

Palaeontological desktop study of an aquaponics farm project on the Farm Boschplaats 91 near Hammanskraal, Bojanala District, North West Province.

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Summary

The proposed new aquaponics facility is located on moderately fossiliferous Ecca sediments of the Hammanskraal Formation, that are capped by geologically recent and palaeontologically insignificant residual soil overburden. Considering the scale and overall impact of the development, it is extremely unlikely that any fossils will be found in within the proposed (\pm 0.5 ha) area. The proposed development may proceed as far as the palaeontological heritage is concerned and a phase 2 impact study is not necessary, provided that all excavation activities are restricted to within the boundaries of the development footprint. If, however, any fossils are discovered within fresh sedimentary bedrock during the construction phase of the development, a professional palaeontologist must be called in immediately to confirm and record the finds. In the meantime, ex situ remains must be wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. In situ material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

Introduction

The report is a preliminary assessment of potential palaeontological impact with regard to development of a new Tilapia aquaponics farm project to be constructed on a part of Portion 2 of the Farm Boschplaats 91 situated within the rural settlement of Bosplaas in the Moretele Local Municipality in the Bojanala Platinum District Municipality within the North West Province (1:50 000 scale topographic map 2528AC Shoshanguve, **Fig. 1**). It is found approximately 60km to the north of Pretoria and just to the north of the town Hammanskraal. **The study area measures approximately 1.5ha in size and the development will occupy**

approximately one third of the small holding situated approximately 2km to the west of the R101 tar road and the Apies River (**Fig. 2 & 3**).

Site centroid coordinates:

25°19'38.15"S 28°14'33.75"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 1:1 Ma and 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

The geology around Hammanskraal is represented by Permian Ecca Group sediments (Karoo Supergroup) to the north (Pe) and Proterozoic granites of the Lebowa Granite Suite to the south (Johnson *et al.* 2006) (**Fig. 4**). 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. Coal deposit outcrop is generally very poor (Johnson et al. 2006) and there are no outcrops in the vicinity of the town of Hammanskraal. 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 ± 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 indicate that the proposed development footprint is located on potentially fossiliferous Ecca sediments of the Hammanskraal Formation that are capped by geologically recent and palaeontologically insignificant residual soil overburden (**Fig. 5**). Considering the scale of the development, it is extremely unlikely that any fossils will be found in within the proposed (± 0.5 ha) area. As far as the palaeontological heritage is concerned, the proposed development may proceed. A phase 2 impact study is not necessary, provided that all excavation activities are restricted to within the boundaries of the development footprint.

If, however, any fossils are discovered within fresh sedimentary bedrock during the construction phase of the development, a professional palaeontologist must be called in immediately to confirm and record the finds. In the meantime, *ex situ* remains must be wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. *In situ* material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

References

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- 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.

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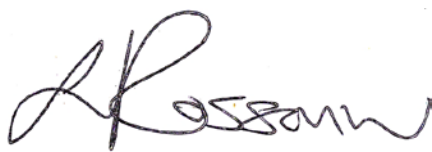
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DECLARATION OF INDEPENDENCE

