Creating solutions for a sustainable cultural environment

NGT™ Projects & Heritage Consultants (Pty) LTD

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

Version: 1.0

Date: 27/11/2014

Registration: 2012/166782/07 **V.A.T:** 4410265724
No. 2 Windsor Place, Princesses Avenue, Windsor West, Randburg, 2194
Tell: 011 476 6057 Fax**:** 011 476 7563
E-mail: nkosinathi@ngtgroup.co.za / info@ngtgroup.co.za / www.ngtgroup.co.za

ACKNOWLEDGEMENT OF RECEIPT

CLIENT:	**Baagi Environmental Consultancy**
CONTACT PERSON:	Mr Lordwick Makhura Tel: 012 993 0756/7 Fax: 012 993 0743/086 433 2321 Cell: 0724371742 E-mail: makhural@baagi.co.za
CONSULTANT:	**NGT Projects & Heritage Consultants (Pty) Ltd**
DIVISION:	**NGT Heritage Solutions** Tel: 011 476 6057 Fax: 011 476 7563 Cell: +27 78 163 0657 E-mail: nkosinathi@ngtgroup.co.za
CONTACT PERSON:	Mr Nkosinathi Tomose (Corporate Affairs)
AUTHOR:	Professor Marion Bamford
SIGNATURE:	NGT___ .... *.....NGT*_____

COPYRIGHT

This palaeontological desktop study report (including all the associated data, project results and recommendations) whether manually or electronically produced, forming part of the submission and any other subsequent reports or project documents such as the inclusion in the Environmental Management Plan report (document for which it is intended for - totally vest with the author, Professor Marion Bamford for NGT Project & Heritage Consultants. Therefore, it is the author's views that no parts of this report may be reproduced or transmitted in any form whatsoever for any person or entity without prior written consent and signature of the author or representatives of NGT Projects & Heritage Consultants. This limitation is with exception to Baagi Environmental Consultancy and its client Eskom whose limitation to use the report and its results and recommendations shall be lifted with and after full settlement of the fees agreed upon with the NGT Projects & Heritage Consultants for the compilation and production of the report.

The limitation for the transmission of the report, both manually and electronically without changing or altering the reports results and recommendations, shall also be lifted for the purposes of submission, circulation and adjudication purposes by the relevant heritage authorities such as Limpopo Heritage Resources Authority (provincial heritage authority) and the South African Heritage Resources Authority (SAHRA) and/or any other interested legalised government authority such as the DEA.

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.

HERITAGE CONSULTANT: NGT Projects & Heritage Consultants

SPECIALIST: Professor Marion Bamford

SIGNATURE: NGT___ .....  .....*for NGT_*

EXECUTIVE SUMMARY

A desktop palaeontological assessment for the proposed transmission line between Medupi and Borutho has been done by consulting the relevant literature. Since there are mainly ancient rocks in the region (ranging in age between about 2000 and 1700 million years old) there is no chance of finding fossils in those rocks. The Clarens Formation is poorly represented in the area and is the right age to contain fossils but since here it is only aeolian (windblown sand) it is not suitable for the preservation of plant material or vertebrate fossils – meaning that the potential of finding fossils is extremely low. As far as the palaeontology impact is concerned, the project may proceed.

CONTENTS

LIST OF FIGURE

LIST OF TABLES

1 BACKGROUND

In 2013 NGT Projects & Heritage Consultant conducted a Heritage Impact Assessment (HIA) study for the proposed Medupi-Borutho 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.

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 Medupi and Borutho, north and south of Lephalale as part of the Medupi Phase 3 project (23°42'14.47"S; 27°34'29.17"E and 23°38'40.23"S; 28°01'20.16"E approximately – taken from Google Earth Map). Figures 1, 2 and 3 show the Medupi-Borutho transmission line; Figure 1 is showing the start-point to mid section (*Figure 2*) and Figure 2 shows the mid section of the powerline to where it ends in Borutho (*Figure 3*).

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 the fossils (under a SAHRA permit and housed in an recognized institution), protect them and/or divert the proposed construction.

