

**Heritage Impact Assessment of a proposed new pump
station facility and associated pipeline in Heuwelsig,
Bloemfontein, Free State Province.**



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Executive Summary

A heritage impact assessment was conducted for the construction of a new pump station and associated pipe line situated within an area designated as a public space in Heuwelsig, Bloemfontein, Free State Province. A foot survey revealed no evidence of *in situ* paleontological remains or exposures, archaeological remains, ancient structures, graves or historical buildings older than 60 years within the vicinity of the study area.

The probability of impact by the development on intact fossil remains is considered low, but it is advised that any excavations into *in situ* (fresh) sedimentary bedrock should allow for inspection of fresh exposures by a qualified palaeontologist at the appropriate time. The sedimentary bedrock component at the site is therefore assigned the rating of Generally Protected B (GP.B). It is unlikely that the proposed development will result in any archaeological impact at the site. The terrain in general is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (GP.C).

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Introduction

A heritage impact assessment was conducted for the construction of a new pump station and associated pipe line situated within an area designated as a public space in Heuwelsig, Bloemfontein, Free State Province. The region's unique and non-renewable archaeological and palaeontological heritage sites are 'Generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. As many such heritage sites are threatened daily by development, both the environmental and heritage legislation require impact assessment reports that identify all heritage resources including archaeological and palaeontological sites in the area to be developed, and that make recommendations for protection or mitigation of the impact of the sites.

Where possible archaeological and palaeontological sites should be saved, but where this is not possible, the loss of information about our heritage resources can be mitigated against or minimized through a process of excavation (or sampling) and dating of a representative sample of the evidence from the site. This allows the heritage specialist to record at least part of the history of the place. Early assessment and mitigation minimizes the negative effects of development and often saves the developer considerable delays and related costs. The primary legal trigger for identifying when heritage specialist involvement is required in the Environmental Impact Assessment process is the National Heritage Resources (NHR) Act (Act No 25 of 1999). The NHR Act requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures over 60 years of age, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites, palaeontological sites and objects.

The Act identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. In this regard, categories of development listed in Section 38 (1) of the NHR Act are:

- The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50m in length;
- Any development or other activity which will change the character of the site;
- Exceeding 5000 m² in extent;
- Involving three or more existing erven or subdivisions thereof;
- Involving three or more subdivisions thereof which have been consolidated within the past five years;
- Costs of which will exceed a sum set in terms of regulations by the South African Heritage Resources Agency (SAHRA).
- The rezoning of a site exceeding 10 000 m².
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

Methodology

The heritage significance of the affected area was evaluated on the basis of existing field data, field reports, geological map, aerial photographs (Google Earth) and published literature. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Relevant archaeological information, aerial photographs and site records were consulted and integrated with data acquired during the on-site inspection.

The task also involved identification and assessment of possible archaeological heritage within the proposed project area, in accordance with section 9(8) and appendix 6 (“Specialist reports”) of the NEMA EIA Regulations, 2014 , whereby the specialist report takes into account the following terms of reference:

- Identify and map possible archaeological sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential archaeological resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

The study area is rated according to field rating categories as prescribed by SAHRA (**Table 1**).

Locality data

1 : 50 000 scale topographic map: 2926AA Bloemfontein

1 : 250 000 scale geological map 2924 Bloemfontein

Site coordinates (**Fig. 2**):

Pump Station site: 29° 4'24.90"S 26°11'37.53"E

Pipe line: A) 29° 4'23.38"S 26°11'38.16"E to B) 29° 4'22.70"S 26°11'44.39"E

The study area is located against the western slope of a small sandstone outcrop facing Ray Champion Street between Heuwelsig and the Rayton Smallholdings (**Fig. 3**).

Geology

The geology of the Bloemfontein area has been described by Theron (1966). The site is located on late Permian, Balfour Formation outcrop (Karoo Supergroup, Beaufort Group, Adelaide Subgroup), partially intruded by Jurassic dolerites on which younger, superficial deposits (colluvial sediments and residual soils) of Quaternary age have been deposited.. (Nolte 1995; Johnson 2006). The sedimentary rocks are intruded by Jurassic dolerites on which younger, superficial deposits (colluvial sediments and residual soils) of Quaternary age have been deposited.

Background

The study area lies within a palaeontologically sensitive area on fossil-bearing bedrock (**Fig. 4**). Regionally the palaeontological footprint is primarily represented by Late Permian Karoo vertebrate fauna and late Quaternary mammalian fossils that are often associated with intact Middle Stone Age artefact assemblages (**Fig. 5**). The Karoo geological strata within the affected area are assigned to the *Dicynodon* Assemblage Zone (AZ) (**Fig. 6**). Therapsids from this biozone occur generally well-preserved in mudrock horizons and are usually found as dispersed and isolated specimens associated with an abundance of calcareous nodules (Kitching 1977; Kitching 1995). Molluscs, insects, plant (*Dadoxylon*, *Glossopteris*) and trace fossils also occur in the biozone. Alluvial deposits of the nearby Modder River and its

tributaries north of the footprint area, are associated with abundant Quaternary mammalian fossils (Broom 1909 Churchill et al 2000; Rossouw 2006). Except for a one therapsid fossil exposure located south of the proposed development footprint, there are currently no records of Karoo palaeontological sites situated within the 2926 AA map sheet area (**Fig. 7**).

