Phase 1 Heritage Impact Assessment of a proposed new Diesel Depot on the farm Avenham 5/2187 Bloemfontein, FS Province.

Report prepared for
MDA Environmental Consultants

by

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Executive Summary

A Phase 1 Heritage Impact Assessment was carried out over a 25 ha area where planned development calls for the construction of a new diesel depot on Portion 5 of the farm Avenham 2187, located next to the N1 national road and about 10 km north of Bloemfontein Free State Province. The study area is located on weather-resistant dolerite outcrop and associated metasediments considered to be of low palaeontological significance. The superficial sediments in and around the study area are also not considered to be fossiliferous. Potential palaeontological impact resulting from excavations within the proposed area is considered very low. The affected area is assigned a site rating of Generally Protected C (GP.C). Several modern structures were recorded on more or less degraded terrain during the survey. 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. The archaeological and cultural component of the proposed project footprint is assigned a site rating of General Protection C (GP.C). It is recommended that the development may proceed with no further heritage assessments required.

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Introduction

At the request of MDA Environmental Consultants a Phase 1 Heritage Impact Assessment was carried out over a 25 ha area where planned development calls for the construction of a new diesel depot on Portion 5 of the farm Avenham 2187, located next to the N1 national road and about 10 km north of Bloemfontein Free State Province. (**Fig. 1**). The extent of the affected areas (over 5000 m2) 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 site visit and subsequent assessment took place during May 2016. 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 archaeological 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

Maps: 1:50 000 scale topographical maps 2826CD Glen and 2926AB Maselspoort

1:250 000 scale geological map 2626 Winburg

Site Coordinates (**Fig 2**):

A) 28°59'38.09"S 26°15'51.44"E

B) 28°59'54.85"S 26°16'12.54"E

C) 29° 0'10.47"S 26°16'4.48"E

D) 29° 0'10.93"S 26°15'55.68"E

E) 28°59'40.07"S 26°15'50.23"E

The study area forms part of a derelict crocodile farm situated against the lower slope of a dolerite koppie (**Fig. 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. The Modder River is a southern tributary of the Vaal River and its alluvial deposits are associated with abundant Quaternary mammalian fossils. 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 association between the age of the younger overbank sediments at Erfkroon and the fossiliferous overbank sediments at Mitasrust, which is located 11 km west of Avenmore, as well as the likelihood of more arid environmental conditions indicated by these sediments, suggest a Last Glacial age (possibly between Isotope Stage 4 and Isotope Stage 2) for the Mitasrust fossils (Rossouw 2006).

The study area is located between archaeologically significant alluvial sediments of the Modder River located 5km to the north, and rich cultural remains previously recorded around the northern outskirts of Bloemfontein, including Anglo Boer War remnants, graveyards and historical structures, stone-built kraal structures and dam walls (Dreyer 2004a, 2004b, 2004c, 2004d, 2005; Henderson 2006; Henderson *et al*. 2008; Rossouw 2012). The study area is located close to but outside the south-western periphery of distribution of Late Iron Age stone-walled settlements in the Free State (Maggs 1976). The Stone Age archaeological record of Modder River catchment 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 the Modder River and

its tributaries, alluvial deposits contain localized occurrences of *in situ* Middle and Later Stone Age material eroding out of the overbank sediments where they are often found in association with fossil mammal remains (Churchill *et al*. 2000; Rossouw 2006). 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 (Rossouw 2006). Widespread traces of prehistoric human habitation, in the form of stone tool scatters and individual surface finds, have previously been recorded around the northern outskirts of Bloemfontein (Goodwin and van Riet Lowe 1929, Henderson *et al*. 2008; Rossouw 2012).

Field Assessment and Recommendations

The study area is located on weather-resistant dolerite outcrop and associated metasediments considered to be of low palaeontological significance (**Fig. 5).** The superficial sediments in and around the study area are also not considered to be fossiliferous. Potential palaeontological impact resulting from excavations within the proposed area is considered very low. The affected area is assigned a site rating of Generally Protected C (GP.C). Several modern structures were recorded on more or less degraded terrain during the survey (**Fig. 6**). 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. The archaeological and cultural component of the proposed project footprint is assigned a site rating of General Protection C (GP.C). It is recommended that the development may proceed with no further heritage assessments required.

