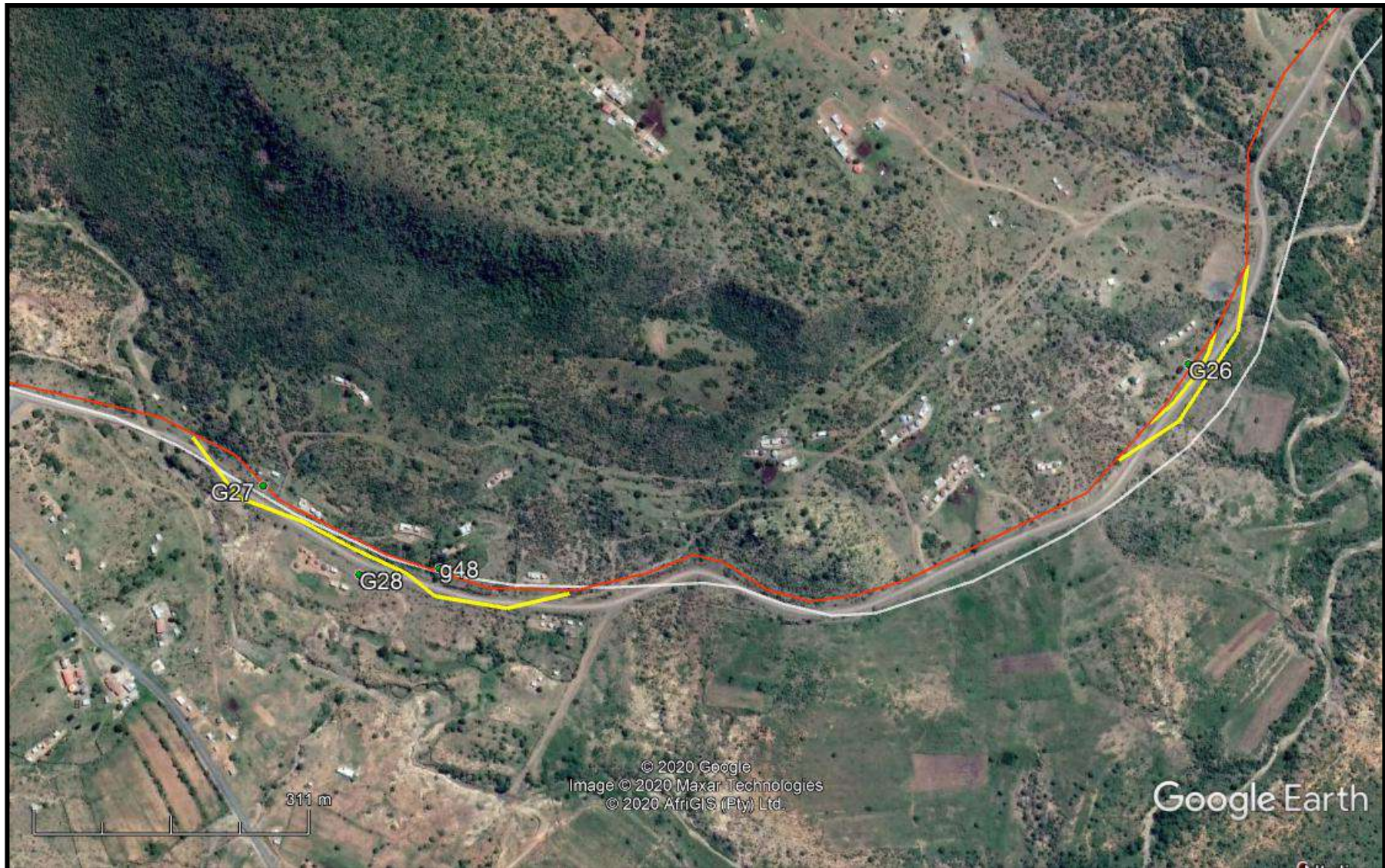


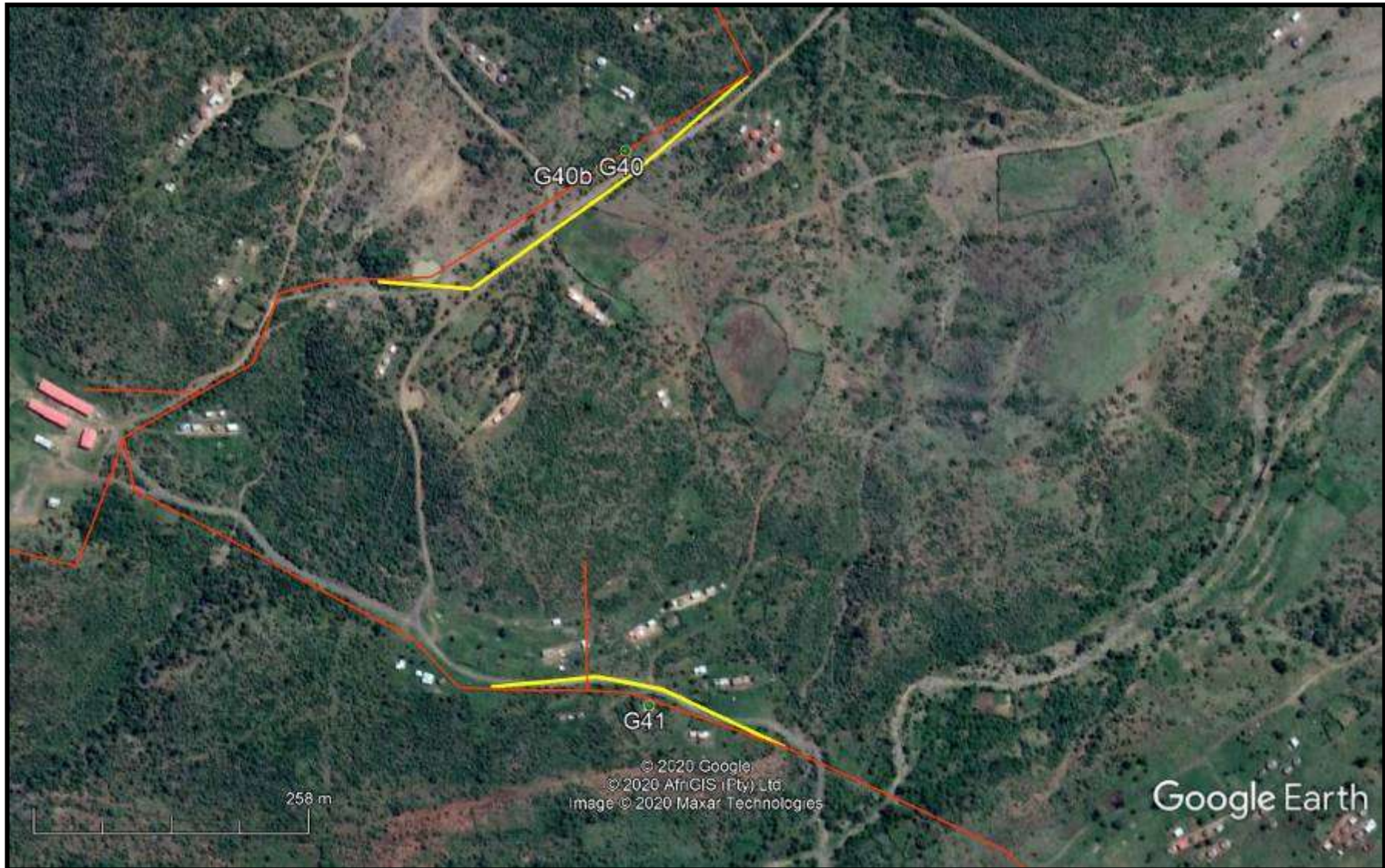
FIG. 64: ROUTE REALIGNMENT AT GUNJO030 - GUNJ032, GUNJ035 - GUNJ039 & GUNJ046



FIG. 65: ROUTE REALIGNMENT AT GUNJO033 & GUNJ034



FIG. 66: ROUTE REALIGNMENT AT GUNJO040 & GUNJ041



*

CONCLUSION

A heritage survey was undertaken for the proposed Gunjana WSS. The project is located in the Msinga Local Municipality, within the Umzinyathi District Municipality's area of jurisdiction. The project involves supplying water to the community of Gunjana via communal standpipes and related infrastructures.