Rich cultural remains previously recorded around the northern outskirts of Bloemfontein can be divided into four categories: Stone Age remains, South African War remnants, graveyards and historical structures, including residential buildings, stone-built kraal and dam walls (Dreyer 2004a, 2004b, 2004c, 2004d, 2005; Henderson 2006; Henderson *et al.* 2008; Rossouw 2012). The Stone Age archaeological record of the Modder River catchment north of Bloemfontein spans back to the early Middle Stone Age. Localized occurrences of *in situ* Middle and Later Stone Age material are preserved within overbank sediments of the Modder River and its tributaries between Maselspoort and Glen north of Bloemfontein (Churchill *et al.* 2000; Rossouw 2006). Widespread traces of prehistoric human habitation, in the form of stone tool scatters and individual surface finds, have previously been recorded at Bayswater 286, Lilyvale 2313 and Hillandale 249 (Goodwin and Van Riet Lowe 1929, Henderson *et al.* 2008; Rossouw 2012) (**Fig. 8**).

Bloemfontein became a major military centre for the British forces in 1900, with several farms north of Bloemfontein requisitioned for military purposes which also included military hospitals, rifle ranges, sangars and a large remount camp at Hillandale (**Fig. 9 & 10**). Archaeological remains related to British military activities in the area include lengthy stonewall structures as well as rubbish dumps, kraals and graveyards. A large military rubbish dump was recorded on Lilyvale 2313/25(33), the property adjacent to the survey area. The stonewall structures are one of the last remaining traces of the British military occupation of the northern part of Bloemfontein. The walls were built by the British Engineers, which had their camp stationed at Tempe. They formed part of a wall which originally ran from the water towers east of Tempe to the edge of Hillandale farm. Some sections can still be seen at the Botanical Gardens, as well as in the Lilyvale and Bayswater areas, between Hillsboro and the R700 road south of the N1. Graveyards and isolated graves are also known from this area.

Field Assessment

The topography of the terrain is marked by sandstone outcrop that is in part metamorphosed by intrusions of dolerite (**Fig. 11**). Vegetation and topsoil has been removed from the proposed pump station area and signs of earlier disturbance are clearly visible along the existing pipe line footprint (**Fig. 12 & 13**). A foot survey revealed no evidence of *in situ* paleontological remains or exposures, archaeological remains, ancient structures, graves or historical buildings older than 60 years within the vicinity of the study area.

Impact Statement and Recommendations

The terrain is reasonably disturbed by ground-clearing activities and the installation of an existing pipe line. The probability of impact by the development on intact fossil remains is considered low, but it is advised that any excavations into *in situ* (fresh) sedimentary bedrock should allow for inspection of fresh exposures by a qualified palaeontologist at the appropriate time. The sedimentary bedrock component at the site is therefore assigned the rating of Generally Protected B (GP.B). It is unlikely that the proposed development will result in any archaeological impact at the site. The terrain in general is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (GP.C).

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Tables & Figures

Table 1. Field rating categories as prescribed by SAHRA.

| Field Rating | Grade | Significance | Mitigation |
|------------------------------|--------------|--------------------------|--|
| National Significance (NS) | Grade 1 | - | Conservation; national site nomination |
| Provincial Significance (PS) | Grade 2 | - | Conservation; provincial site nomination |
| Local Significance (LS) | Grade 3A | High significance | Conservation; mitigation not advised |
| Local Significance (LS) | Grade 3B | High significance | Mitigation (part of site should be retained) |
| Generally Protected A (GP.A) | - | High/medium significance | Mitigation before destruction |
| Generally Protected B (GP.B) | - | Medium significance | Recording before destruction |
| Generally Protected C (GP.C) | - | Low significance | Destruction |