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Tables and 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

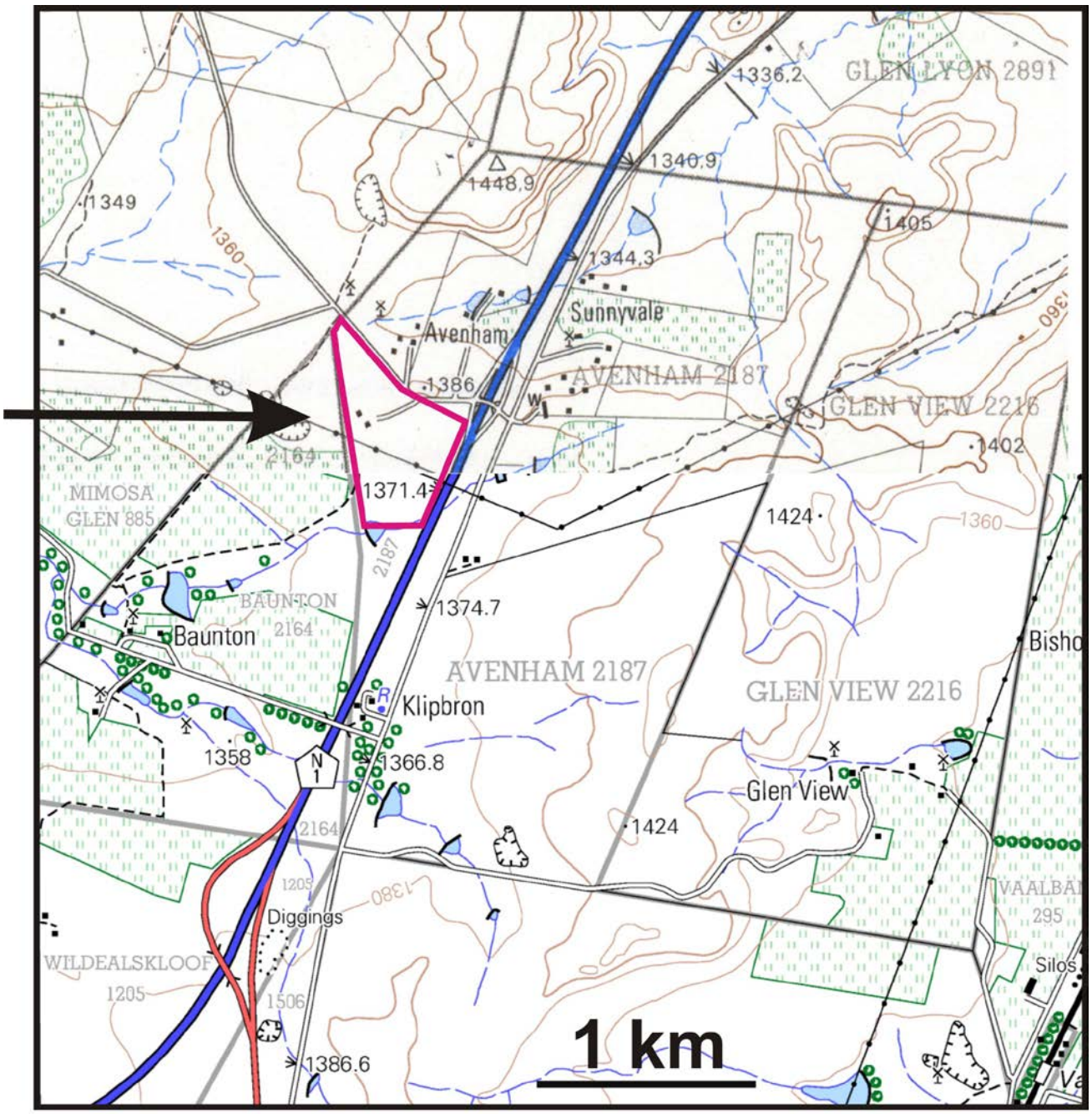

Figure 1. Location of study area marked by a yellow rectangle (portion of 1:50 000 scale topographic maps 2826 Glen and 2926AB Maselspoort).