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 / 06 / 2017

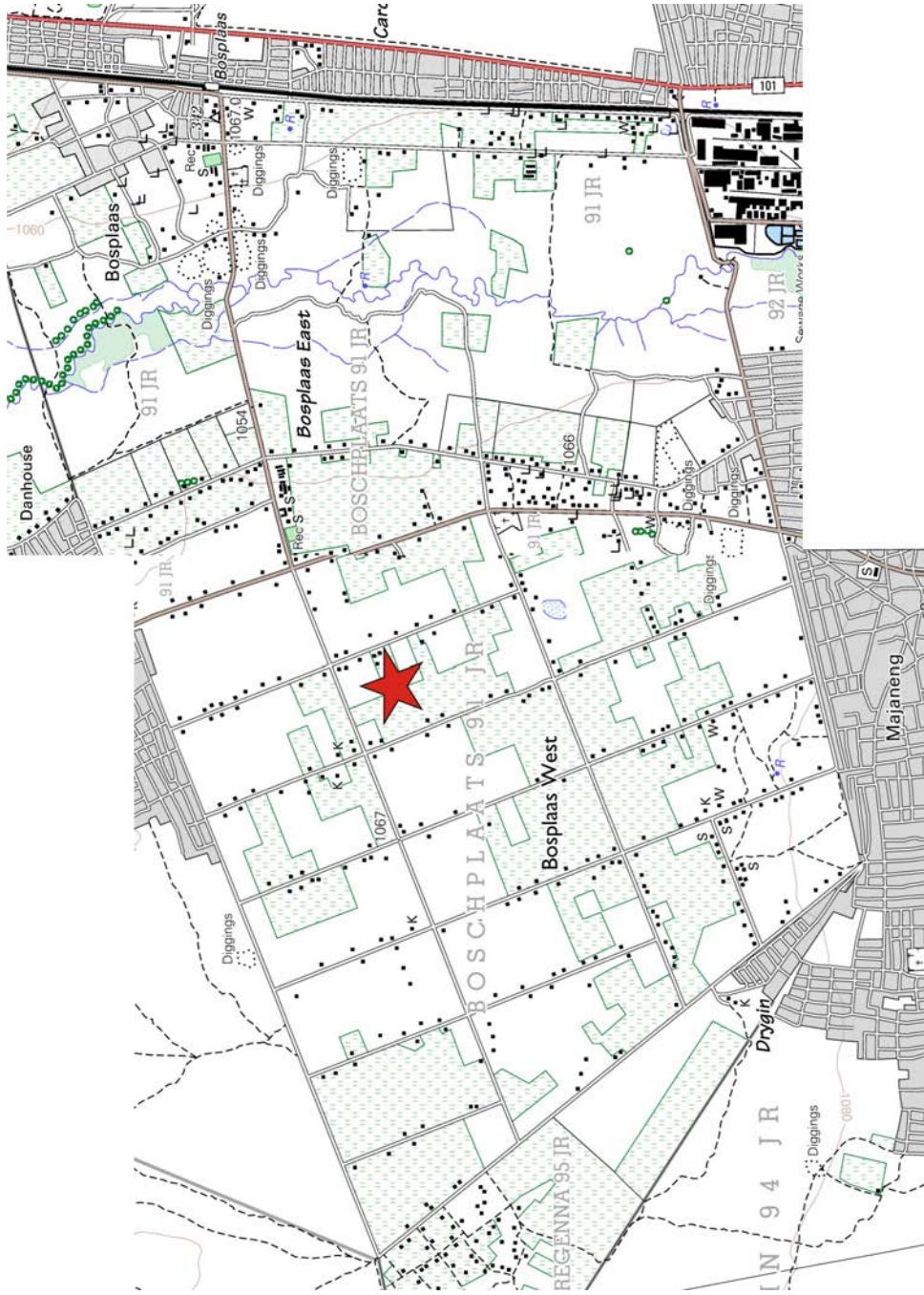


Figure 1. Map of the study area (portion of 1:50 000 scale topographic 2528AC Shoshanguve).



Figure 2. Aerial view of the study area.



Figure 3. General view of the site, looking east (top) and west (below).

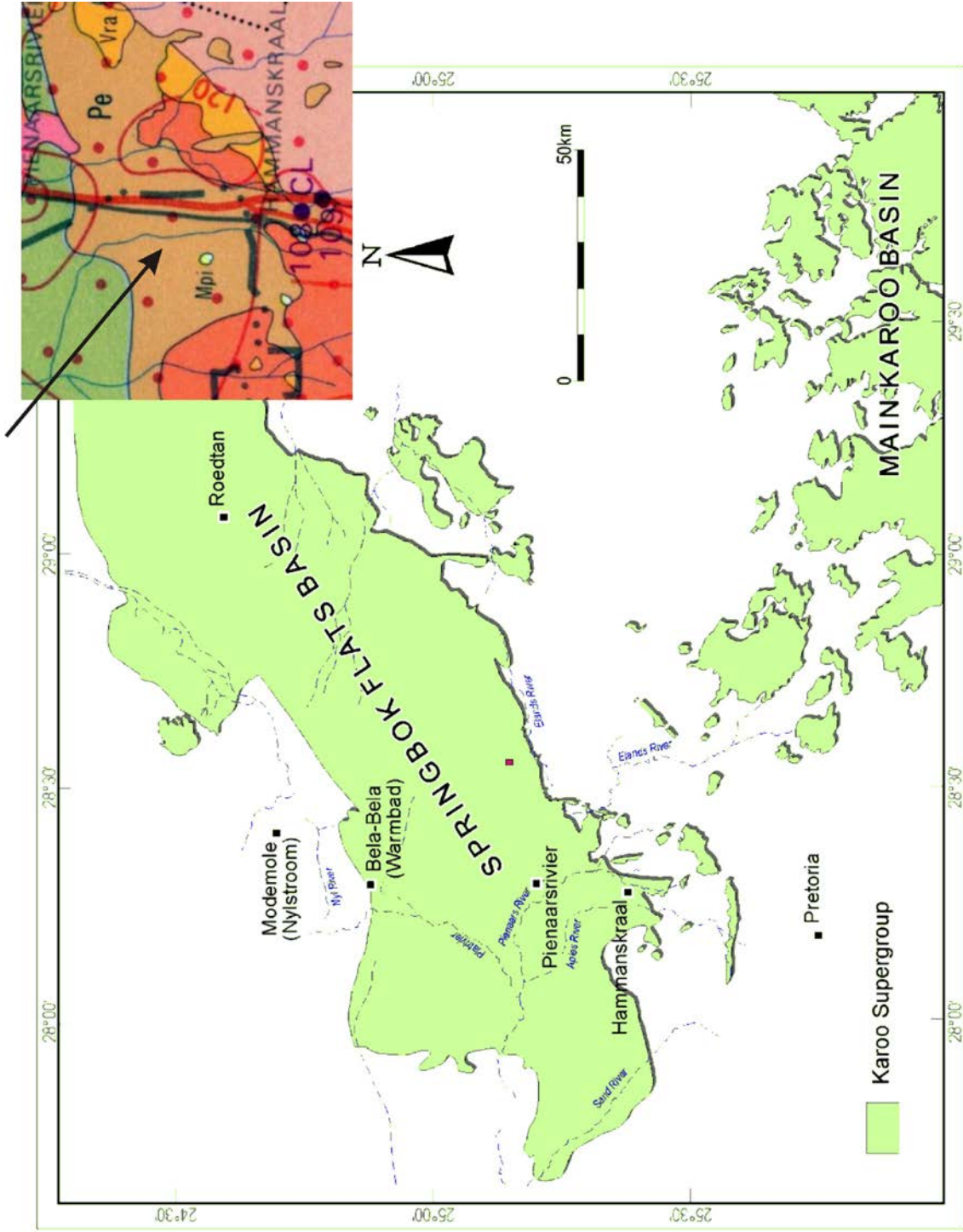


Figure 4. Distribution of the Ecca Group in the Springbok Flats Basin and northern part of the Main Karoo Basin (Nel 2012). Geological map of the Hammanskraal area (insert; 1 : 1 000 000 scale geological map of RSA, 1997).



Figure 5. Well-developed residual soil overburden exposed immediately to the north of the study area.