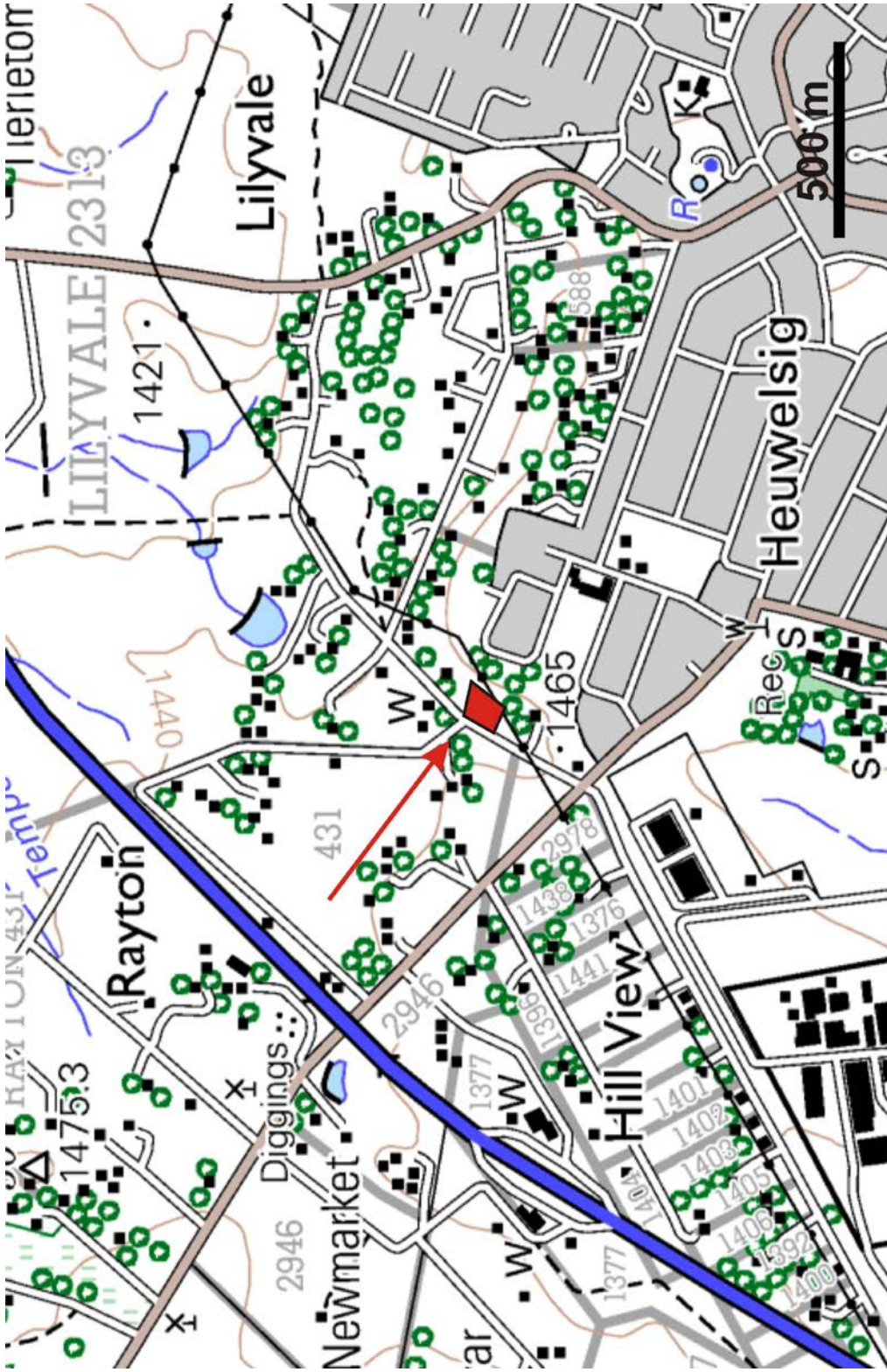


Figure 1. The Heuwelsig pump station site and proposed pipeline (portion of 1:50 000 scale topographic map 2926 AA Bloemfontein).

