

# **Phase 1 Heritage Impact Assessment proposed new quarry on remainder portion of Farm De Hoop 230, Bloemfontein, FS Province**

Report prepared for  
EKO Environmental Consultants  
by  
Palaeo Field Services  
PO Box 38806  
Langenhoven Park  
9330

## **Summary**

In terms of Regulation 2(2) of the Mineral and Petroleum Resources Development Act, Act 28 of 2002, a Phase 1 Heritage Impact Assessment was carried out over a 5 ha area where planned development calls for the establishment of a quarry with a crusher and related activities on the remainder portion of the farm De Hoop 320, near Bloemfontein Free State Province. The study area is underlain by intrusive dolerite outcrop. There is no evidence for the accumulation and preservation of intact fossil material within the superficial Quaternary sediments in the immediate vicinity of the study area. The pedestrian survey indicated that impact within the demarcated area is primarily restricted to bedrock that is exclusively doleritic and therefore not palaeontologically significant. There are no palaeontological or archaeological grounds to halt the proposed development and it is considered unlikely that development will affect palaeontological or archaeological heritage resources within the demarcated permit area in the future. The site is rated Generally Protected C (GP.C).

## Introduction

At the request of EKO Environmental Consultants a Phase 1 Heritage Impact Assessment was carried out over a 5 ha area where planned development calls for the establishment of a quarry with a crusher and related activities on the remainder portion of the farm De Hoop 320, near Bloemfontein Free State Province. (**Fig. 1**). The extent of the affected areas (over 5000 m<sup>2</sup>) falls within the requirements for a Heritage Impact Assessment (HIA) as required by Section 38 (Heritage Resources Management) of the South African National Heritage Resources Act (Act No. 25 of 1999). The task involved identification of possible archaeological sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

### Terms of Reference

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

### Approach and Methodology

The heritage significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian and vehicle survey. 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 study area is rated according to field rating categories as prescribed by SAHRA (**Table 1**).

### Locality data

1:50 000 scale topographical map 2629 AA Bloemfontein

1:250 000 scale geological map 2624 Bloemfontein

Site Centroid Coordinates: 29°13'56.09"S 26° 0'25.56"E

The study area forms part of an old borrow pit located on the farm De Hoop 320 situated about 3 km north of the R706 road between Bloemfontein and Jagersfontein and about 25 km west south west of the Bloemfontein CBD (**Fig. 2 & 3**).

## Geology

The geology of the region has been described by Nolte (1995) and Johnson (2006). The study area situated within the outcrop area of the Karoo Supergroup, which is primarily represented by late Permian, Beaufort Group (Adelaide Subgroup) sedimentary rocks, consisting of alternating sandstone and mudstone layers. These sedimentary rocks form the base on which younger, superficial deposits of Quaternary age have been deposited (Partridge *et al.* 2006). Superficial sediments consist mainly of well-developed, residual soils and alluvial deposits near river drainages. Dykes and sills of resistant Jurassic dolerite intrusions are present in the region.

## Background

The local palaeontological footprint is primarily represented by Late Permian Karoo vertebrate fauna and Late Cenozoic (Quaternary Period, comprising the Pleistocene and Holocene Epochs) mammalian fossils. The Karoo geological strata within the affected area are assigned to the *Dicynodon* Assemblage Zone (AZ) (**Fig. 4**). 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 1995). Other vertebrate fossils include fish, amphibians and amniotes. Molluscs, insects, plant (*Dadoxylon*, *Glossopteris*) and trace fossils (arthropod trails, worm burrows) are also occur in the biozone.

A number of palaeontological localities, such as the ones at Erfkroon and Mitasrust, have been found eroding out of Pleistocene alluvial terraces and dongas along the Modder River near Bloemfontein. The river's fossil-bearing potential has been known for almost 150 years, with a frontlet and horn cores of *Syncerus qntiquus* recovered as far back as 1839 (Cooke 1955) and the remains of *Megalotragus priscus* discovered around the turn of the previous century (Broom 1909). The upper calcretized layers of the Florisian fossil locality at Erfkroon, which is located 60 kilometers west and downstream from Avenmore on the northern bank of the Modder River presumably represent palaeosols formed under semi-arid to arid conditions with ages ranging between 25 000 and 113 000 years ago (Churchill *et al.* 2000).