The heritage survey desktop noted that there would be 20th century settlements within the general study area as well as archaeological sites. The PIA desktop noted that while fossil bearing deposits do occur in the area, they are unlikely to yield important fossil finds, especially in the upper weathered deposits. A Chance Find Protocol was initiated for the PIA.

The heritage survey recorded forty eight (48) heritage sites, of which most will be affected by the pipeline. These sites consisted mostly of human graves while one site was a late Iron Age/Historical Period stone walled settlement... All graves must have a 20m buffer between the edge of the grave and a development. Furthermore, all graves within 50m of a development need to be clearly demarcated before the construction begins. The demarcation needs to be 5m from the edge of the grave.

The proposed WSS has a 10m footprint, and in several instances the route needs to be aligned so as not to affect human graves. In a few instances the existing road can be used as a natural buffer, provided that the pipeline footprint does not extend into the road. Alternative realignments were noted for those areas where the pipeline could be realigned.

The aim of the mitigation is to have as little impact on heritage sites as possible. This includes the stonewalling from the settlements that are less than 60 years in age.

REFERENCES

Maps

2830CB Pomeroy 1965, 2000

75_030_05530 - 05534

75_011_05006

Database:

KZN Museum

SAHRIS

Umlando

*

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
PIA DESKTOP

**THE PROPOSED GUNJANA COMMUNITY WATER
SUPPLY SCHEME, UMZINYATHI DISTRICT
MUNICIPALITY,
KWAZULU - NATAL**

FOR

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28 July 2020

EXECUTIVE SUMMARY

This proposed pipeline development is on Vryheid Formation, Pietermaritzburg Formation and Dolerite. It is not an important Palaeontological Material area. A Chance Find Protocol has been inserted in case fossils are found during excavation. Should this take place then a Palaeontologist must be called to inspect the discovery.

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1. BACKGROUND AND PROPOSED PROJECT

According to the *Terratest Notification Sheet*. The proposed Gunjana project is located in the Msinga Local Municipality, within the Umzinyathi District Municipality's area of jurisdiction. The project involves supplying water to the community of Gunjana via communal standpipes and includes the following components:

- Drilling and equipping of two boreholes;
- Construction of two reservoirs (50 KI and 300 KI);
- 8.5km of 110mm diameter steel bulk rising main with a flow rate of approximately 5.5 l/s;
- 38km of uPVC and HDPE reticulation network with diameters ranging from 50mm to 200mm;
- Standpipes;
- Break pressure tanks;
- Air, scour and isolating valves; and
- Road and donga crossings.



Figure 1: Location of the proposed project (red). Source map GoogleEarth.

2. GEOLOGY

The proposed project site is located within rocks of the Vyrheid Formation, Pietermaritzburg Formation and Karoo Dolerite (Fig. 2).