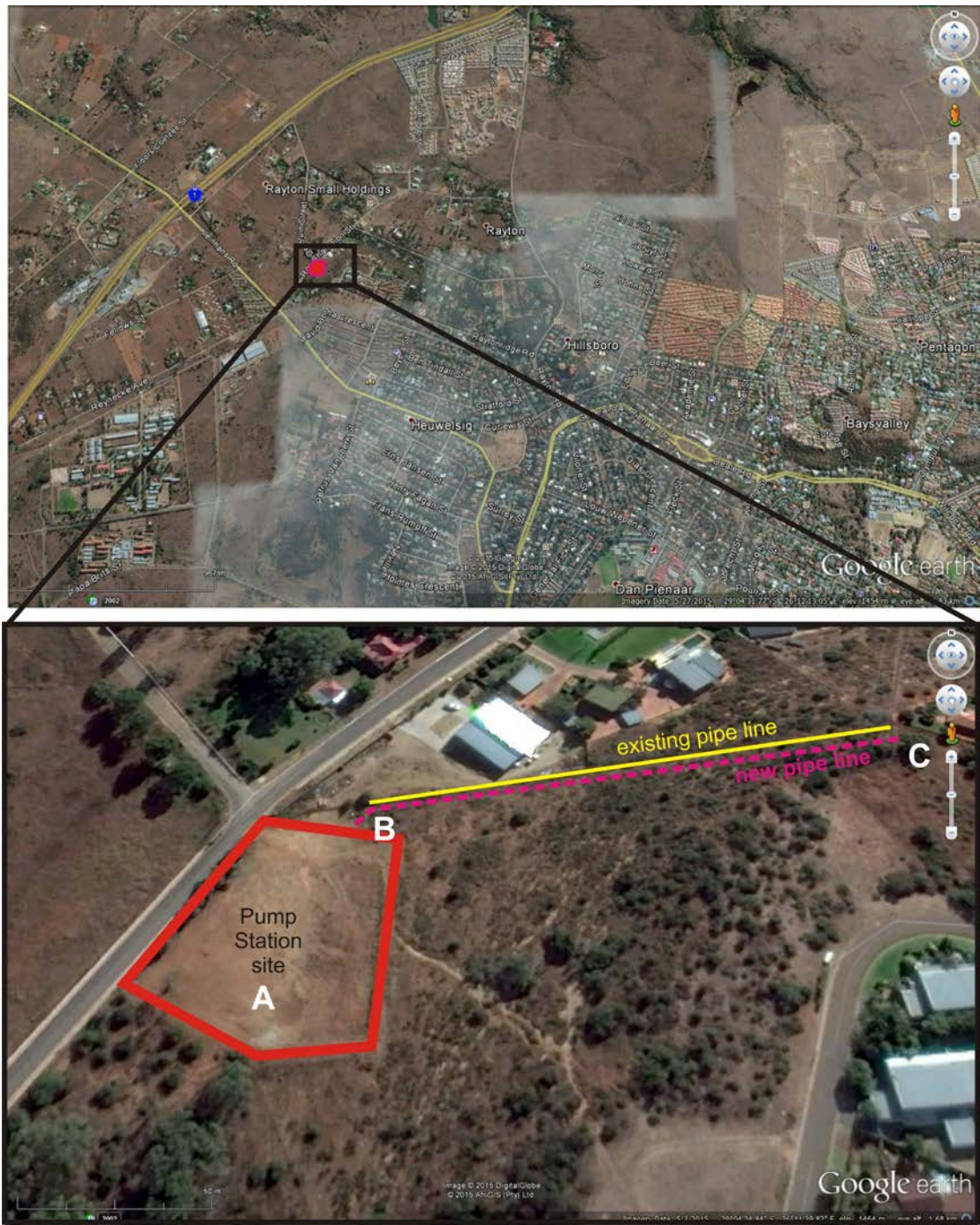


Figure 2. Aerial view of the study area.



Figure 3. Layout of the proposed development.

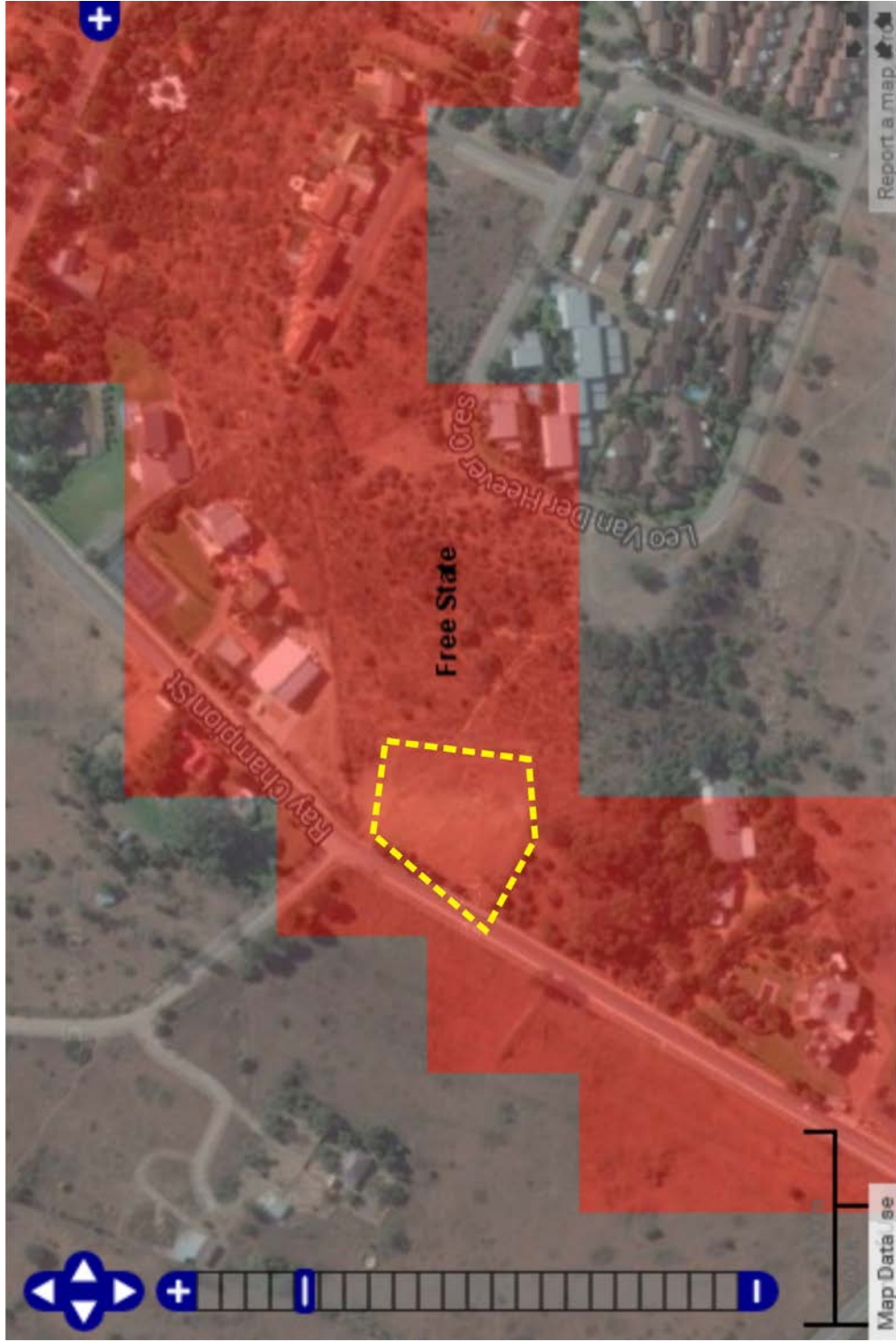


Figure 4. Location of the site in relation to palaeontologically sensitive areas in the region (after SAHRA Palaeontological Sensitivity Map 2015).
The area covered in red is considered to be highly sensitive.

