



Title: A Desktop Palaeontological Impact Assessment for the Proposed Eskom Borutho-Witkop Transmission Line, Limpopo Province, South Africa.

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DECLARATION OF INDEPENDENCE

This report has been compiled by Professor Marion Bamford, lead palaeontologist for NGT Project & Heritage Consultants. The views expressed in this report are entirely those of the author and NGT Projects & Heritage Consultants no other interest was displayed during the decision making process for the project.

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EXECUTIVE SUMMARY

A desktop palaeontological assessment for the proposed transmission line between Borutho and Witkop has been done by consulting the relevant literature. Since there are only ancient rocks in the region (ranging in age between about 2900 and 1700 million years old) there is no chance of finding fossils. As far as the palaeontology impact is concerned, the project may proceed.

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1. BACKGROUND

In 2013 NGT Projects & Heritage Consultant conducted a Heritage Impact Assessment (HIA) study for the proposed Borutho-Witkop 400kV Transmission Line. The HIA was exclusive of a palaeontological study. This report was submitted to SAHRA for adjudication purposes and it received a Positive Review Comment for archaeological resources along the proposed line. SAHRA requested that a Desktop Palaeontological Study be conducted by a qualified palaeontologist to assess the palaeontological sensitivity of the proposed development area in order to complete the heritage component of the proposed Borutho-Witkop line.

NGT Projects and Heritage Consultants was appointed by Baagi Environmental Consultancy to conduct the palaeontological study on behalf of its client Eskom as per the SAHRA project Review Comment. As such a desktop palaeontological study is reported here for the proposed construction of a 400kV powerline with pylons between Borutho and Witkop, north of Mokopane as part of the Medupi Phase 3 project (23°54'11.77"S; 28°58'37.03"E and 24°02'49.26"S; 29°21'38.16"E approximately – taken from Google Earth Map), shown in Figure 1.

In accordance with the national legislation (National Heritage Resources Act (No. 25 of 1999)) the sites to be developed must be assessed for the occurrence of any palaeontological material. If any fossils are likely to be present then their importance and rarity must be gauged and if they are important then plans must be put in place to remove the fossils (under a SAHRA permit and housed in an recognized institution), protect them and/or divert the proposed construction.