The Stone Age archaeological record around Bloemfontein spans back to the early Middle Stone Age. Prehistoric archaeological remains previously recorded in the region include stone tools and mammal fossil remains from sealed and or exposed contexts. Along much of the course of Modder River and its tributaries north of Bloemfontein, alluvial deposits contain numerous occurrences of *in situ* Middle and Later Stone Age material eroding out of the overbank sediments where they are often found in association large mammal fossil remains (Churchill *et al.* 2000; Rossouw 1999, 2000, 2006). The incidence of surface scatters usually decreases away from localized areas such as alluvial contexts and dolerite-shale contact

zones when stone tools largely occur as contextually derived individual finds in the open veld. 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). There is no record of Later Iron Age settlements in the immediate area around Bloemfontein (Maggs 1976).

The cultural significance of the landscape west of Bloemfontein is primarily represented by the historical footprint left behind by early colonial settlers, when several farms, including Bains Vlei and Kwaggafontein, the latter located immediately northeast of De Hoop farm, was owned by Andrew Hudson Bain who settled in the Free State in 1847 (Collins 1965). In 1860 and 1862 two hunts, organized for the second son of Queen Elizabeth and for the Barolong tribe respectively, took place at Bains Vlei which led to the mass killing of thousands of antelope and a subsequent dwindling of large antelope herds in the Bloemfontein area.

The British march on Bloemfontein from the west, passed the Rooidam area on the 12<sup>th</sup> of March 1900 (**Fig. 5**). After Bloemfontein was occupied by British forces on 13 March the city became a major military centre, 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. Hillandale was owned by Abraham Fischer, and was expropriated by the British along with the Tempe farms.

## **Field Assessment and Recommendations**

The development footprint is underlain by palaeontologically insignificant dolerite intrusions that are buffered by well-developed superficial deposits considered to be of low to very low palaeontological sensitivity (**Fig. 6 & 7**). As far as the overall palaeontological heritage is concerned, likelihood of palaeontological impact resulting from this development is considered non-existent.

There is no above-ground evidence of building structures older than 60 years, Stone Age archaeological remains, graves or material of cultural significance within the confines of the development footprint. As far as the archaeological heritage is concerned, the proposed development is considered to be of low archaeological significance and is assigned a site rating of Generally Protected C (**Table 1**).

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## AUTHOR DETAILS

Dr. Lloyd Rossouw specializes in the southern African Quaternary and has over twenty years of extensive fieldwork experience. He graduated with Archaeology and Cultural Anthropology for his BA degree and went on to receive training in southern African archaeology at Honors level at the University of Stellenbosch's Archaeology Department. He received specialized training in faunal osteology and Quaternary palaeontology for his MSc-degree at the Bernard Price Institute of Palaeontology (Wits) and obtained his PhD-degree at the University of the Free State, specializing in plant microfossil research. He is a member of the Association for Southern African Professional Archaeologists (ASAPA) and the Palaeontological Society of Southern Africa (PSSA).

## DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project.

A handwritten signature in black ink, appearing to read 'L Rossouw', written in a cursive style.