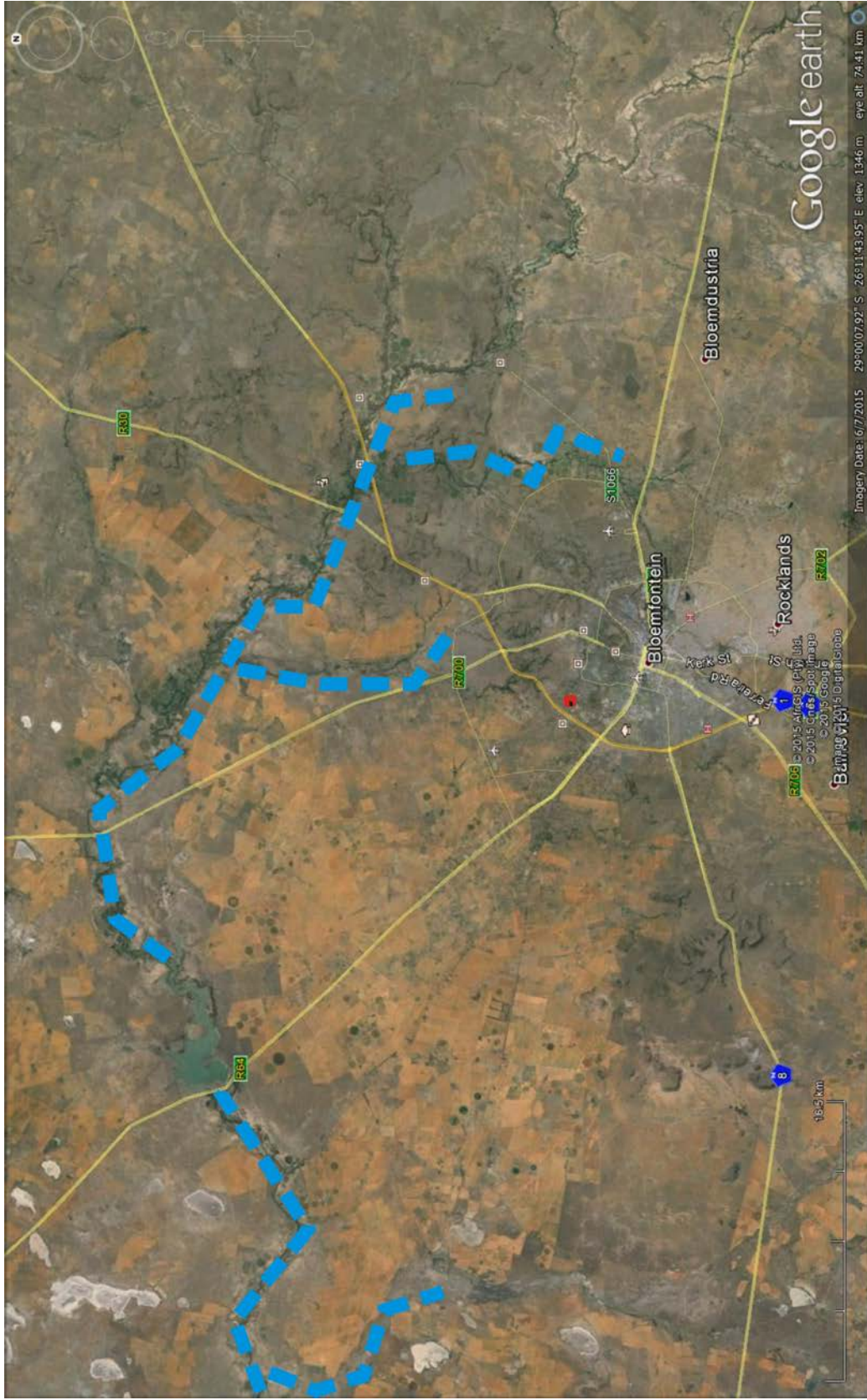


Figure 5. Position of fossil-bearing and archaeologically significant overbank sediments of the Modder River and its tributaries between Maselspoort and the Krugersdrift Dam in relation to the location of the study area (red square).

