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**HERITAGE AND PALAEOLOGICAL IMPACT ASSESSMENT REQUESTED
IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT
NO 25/1999 FOR THE MINING RIGHT ON THE REMAINING PORTION OF THE
FARM JACOBSFONTEIN (PLAAS 503 / WERDA) NEAR POSTMASBURG IN THE
NORTHERN CAPE PROVINCE¹**

Prepared by

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Tuesday, 28 March 2017

¹ Adapted from a Report of the same Title prepared by Dr Nohlahla Vilakazi on behalf of Archaeological & Heritage Services Africa (Pty) Ltd (AHSA).

DECLARATION OF INDEPENDENCE

AHSA is an independent consultancy: I hereby declare that I have no interest, be it business, financial, personal or other vested interest in the undertaking of the proposed activity, other than fair remuneration for work performed, in terms the National Heritage Resources Act (No 25 of 1999).

A handwritten signature in black ink, appearing to read 'J. Chikumbirike', is written over a light grey rectangular background.

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Qualifications: PhD in Palaeontology, University of the Witwatersrand

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1. INTRODUCTION

The company Van Wyk Diamonds Pty Ltd is applying for a prospecting right on the farm Jacobsfontein 503 in the Z.T. Mgcawu District Municipality, formerly known as Siyanda District Municipality (Fig1). Z.T. Mgcawu District Municipality forms the mid-northern section of the Northern Cape Province on the frontier with Botswana. The district comprises six local municipalities namely: Mier, Kai! Garib, //Khara Hais, Tsantsabane, !Kheis and Kgatelopele. Upington is the district municipal capital, where the municipal government is located.

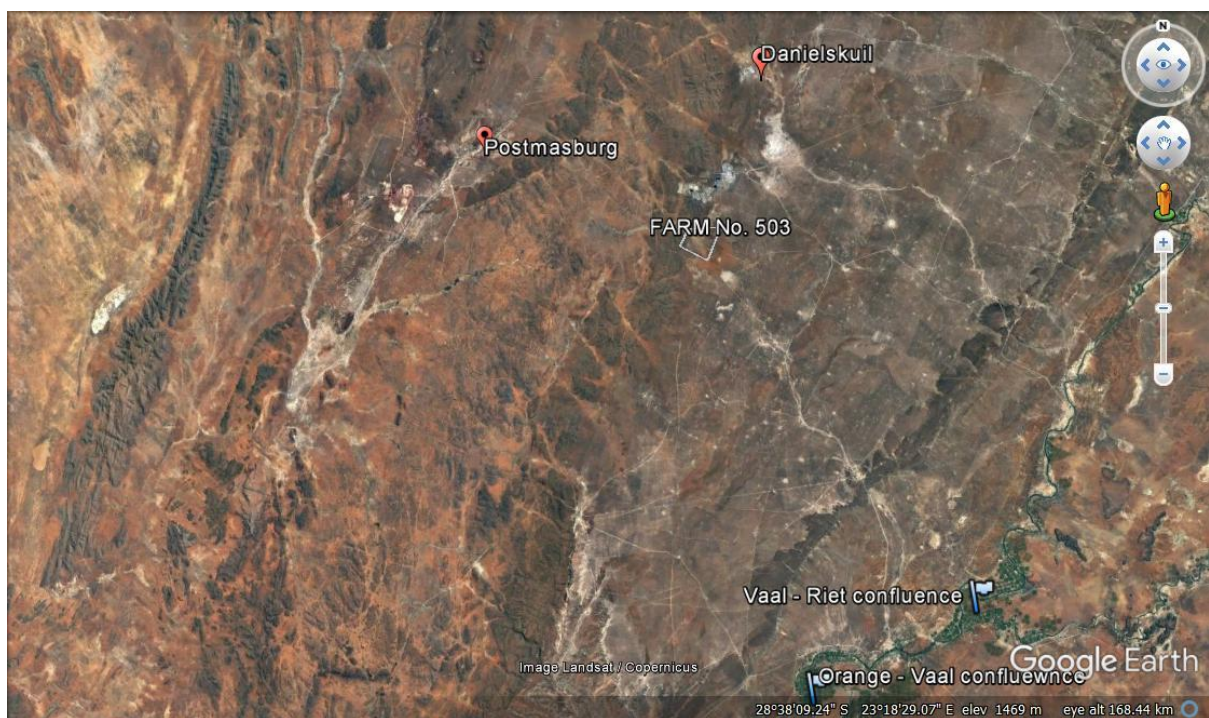


Fig 1. Google-Earth locality map.

2. APPROACH AND METHODOLOGY

2.1. Details of Specialist

The author of this report is a palaeontologist and member of the Association of Southern African Professional Archaeologists, Palaeontological Society of South Africa (PSSA), and employed as lecturer in the School of Humanities (Heritage) at Sol Plaatje University.