20 / 11 / 2020

## Tables and Figures

**Table 1.** Field rating categories as prescribed by SAHRA.

<b>Field Rating</b>	<b>Grade</b>	<b>Significance</b>	<b>Mitigation</b>
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



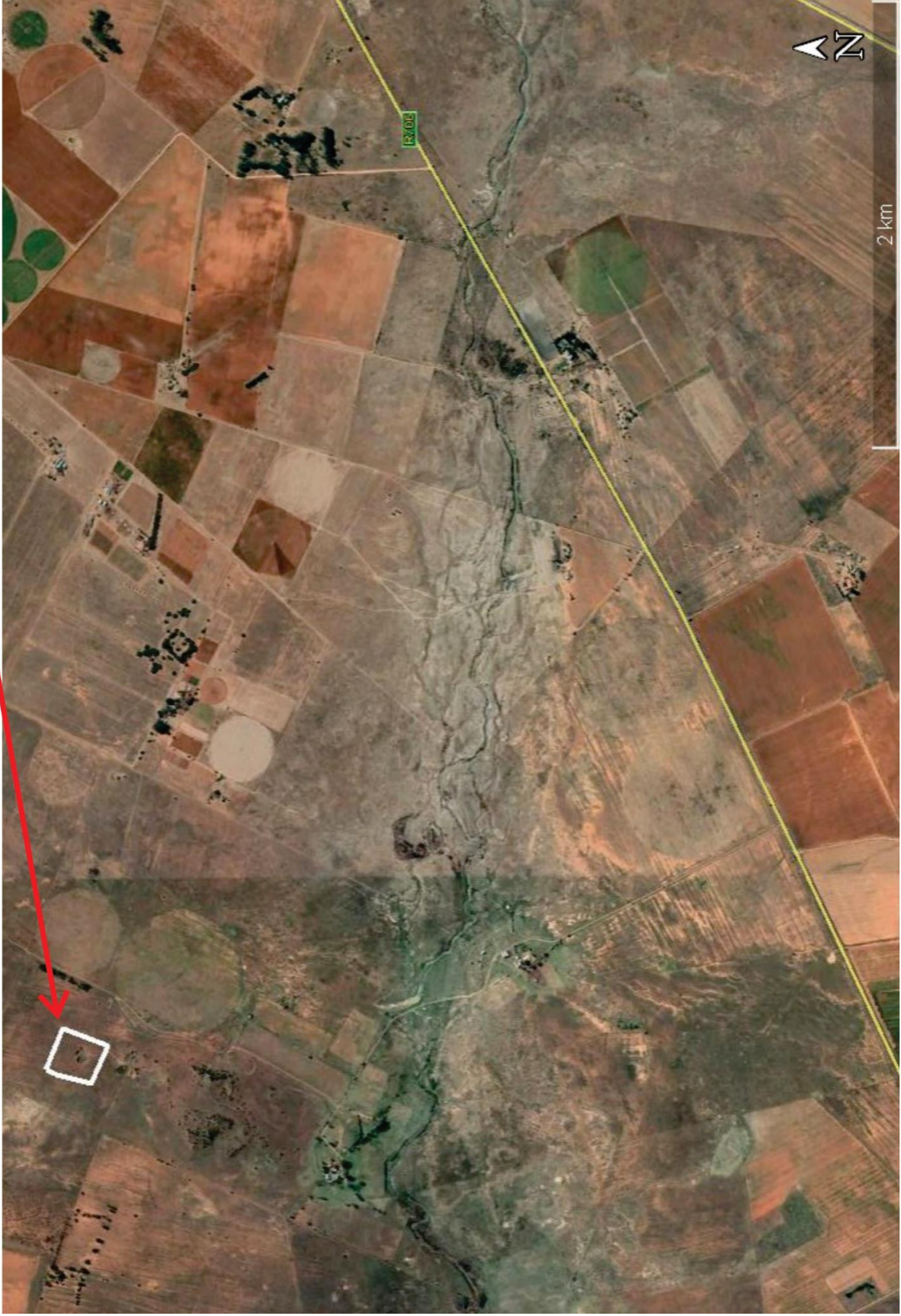
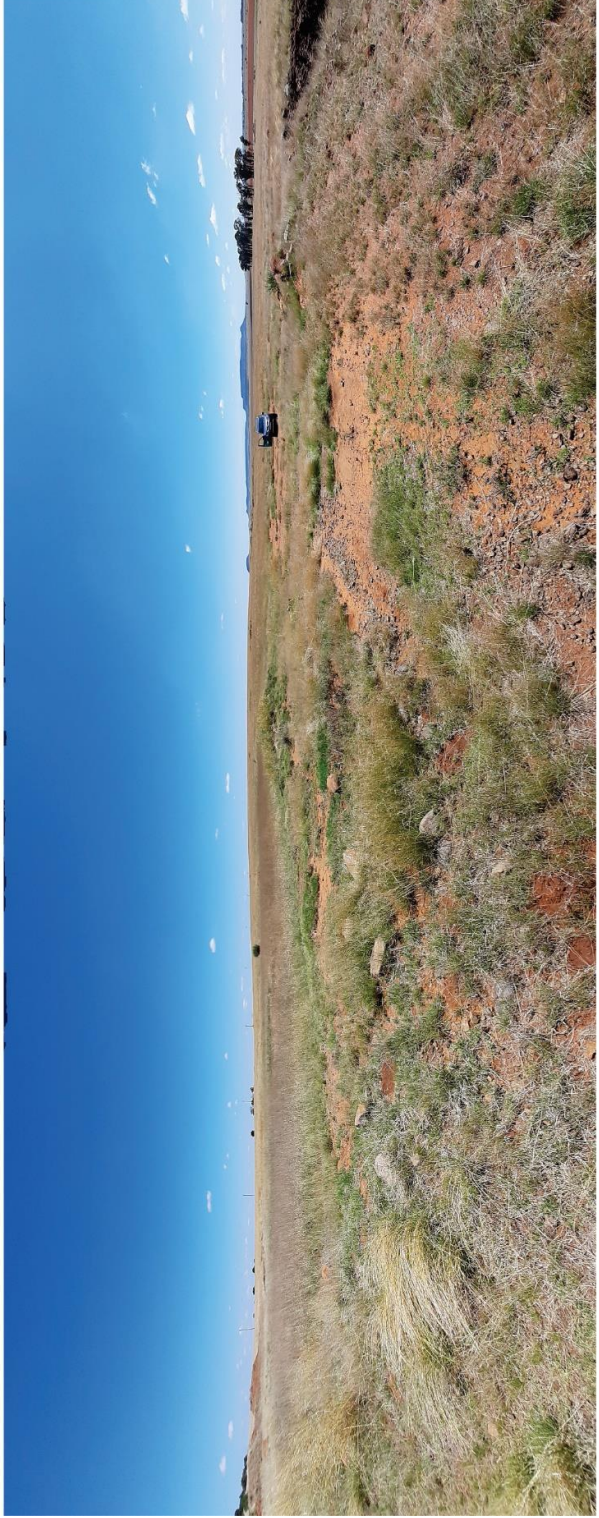