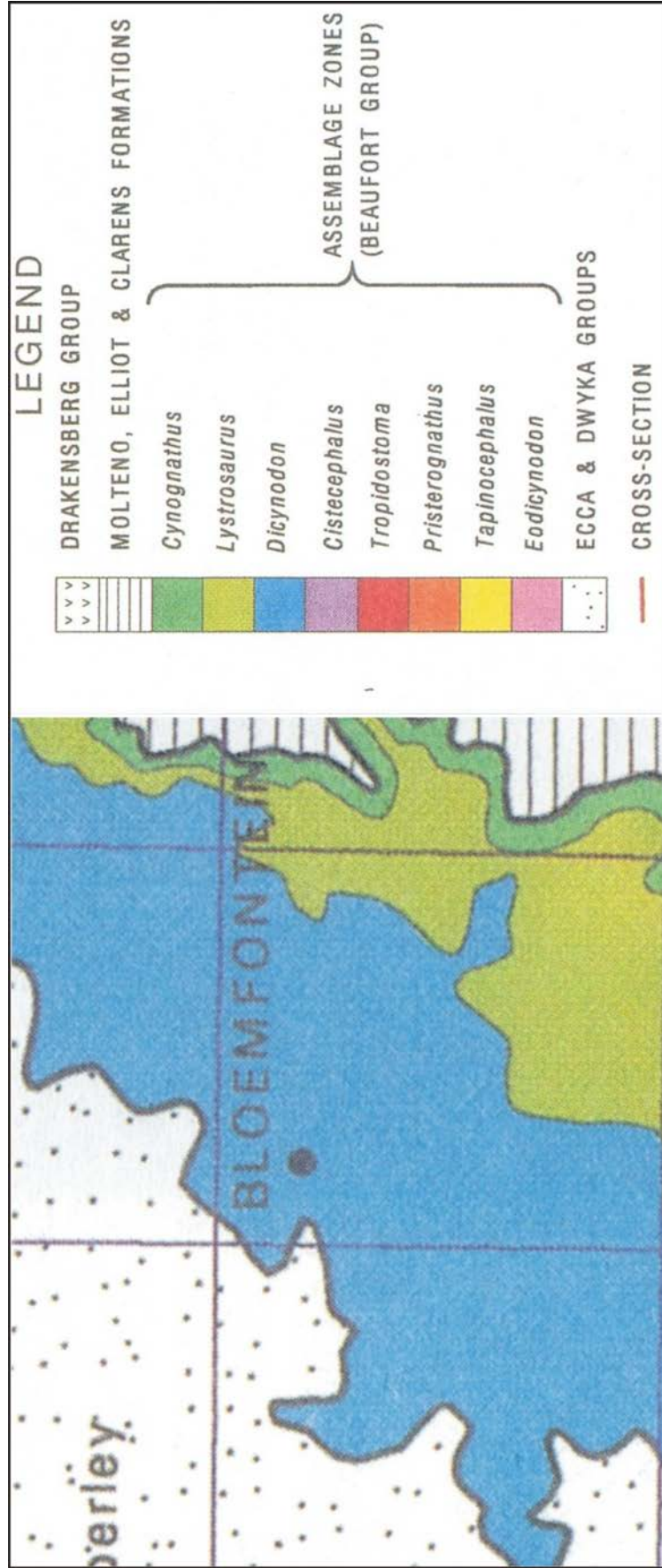


Figure 6. Distribution of vertebrate biozones of the Beaufort Group around Bloemfontein (after Rubidge 1995).