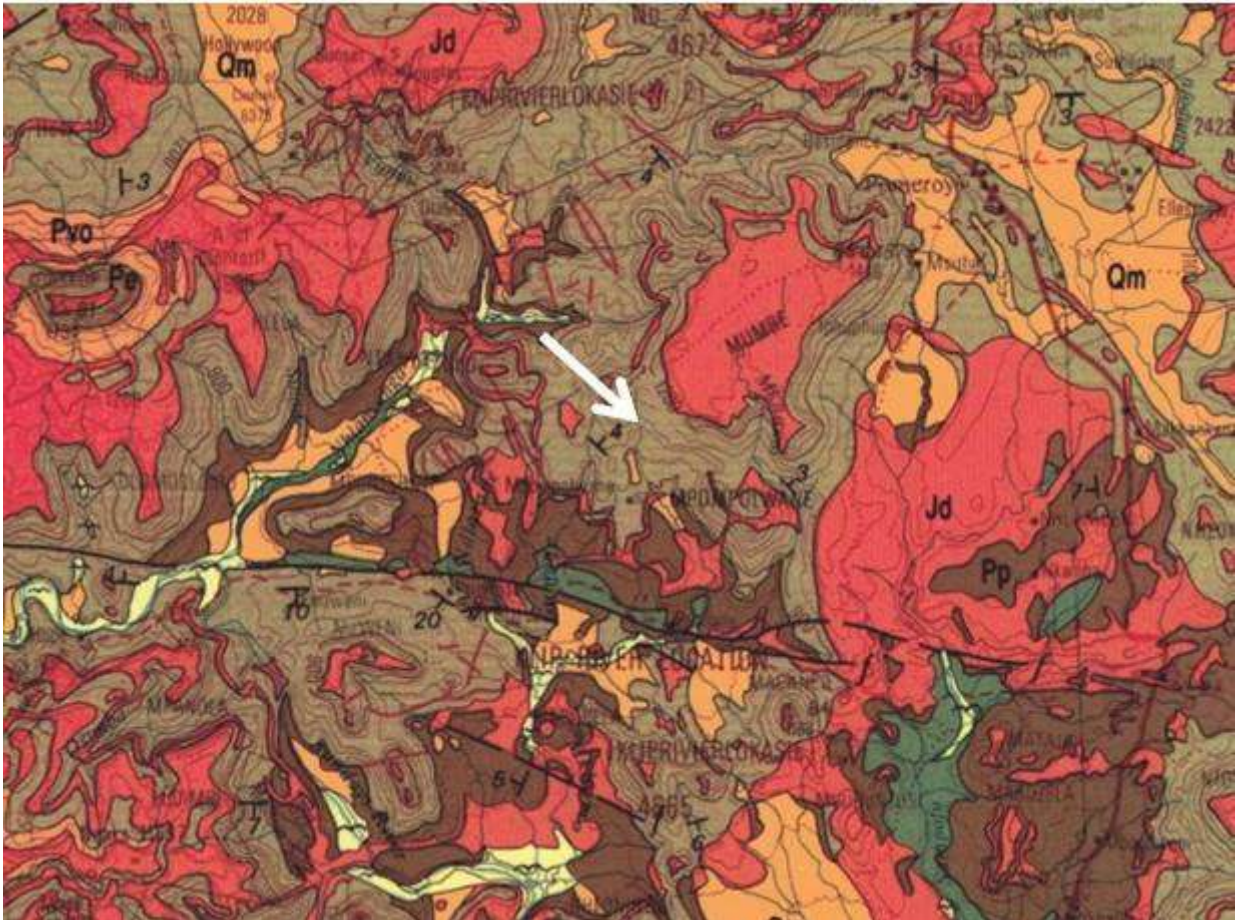


Figure 2: Geology of proposed site (arrowed). Extract from the Dundee 2830 1:250 000 Geological Map. The Vyrheid Formation (grey) and Karoo Dolerite (red).

Pietermaritzburg Formation

The Pietermaritzburg Formation comprises 400m of upward coarsening marine silty mudrocks (Bordy et al., 2017).

Vryheid Formation

The Vryheid Formation is a fluvio-deltaic sequence deposited in the northeastern extremity of the Karoo Basin (Ryan, 1967; Hobday, 1973) which oversteps the Pietermaritzburg Formation and Dwyka Group in places, resting directly on Precambrian basement (Van Vuuren and Cole, 1979). The total duration of the Vryheid Formation was from ~290 Ma to 265 Ma. This is based on ages of the end of Dwyka glaciation (288 ± 3.0 and 289.6 ± 3.8 Ma; Bangert et al., 1999) and dating of a tuff in the Tierberg Formation (269.5 ± 1.2 Ma; Belica et al., 2017) which correlates with the upper part of the Vryheid Formation. At this location the Vryheid Formation deposition represents deep water deposition below storm wave base.

Karoo Dolerite

Karoo dolerite intrusions are present. These are 184 million years (Ma) old and represent the onset of the break-up of the Gondwana Supercontinent (Hastie et al (2014). According to Watkeys (2006), Gondwana rifting commenced between 155 and 135 Ma.