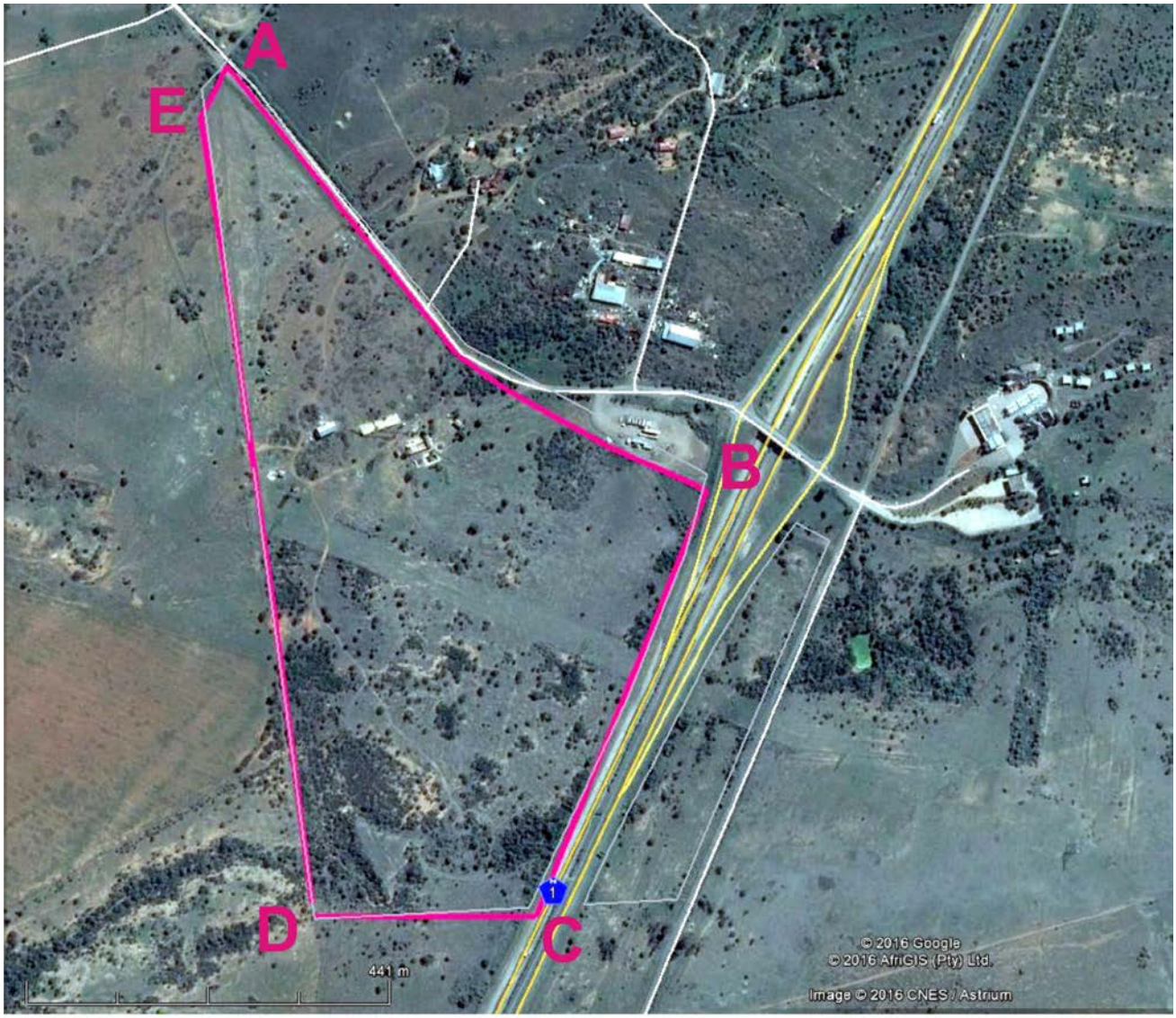

Figure 2. Aerial view of the study area.