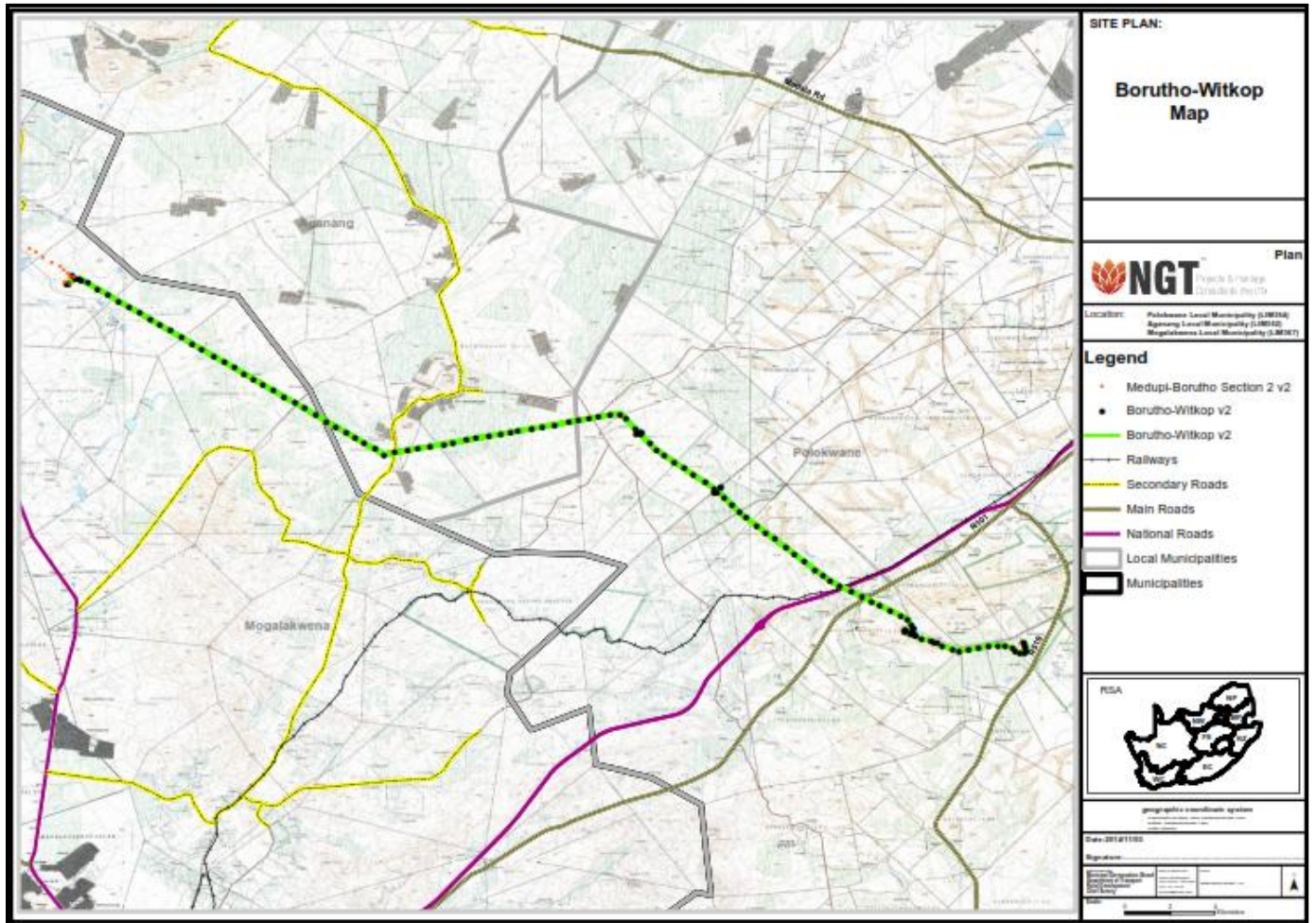


Figure 1 -Map showing the Borutho Witkop Transmission Line, Limpopo Province.

2. METHODS

The published geological and palaeontological literature, unpublished records and databases were consulted to determine if there are any records of fossils from the sites and the likelihood of any fossils occurring there.

3. A GEOLOGICAL AND PALAEOLOGICAL CONTEXT OF THE STUDY AREA

The geology of the region is complex with many formations outcropping there, comprising sandstones, conglomerate, gneiss and a variety of granites of the Pietersburg Greenstone Belt, Turkloof Suite, Rooiberg Group and Waterberg Group (Fig 2, Table 1). There is a mixture of ancient igneous and metamorphic rocks, ranging in age from almost 3000 Ma to 1700 Ma (references in Table 2). There is no indication of an extensive aquatic environment

in this region, and the oldest terrestrial plant fossils are about 425 Ma (Silurian; Cowan, 1995; Taylor et al., 2009) with terrestrial vertebrates evolving much later in the Upper Carboniferous – meaning that means that the potential of finding fossils is extremely low.

