

# **Palaeontological desktop study of a proposed new Borrow Pit on the farm Droogegrond 169 JR near Bela Bela, Limpopo Province.**

Report prepared by Dr L. Rossouw, PO Box 38806 Langenhovenpark 9330.

12 February 2017

## **Summary**

The proposed borrow pit footprint is located on a contact metamorphic zone of potentially fossiliferous Ecca sediments of the Hammanskraal Formation, and palaeontologically insignificant igneous intrusions (dolerite). Potential impact on palaeontological heritage resources within the proposed borrow pit footprint is considered low. As far as the palaeontological heritage is concerned, the proposed development may proceed with no further palaeontological assessments required, provided that all excavation activities are restricted to within the boundaries of the development footprint.

## **Introduction**

The report is a preliminary assessment of potential palaeontological impact with regard to development of new borrow pit for the paving of the bus and taxi route at Rapotokwane Village in the Bela-Bela Local Municipality area, Limpopo Province (**Fig. 1**). The proposed footprint covers a 2.5 ha area located on open, low relief terrain adjacent to Rapotokwane on the farm Droogegrond 169 JR (**Fig. 2**).

Site coordinates:

- A) 25° 8'22.99"S 28°39'9.18"E
- B) 25° 8'27.34"S 28°39'11.11"E
- C) 25° 8'30.87"S 28°39'15.23"E
- D) 25° 8'32.53"S 28°39'9.80"E

## **Methodology**

The assessment was carried out in accordance with National Heritage Resources Act 25 of 1999 with the aim to assess the potential impact on palaeontological heritage resources that

may result from the proposed development. The palaeontological significance of the affected areas were evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature.

### **Assumptions and Limitations**

The assessment provided within this report is based upon a desktop study without the benefit of a site visit. As such, the presentation of geological units present within the study area is derived from 1:250 000 geological maps that may vary in their accuracy. It is also assumed, for the sake of prudence, that fossil remains are always uniformly distributed in fossil-bearing rock units, although in reality their distribution may vary significantly.

### **Geology**

According to the 1:250 000 scale geological map of the area, bedrock is represented by Permian Ecca Group sediments and infrequent Jurassic dolerite intrusions (Karoo Supergroup) that were deposited unconformably on pre-Karoo rocks dominated by the Lebowa Granite Suite (Johnson *et al.* 2006). The Ecca Group equivalent in the Springbok Flats Basin is the Hammanskraal Formation, divided into an Upper Ecca Stage (UES) and Middle Ecca Stage (MES) (Visser & Van der Merwe 1959). The lower portion of the UES is comprised of grit, sandstone, sandy shale and carbonaceous shales which are possibly comparable to the Vryheid Formation of the Main Karoo Basin. The MES grades into the upper portion of this formation and is comprised of grey sandy shale, shaley sandstone with cross-bedding and minor layers of white sandstone and poorly bedded grey shale. This sequence can possibly be correlated to the Volkrust Formation of the Main Karoo Basin. A coal zone, consisting of interbedded black shale and coal occurs in local basins at the top of the formation.

### **Palaeontology**

Surface exposures are poor, but Glossopterid flora has been recorded within the Hammanskraal Formation especially in the coal zone at top of the succession, and mostly from borehole cores. Ancient human skeletal and associated Florisian faunal remains discovered at Tuinplaats (Springbok Flats) have been discovered in geologically recent calcareous soils (Quaternary overburden) at a depth of  $\pm 1.0$  m (Pike *et al.* 2004). There is currently no record of Quaternary fossil sites within the immediate vicinity of the study area.

## **Impact Statement and Recommendation**

The desktop investigation indicates that the proposed borrow pit footprint is in part located on potentially fossiliferous Ecca sediments of the Hammanskraal Formation, but mostly on palaeontologically insignificant igneous intrusions (dolerite). Potential impact on palaeontological heritage resources within the proposed borrow pit footprint is considered low. As far as the palaeontological heritage is concerned, the proposed development may proceed with no further palaeontological assessments required, provided that all excavation activities are restricted to within the boundaries of the development footprint.