3. PALAEOONTOLOGY

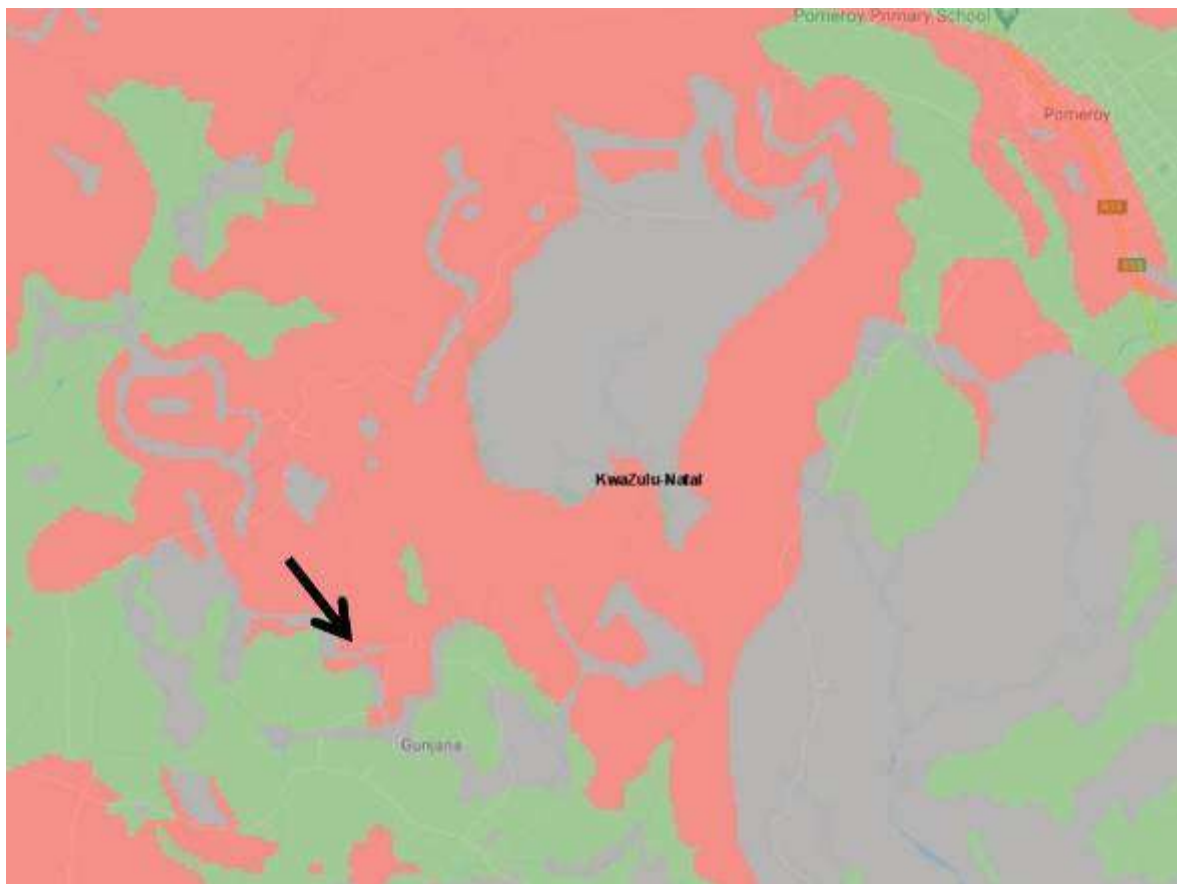


Fig. 3: Palaeosensitivity map of the Gunjana proposed site (arrowed). Green is Pietermaritzburg Formation, red is Vryheid Formation and grey is Karoo Dolerite.

Pietermaritzburg Formation

The Pietermaritzburg Formation is a monotonous sequence of siltstones. Occasional leaf and trace fossils are found. This unit is not generally fossiliferous.

Vryheid Formation

Evidence of bioturbation is ubiquitous within the Vryheid Formation. Trace fossils which have been observed near the proposed site are very common but not important as **Palaeontological Material**. The Vryheid Formation is known to be fossiliferous elsewhere (especially within the Coal Zone), but at this locality these rocks comprise lithified mass flow sediments. Mass flows are submarine landslides. These are very violent events and make body fossil preservation very unlikely. Prospective fossils are likely to be broken up and dispersed during this process. Pelagic fossils (such as fish) could be preserved between the mass flows but these are rare/non-existent in Vryheid Formation rocks of this type, the reason for this is not clear.

Karoo Dolerite

Karoo Dolerite is also present in this area. This is an igneous intrusive rock and by definition cannot be fossiliferous.

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 & RECOMMENDATIONS

The proposed development is on rock which is very unlikely to be fossiliferous, thus a pre-excavation field trip is not required.

A **Chance Find Protocol** has been inserted. Should any **Palaeontological Material** be uncovered. Should this take place a Palaeontologist must be called in to investigate.

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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.