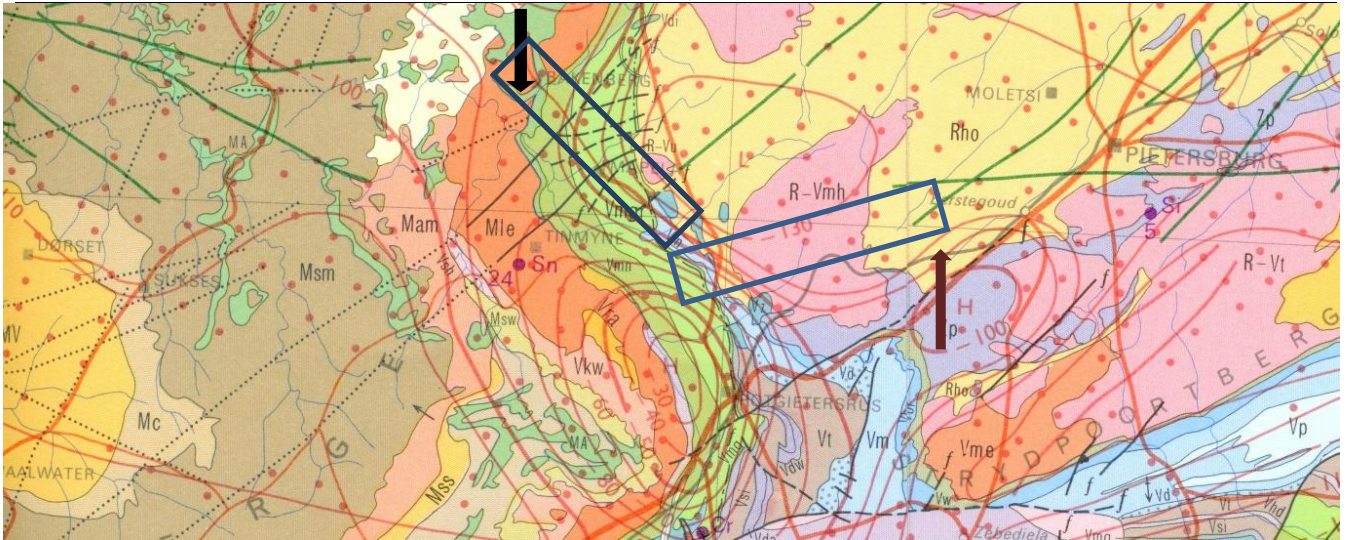


Figure 2- Geological map of southern Limpopo showing the proposed area for the Borutho and Witkop transmission line. Borutho is indicated by the blue arrow in the upper left of the map, and Witkop in the lower right. Broad bands are shown for the transmission line. Note that there are no formations young enough to contain fossils anywhere in the region. Abbreviations of the rock types are explained in Table 1. Map enlarged from the Geological Survey 1: 1 000 000 map 1984.

Table 1- Explanation of symbols for the geological map and approximate ages with the references: Brandl et al., 2006. Barker et al., 2006; Buchanan, 2006; Cawthorn et al., 2006.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene (last 25 Ma)
Msm	Sandriversberg & Moglalkwena Fm	Sandstone, conglomerate	1700-2000 Ma Waterberg Group
Mam	Aasvoelkop & Makgabeng Fm	Sandstone, mudstone	1700-2000 Ma Waterberg Group
Mss	Skilpadkop & Setlaole Fm	Grit, conglomerate, sandstone	1700-2000 Ma Waterberg Group
Msw	Swaershoek Fm	Sandstone, trachyte	1700-2000 Ma Waterberg Group
Mle	Lebowa granite Suite	hornblende and biotite granites	>2000 Ma
Vsh	Schrikkloof Fm, Rooiberg Group	Flow-banded porphyritic rhyolite	>2050 Ma
Vkw	Kwakkasnek Fm, Rooiberg Group	Massive porphyritic rhyolite	>2052 Ma
Vmg	Magaliesberg Fm	Quartzite	
Vt	Timeball hill & Rooighooght	Shale, quartzite, conglomerate, breccia, diamictite	
Vm	Malmani sub group	Dolomite, chert	>2500 Ma
R-Vmh	Mashashane Suite	Biotite-hornblende granite	
R-Vt	Turkloof	Biotite granite	>2650 Ma Archaean
Rho	Hout River Gneiss	Gneiss, migmatite, leucogranite	
Zp	Pietersburg Greenstone Belt	Ultra mafic and mafic lavas, quartzite, conglomerate, chlorite schist	2840-2870Ma

4. CONCLUSIONS

Based on the geological and palaeontological context of the region under consideration the following conclusion is made about the study area. Rocks in this region are mostly much too old (Archaean in age) to contain fossils or are sediments of the correct age but not known to have preserved any fossils (Neogene sands and alluvium) - it is extremely unlikely that any fossils will be found along the proposed routes for the transmission.

5. RECOMMENDATIONS

If in the extremely unlikely event that any fossils are discovered during the construction of the transmission line and related infrastructure, then it is strongly recommended that a palaeontologist be called to assess their importance and rescue them if necessary.

As far as the palaeontology is concerned the proposed development can go ahead along the proposed route.

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