Figure 3. General view of the study, looking south (top) and northwest (bottom left).

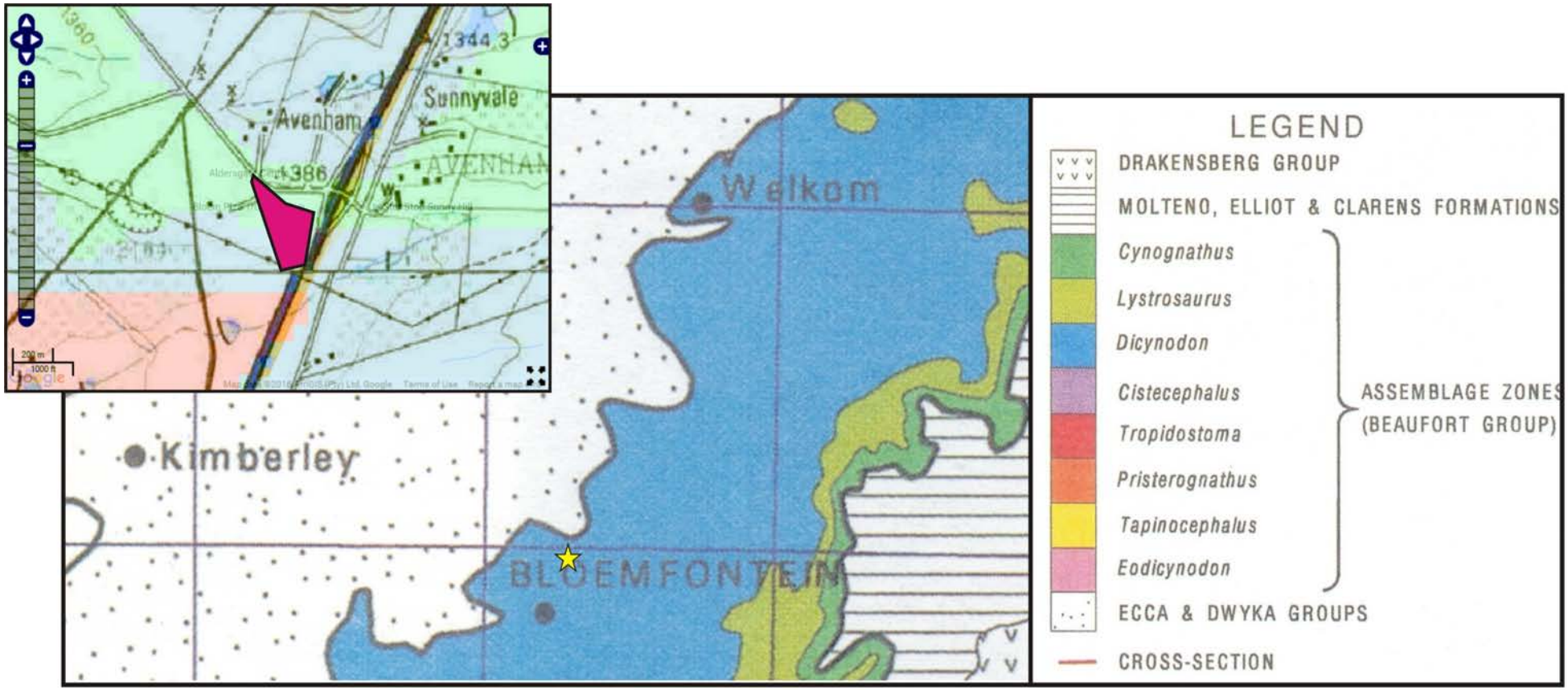

Figure 4. Geographical distribution of vertebrate biozones of the Beaufort Group around Bloemfontein (map after Rubidge 1995). The study area is marked by a yellow star. Site locality marked on the SAHRIS palaeosensitivity map (insert, top left).

Figure 5. The study area is located on weather-resistant dolerite outcrop and associated metasediments considered to be of low palaeontological significance. Scale 1 = 10 cm.

Figure 6. Modern structures associated with the old crocodile farm located on more or less degraded terrain.