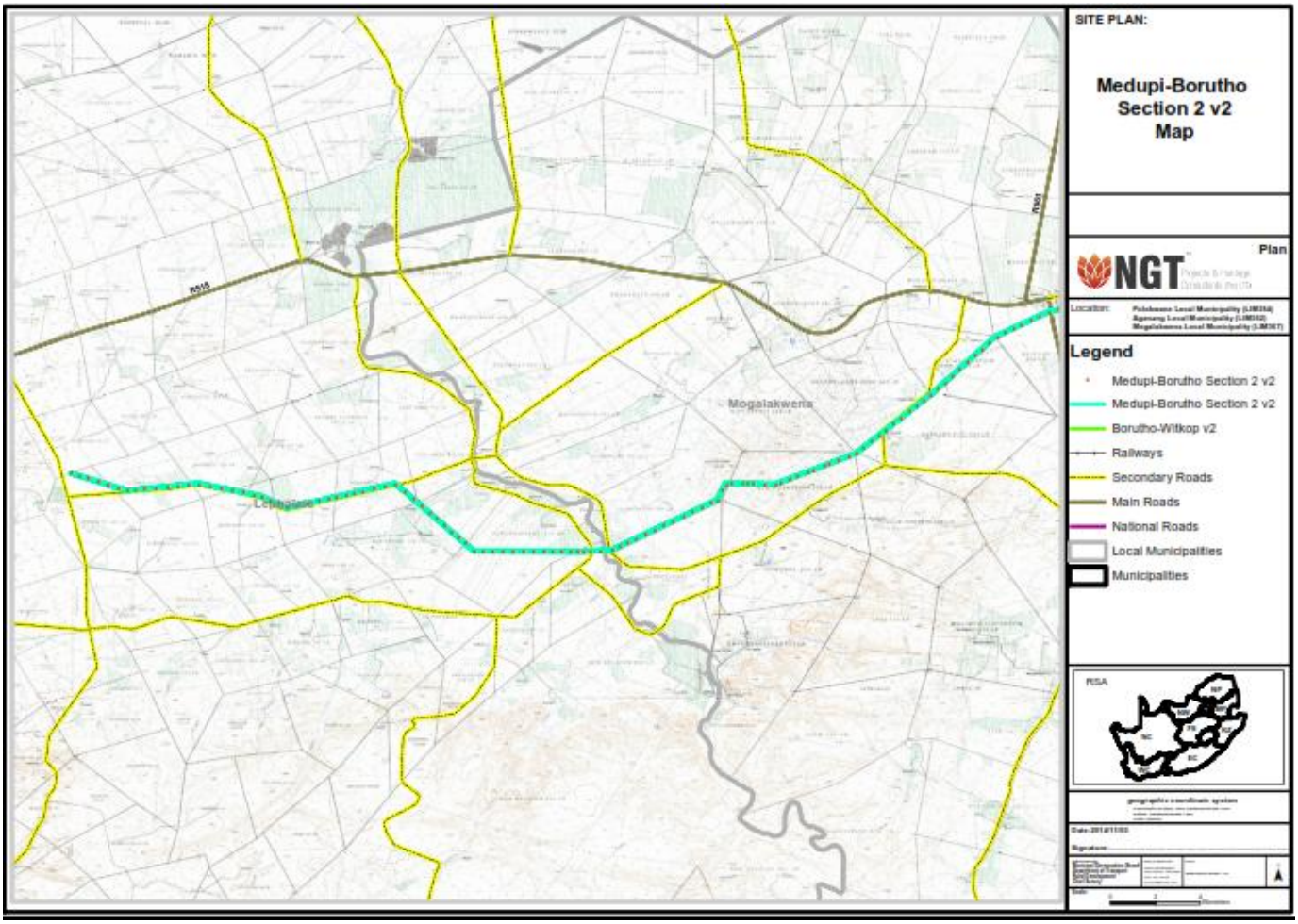

Figure 1- Map showing the start point to mid section of the Medupi-Borutho Transmission Line, Limpopo Province.