Figure 1. Aerial view the proposed new quarry on the remainder portion of the farm De Hoop 320 (source 1:50 000 scale topographical map 2926 AA Bloemfontein).



**Figure 2. General view of the site looking at old borrow pit, direction north.**



Figure 3. Aerial view of the study area.

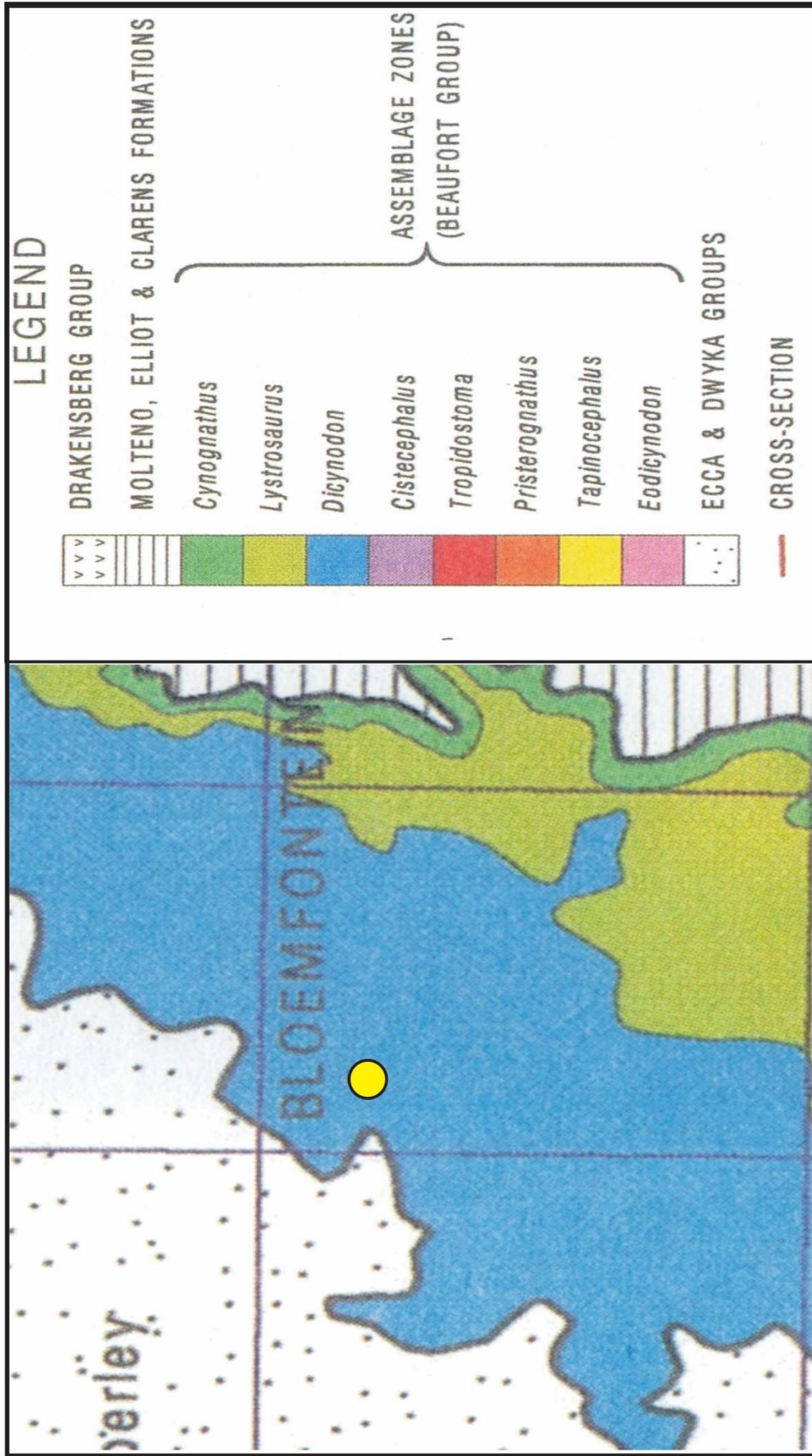


Figure 4. The sedimentary strata underlying the Bloemfontein area are assigned to the *Dicynodon* Assemblage Zone. (Map = distribution of vertebrate biozones of the Beaufort Group after Rubidge 1995.