2.2. General approach for palaeontological impact studies

The potentially fossiliferous rock units (groups, formations) found within the study area are determined from geological maps. The fossil heritage within the study area is also determined from published scientific literature and previous palaeontological impact studies conducted in the same region, the author's own field experience and knowledge of specimen collections at the University of the Witwatersrand.

3. GEOLOGICAL CONTEXT

The municipality falls within the Campbell Rand Subgroup (previously included within the Ghaaplatto Formation) of the Ghaap Group (Almond, 2012). The Campbell Rand succession has been subdivided into a series of formations, some of which were previously included within the older Schmidtsdrift Formation or Subgroup (Eriksson, et. al., 2006).

This Subgroup (Campbell Rand) is a very thick (1.6-2.5 km) carbonate platform succession of dolomites, dolomitic limestones and cherts with minor tuffs that were deposited on the shallow submerged shelf of the Kaapvaal Craton, roughly 2.6-2.5 Ga (billion years ago) (McCarthy & Rubidge, 2005). A range of shallow water facies, often forming depositional cycles reflecting sea level changes, including stromatolitic limestones and dolostones, oolites, oncolites, laminated calcilutites, cherts and marls, with subordinated siliclastics (shales, siltstones) and minor tuffs, can be seen (Almond, 2014). Exposure levels of these rocks are often very low due to their solubility and low resistance to weathering (Almond, 2012). The outcrop area of chert-rich subunits is often largely covered in down wasted, siliceous rock rubble (Almond, 2012).

Banded ironstone deposits are also present (Figs 2, 3). These are distinctive units of sedimentary rocks that are almost always Precambrian Age. They are important in that they are a commercial source of iron ore. This banded ironstone contains from 25 to 45% Iron (Taylor, et. al., 1988). The ore is very fine grained and made up predominantly of hematite, which can be successfully upgraded to suit blast furnace operations (Taylor, et. al., 1988).



Fig 2. Photo showing some banded ironstone in the area.



Fig 3. Photo showing sedimentary layers on the slope of the ridge on Werda.

4. PALAEOLOGICAL CONTEXT

The shallow shelf and intertidal sediments of the carbonate-dominated lower part of the Ghaap Group are well known for their rich fossil biota of stromatolites or microbially-generated, finely-laminated sheets, mounds and branching structures

(Almond, 2012). Some stromatolite occurrences on the Ghaap plateau of the Northern Cape are well preserved (Eriksson, *et. al.*, 2006).

The Tsineng Formation at the top of the Campbell Rand carbonate succession has yielded both stromatolites which were previously assigned to the Tsineng Member of the Gamohaam Formation, as well as filamentous microfossils named *Siphonophycus* (Altermann & Schopf, 1995).



Fig 3. Photo showing a possible fossil imprint.

5. CONCLUSION AND RECOMMENDATIONS

The Campbell Rand Subgroup has yielded well preserved stromatolites as well as filamentous microfossils. There is most likely to be good material around the proposed area.

During prospecting and mining the environmental control officer should be aware of the possibility to strike important fossils and should periodically monitor all major excavations

In the event of major fossil finds being discovered, they should be safeguarded preferably in situ and reported to the relevant heritage resources authority so that appropriate mitigation by a palaeontologist can be considered and implemented.

These recommendations must form part of the environmental management plan (EMP) to be implemented during the mining phase.

A **Fossil Finds Procedure** is appended to this report (Annexure A).

6. REFERENCES

- ALMOND, J.E. 2012. Palaeontological specialist assessment: desktop study. Proposed 16 MTPA expansion of Transnet existing Manganese ore export railway line and associated infrastructures' between Hotazel and the port of Ngqura, Northern and Eastern Cape
- ALMOND, J.E. 2014. Palaeontological heritage basic assessment: desktop study. Proposed mineral prospecting on the farms Achambachs Puts 56, Plaas 53, Plaas 566 and Plaas 567 near Griekwastad, Siyancuma Local Municipality, Hay Magistrial District, Northern Cape
- ALTERMANN, W. & SCHOPF, J.W. 1995. Microfossils from the Neoproterozoic Campbell Group, Griqualand West sequence of the Transvaal Supergroup, and their palaeo-environmental and evolutionary implications. *Precambrian Research* **75**: 65-90
- ERIKSSON, P.G., ALTERMANN, W. & HARTZER, F.J. 2006. The Transvaal Supergroup and its precursors. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.). The geology of South Africa, pp 237-260. Geological Society of South Africa, Marshalltown
- McCARTHY, T. & RUBIDGE, B. 2005. The story of Earth and life: a southern African perspective on a 4.6-billion-year journey, 344 pp. Struik, Cape Town
- TAYLOR, D.J.C., PAGE, D.C. & GELDENHUYS, P. 1988. Iron and steel in South Africa. *J. S. Afr. Inst. Min. Metall.* **88(3)**: 73-95
- <http://localgovernment.co.za>

7. ACKNOWLEDGEMENT

Dr Nohlahla Vilkaazi, UNISA, produced an earlier version of this Report.