

D-1867 UPGRADE, KWAZULU-NATAL DESK-TOP PALAEOLOGY REPORT

FOR

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BY

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July 2019

EXECUTIVE SUMMARY

According to the geology, there is little likelihood of any vertebrate fossils being found within this area. Impact is low and no mitigation required.

2. GEOLOGY

The proposed road upgrade starts in the Dwyka Group (C-Pd) and continues into basement (Rk and Rd). Dolerite (Red: Jd) dykes and sills may be encountered on the route (Fig. 2).



Fig. 2: Extract from the Vryheid 2730 1: 250 000 Geological map.

The dolerite (Jd: Fig. 2) is intrusive and of late Karoo age (184 Ma) and represents the onset of the break-up of the Gondwana Supercontinent. Break-up was complete by 140 Ma. Dolerite is an igneous rock and is unfossiliferous.

From Fig. 2, Rk (shale, quartzite, subordinate iron rich shale, Banded Iron formation, conglomerate and lava), Rd (diabase) represent rocks of the Randian basement (2,500 – 3,000 Ma). The diabase (Rd) is a dolerite which has undergone greenschist metamorphism.

Sediments which now constitute the Dwyka Group were deposited during the Late Palaeozoic Glaciation (locally known as the Dwyka Glaciation). This was a world wide event. In the Southern African region, the glaciation commenced, at the end of the Carboniferous at 305 to 307 Ma (Visser, 1997), and ended in the Early Permian at about 290 Ma (Wopfer, 2002). This group can be further subdivided into the Elandsvlei and the Mbizane Formations (von Brunn & Visser, 1999). In the project area the Mbizane Formation predominates. This is a generally sandy unit, with very little fine deposits.

3. PALAEOLOGY

Randian age rocks (2,500 – 3, 000 Ma) may contain unicellular microfossils. Although multi-cellular life only came into existence ~ 600 Ma, prior to this the world was dominated by single-celled life. These microfossils are the subject of academic study, but are very common when they are found.

In theory vertebrate fossils could be found within the Mbizane Formation of the Dwyka Group but none have been recorded to date. Trace fossils may be encountered but these are common.

4. IMPACTS

- **Impact: Low**
- **Mitigation: None required**

5. CONCLUSIONS

According to the geology, there is little likelihood of any vertebrate fossils being found within this area. Impact is low and no mitigation required.

6. REFERENCES

Visser, J.N.J., 1997. A review of the Permo-Carboniferous glaciation in Africa, In: J.B. Martini (Editor). Late Glacial and Postglacial Environmental Changes. Oxford University Press, New York, U.S.A., 169–191.

Von Brunn, V. and Visser, J.N.J., 1999. Lithostratigraphy of the Mbizane Formation (Dwyka group). South African Committee for Stratigraphy., *Lithostratigraphic Series*, (32), p.10

Vryheid2730 1: 25 000 Geological Map Council for Geosciences, Pretoria.

Wopfner, H., 2002. Tectonic and climatic events controlling deposition in the Tanzanian Karoo Basin. *Journal of African Earth Sciences*, 34, 167–177.

APPENDIX 1. DETAILS OF SPECIALIST

Dr Alan Smith

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Honorary Research Fellow: Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Durban.

Role: Specialist Palaeontological Report production

Expertise of the specialist:

- PhD in Geology (University of KwaZulu-Natal), Pr. Sc. Nat., I.A.H.S.
- Expert in Vryheid Formation (Ecca Group) in northern KZN, this having been the subject of PhD.
- Scientific Research experience includes: Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits.
- Experience includes understanding Earth Surface Processes in both fluvial and coastal environments (modern & ancient).
- Alan has published in both national and international, peer-reviewed journals. He has published more than 50 journal articles with 360 citations (detailed CV available on request).
- Attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, South Africa) and is actively involved in research.

Selected recent palaeo-related work includes:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.
- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.
- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.
- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No.

Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.