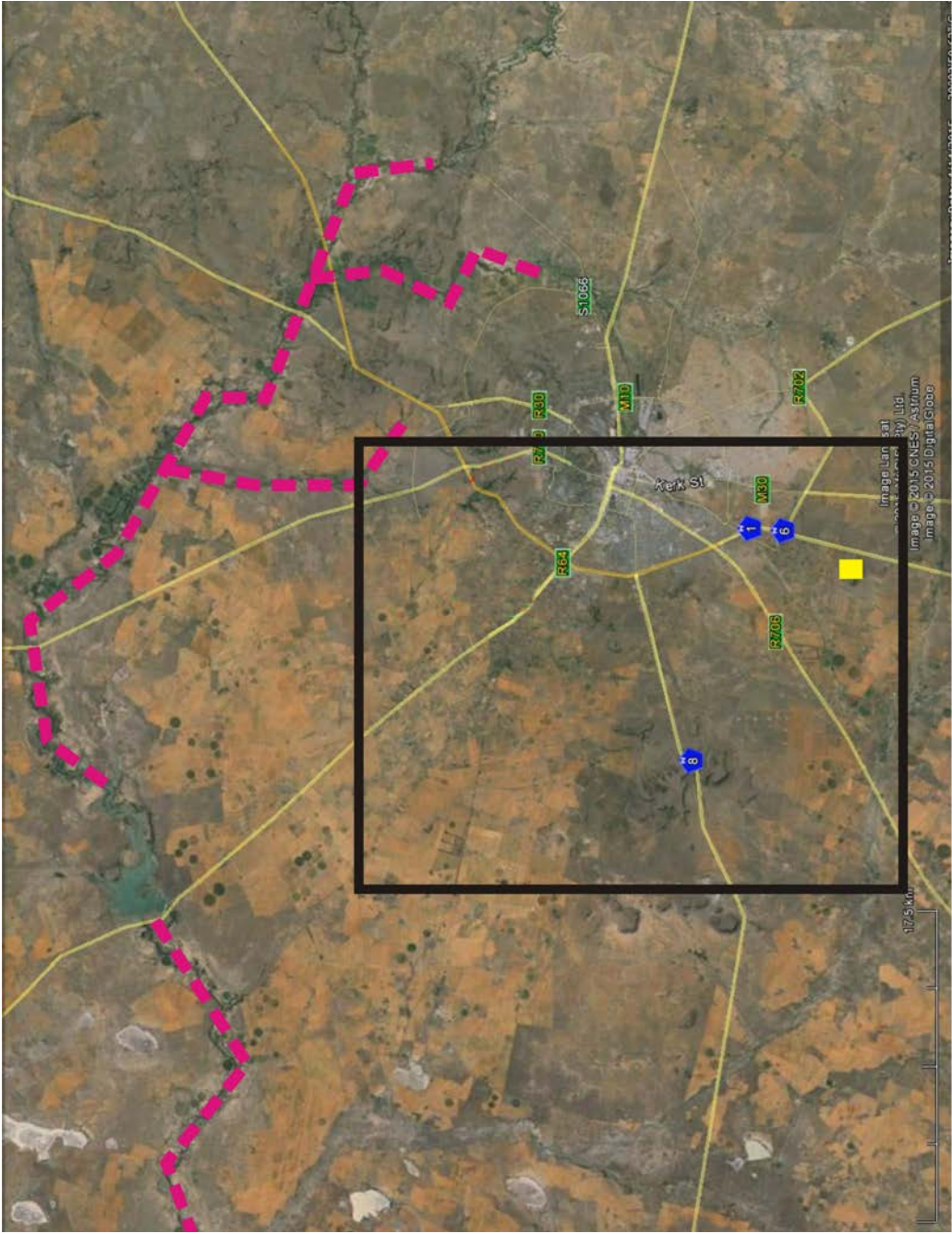


Figure 7. Position of a therapsid fossil exposure (yellow square) situated within the 2926 AA map sheet area (black square) and located 18 km to the south of the proposed development footprint.

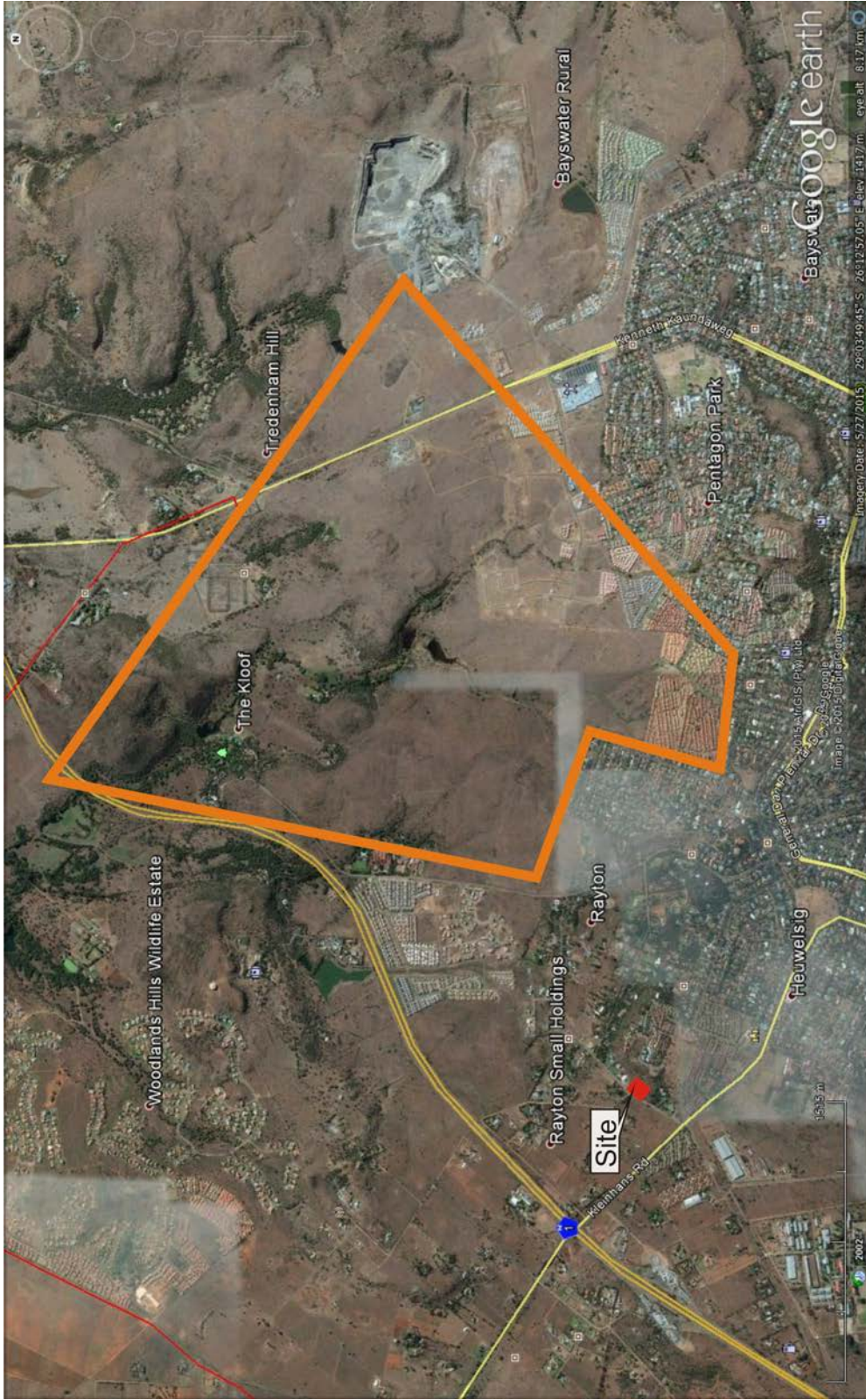


Figure 8. The orange polygon indicates formerly undisturbed veld at Bayswater 286, Lilyvale 2313 and Hillandale 249 where stone tool scatters and individual surface finds, have been recorded in the past.