## **References**

- Geological Survey, 1978. 1:250 000 Geological Series 2528 Pretoria. Geological Survey, Pretoria
- Johnson, M.R., Van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H. de V., Christie, A.D.M., Roberts, D.L., and Brandl, G. (2006). Sedimentary Rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J. (Eds.), *The Geology of South Africa*. Geological Society of South Africa, Johannesburg, 461-499.
- Kraak, C. 2014. *A provisional basin analysis of the Karoo Supergroup, Springbok Flats Basin, South Africa*. Unpublished MSc thesis, University of Pretoria
- Nel, L. 2012. *The Geology of The Springbok Flats*. Unpublished PhD thesis, University of the Free State.
- Pike, A. W.G., Eggins, S., Grun, R., Thackeray, F. 2004. U-series dating of TP1, an almost complete human skeleton from Tuinplaas (Springbok Flats), South Africa. *South African Journal of Science* 100(7-8):381.
- Visser, H. N., and Van Der Merwe, S. W., (1959), The Northeastern SBF Coal Field: Records of bore-holes 1 to 27 drilled for the Department of Mines. *Geological Survey, Bulletin* 31, pp 1-97.

## 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 and have no conflicting interests in the undertaking of the activity.

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

12 / 02 / 2017

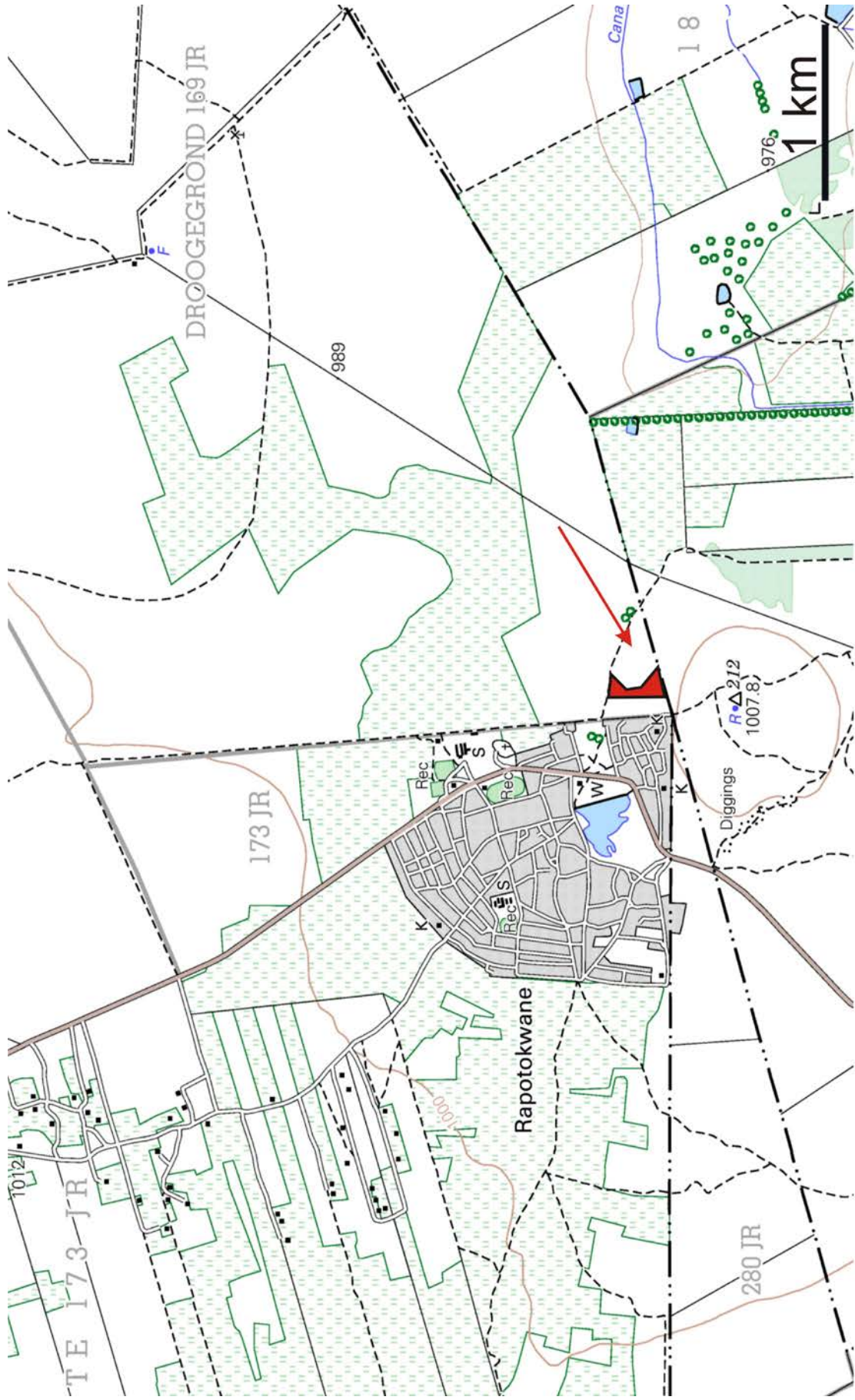


Figure 1. Map of the proposed borrow pit near Rapotokwane Village (portion of 1:50 000 scale topographic 2528BA Rust de Winter).