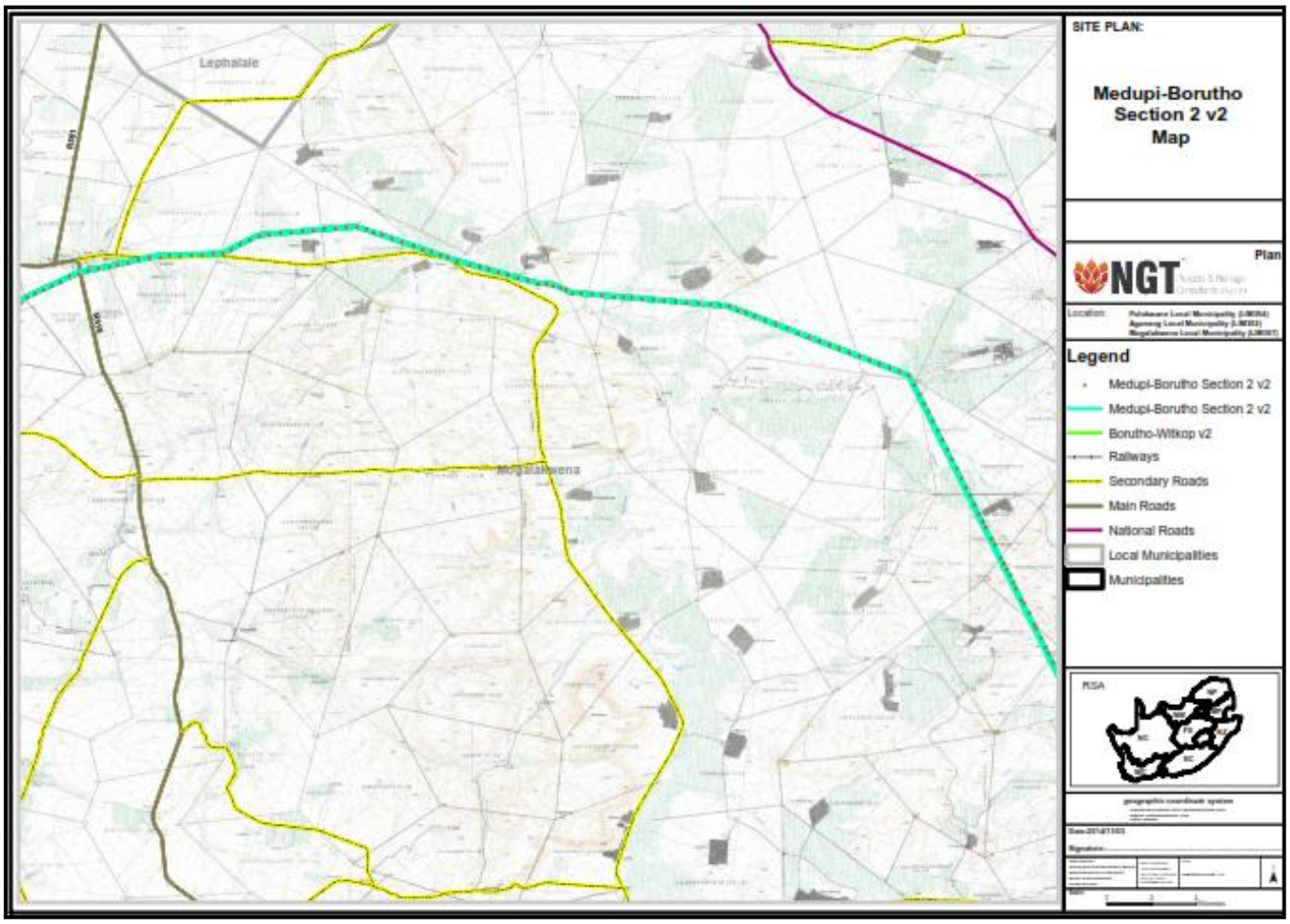

Figure 2- Map showing the mid section of the Medupi-Borutho Transmission Line, Limpopo Province.