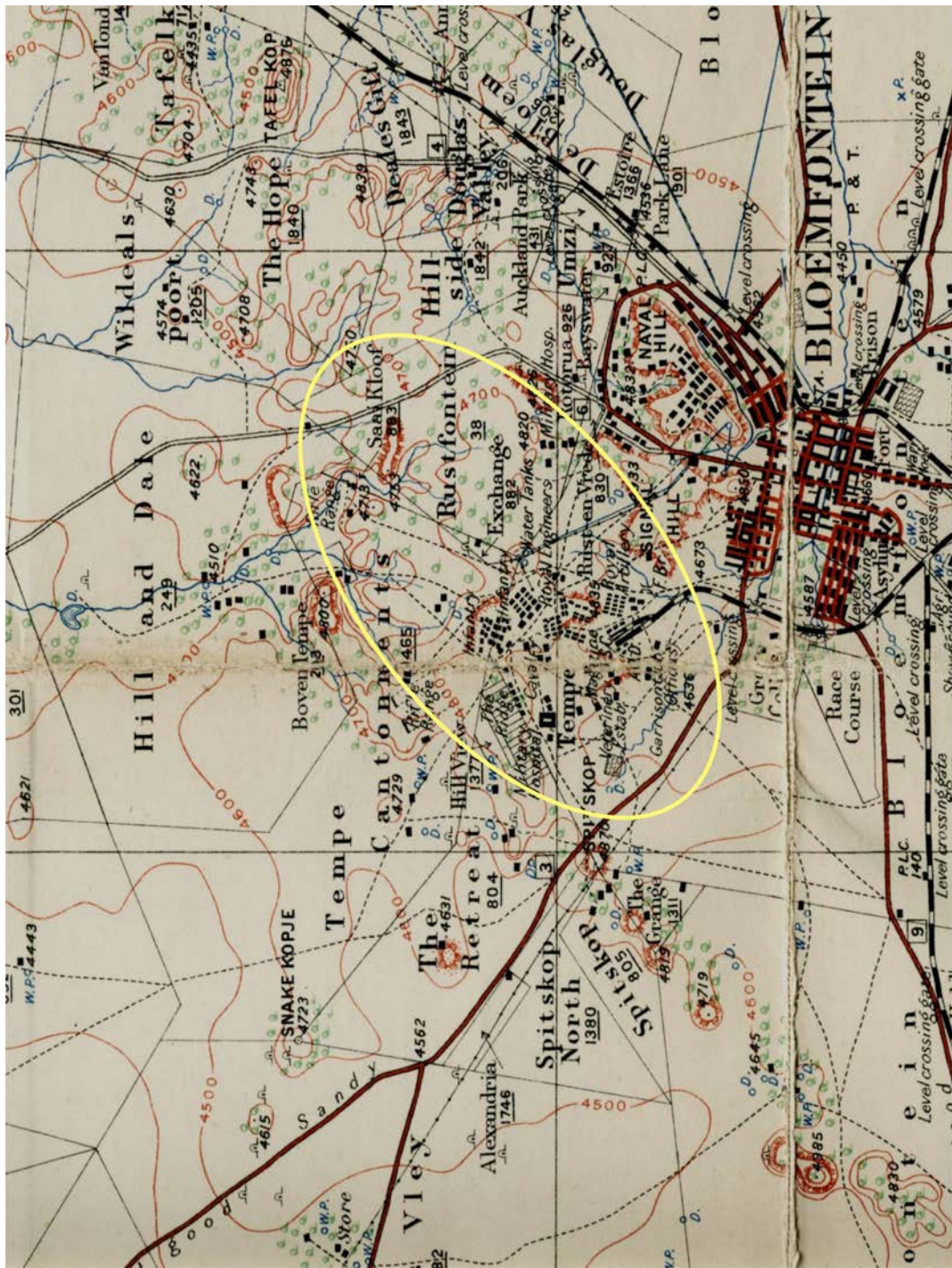


Figure 9. Map of British military camps and installations around Bloemfontein, circa 1913.

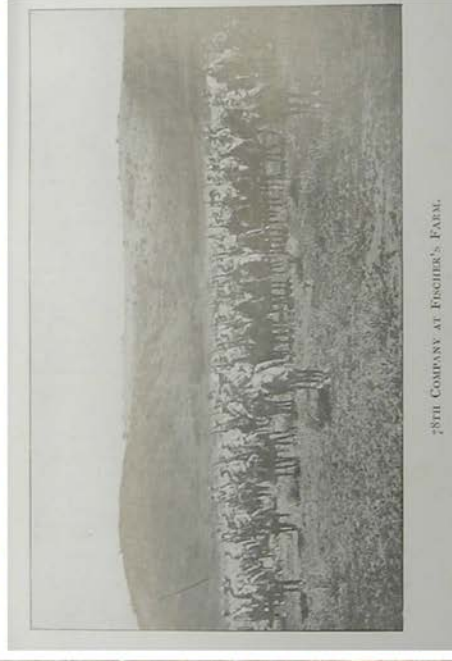


Figure 10. Low stonewall structures represent some of the last remnants of the British army camps that were established north of Bloemfontein during and shortly after the South African War (left & top right). Some of the walls were built by British engineers, which had their camp stationed at Tempe. The wall originally ran from the water towers east of Tempe to the edge of Hillendale farm. A large remount camp existed at Hillendale (bottom right).



Figure 11. The topography of the terrain is marked by a sandstone outcrop (left) that is in part metamorphosed by intrusions of dolerite (right).



Figure 12. The proposed pump station locality, looking southwest.



Figure 13. The existing pipe line footprint, looking east (left) with signs of earlier disturbance as a result from the installation of the existing pipe line.