Figure 2. Aerial view of the study area.

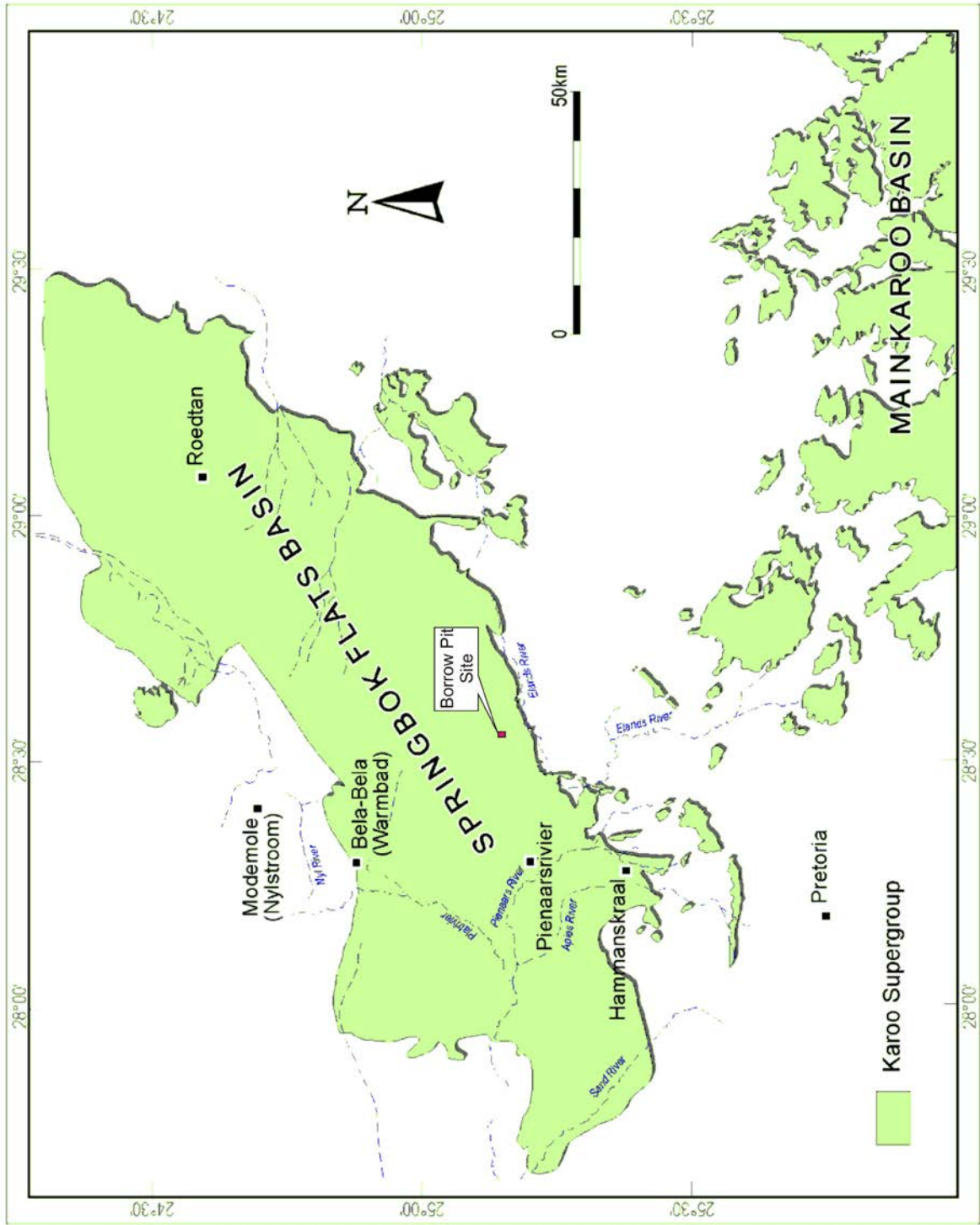


Figure 3. Distribution of the Ecca Group in the Springbok Flats Basin and northern part of the Main Karoo Basin (Nel 2012).