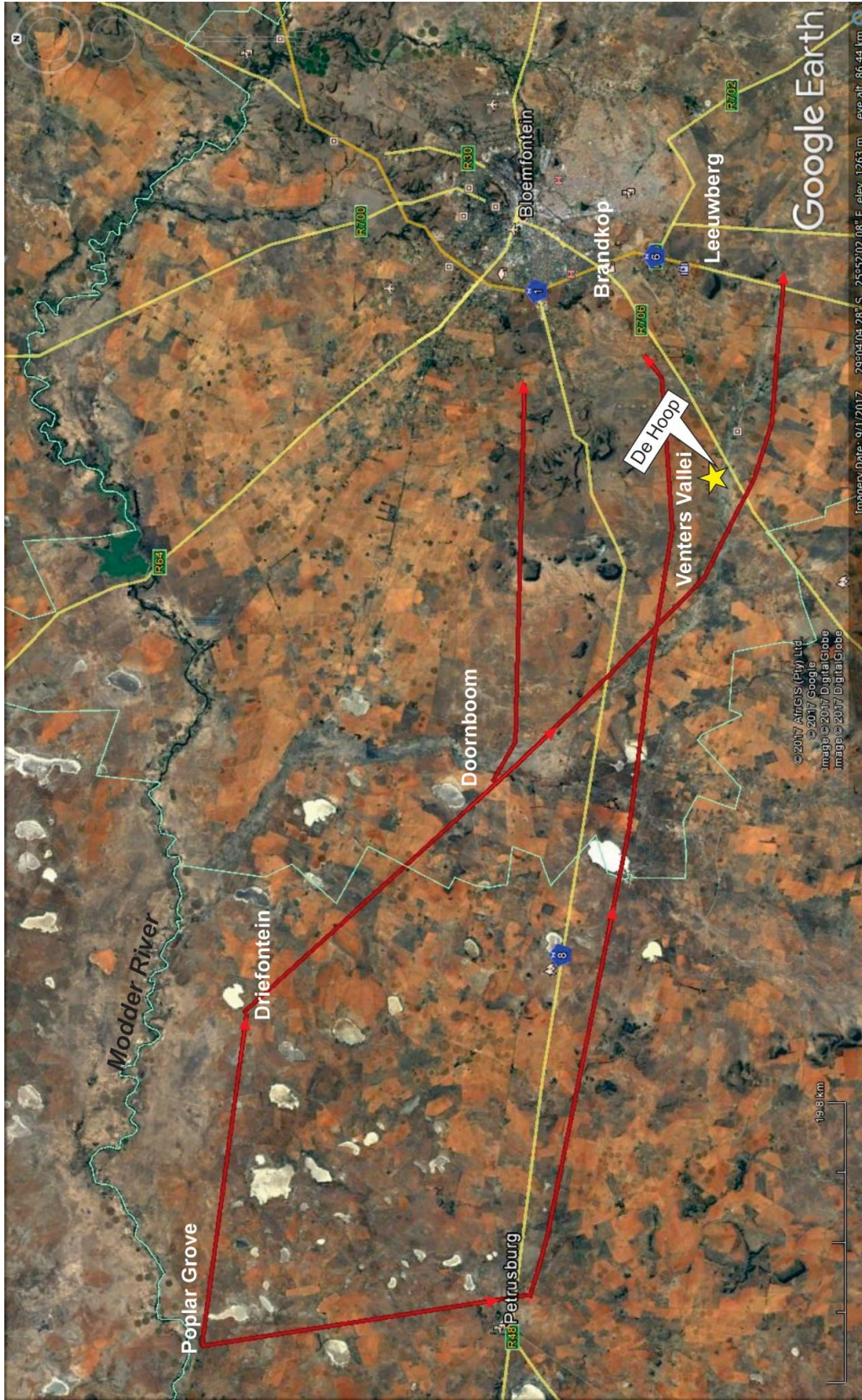


Figure 5. British march on Bloemfontein, March 1900. The position of Rooidam is indicated by the yellow star. According to Amery (1905) “On the morning of the 12th, French pushed on to Venter’s Vallei. Here Roberts joined him, and directed him, to turn in to the north-east and make a dash for Brand Kop. At 1 P.M. French brought the column a mile west of Ferreira Siding, nearly 30 miles from the bivouac at Doornboom. A detachment was sent to the right to cut the railway at Leeuwberg. French himself at once hurried forward towards Brand Kop with the mounted troops, leaving the weary batteries to crawl on after as best they could. The Boers were soon found in positions on both sides of the railway. French, who was with the reconnoitring line, ordered Major Allenby, with the advanced guard squadron of the Greys, to seize a ridge 2,000 yards south of the Brand Kop.”