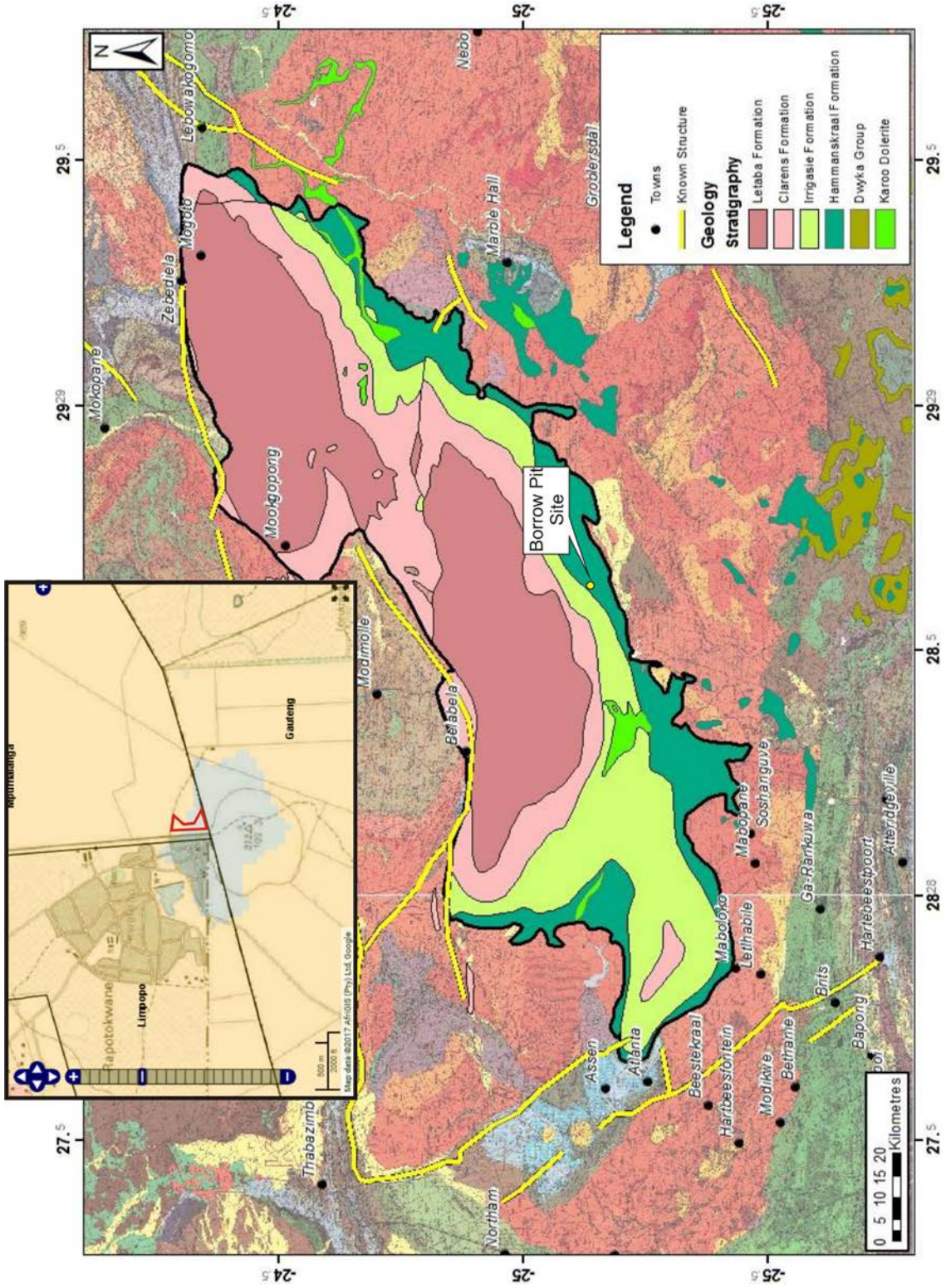


Figure 4. The borrow pit footprint covers potentially fossiliferous Ecca sediments (Hammanskraal Formation, light orange area insert) as well as palaeontologically insignificant igneous intrusions (dolerite, grey area insert).