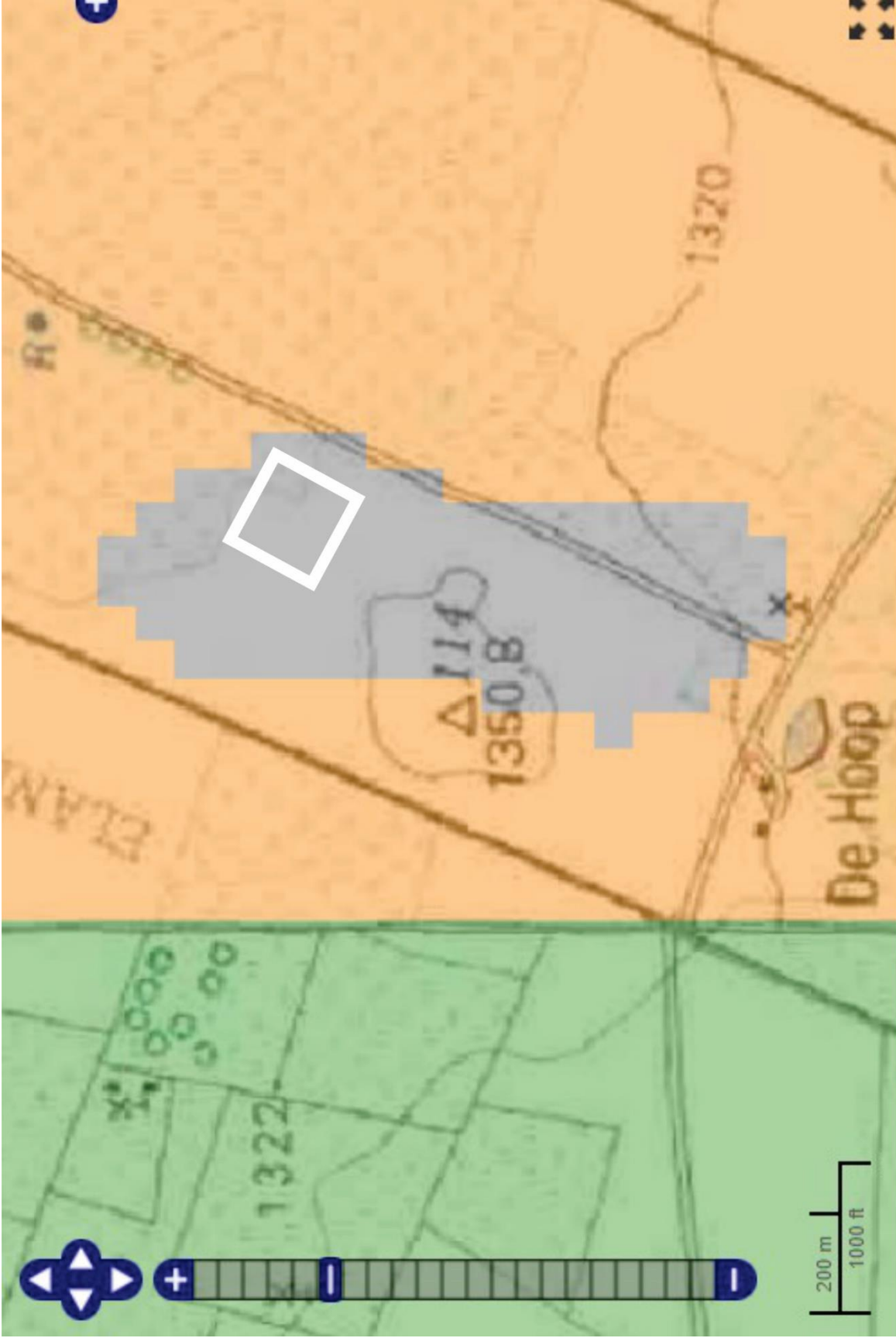


Figure 6. Position of the study area (white polygon) marked on the SAHRIS Palaeontological Sensitivity Map: Grey Zone = insignificant, no further palaeontological studies required.



**Figure 7. The entire study area is underlain by intrusive dolerite outcrop (above) that are capped in places by well-developed superficial deposits (below). (scale: 1 = 10 cm).**