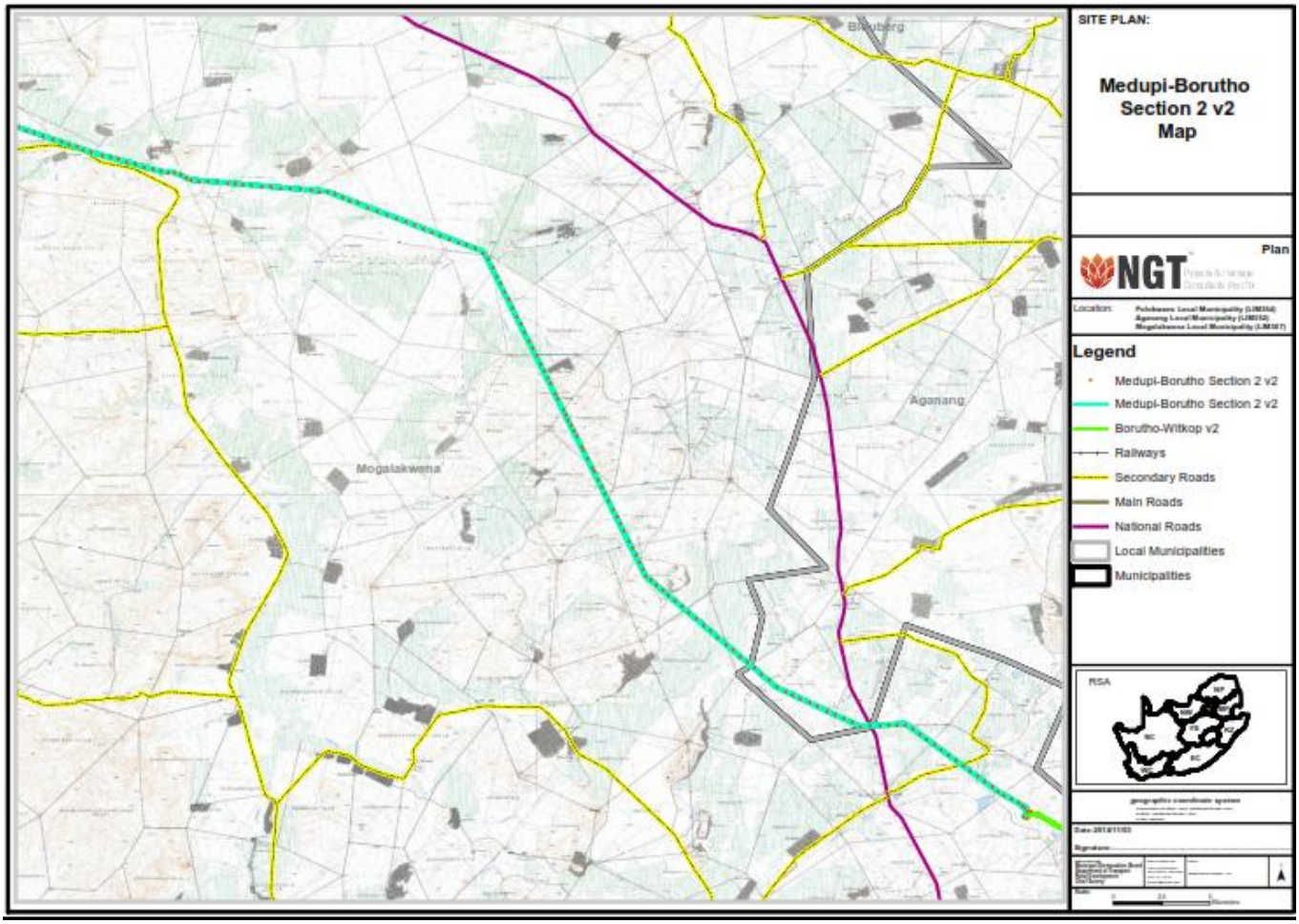

Figure 3 Map showing the mid to end section of the Medupi-Borutho Transmission Line, Limpopo Province

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 PALAEONTOLOGICAL CONTEXT OF THE STUDY AREA

The proposed route for the transmission lines is on rocks of the Clarens Formation, undifferentiated Permian-Triassic sediments and the ancient Lebowa Granite Suite (Mle on the map). The latter can be ignored as these igneous rocks are much too old to contain fossils.

In the Ellisras Basin the Karoo Supergroup is poorly exposed, with just a few arenaceous units (Johnson et al., 2006, p. 487). There are coal seams below ground, particularly in the Grootgeluck Formation but these are many metres below the surface. The Clarens Formation is the right age to contain fossils but is aeolian (windblown sand) and not suitable for the preservation of plant material. No vertebrate fossils have been reported from this area. – meaning that means that the potential of finding fossils is extremely low.

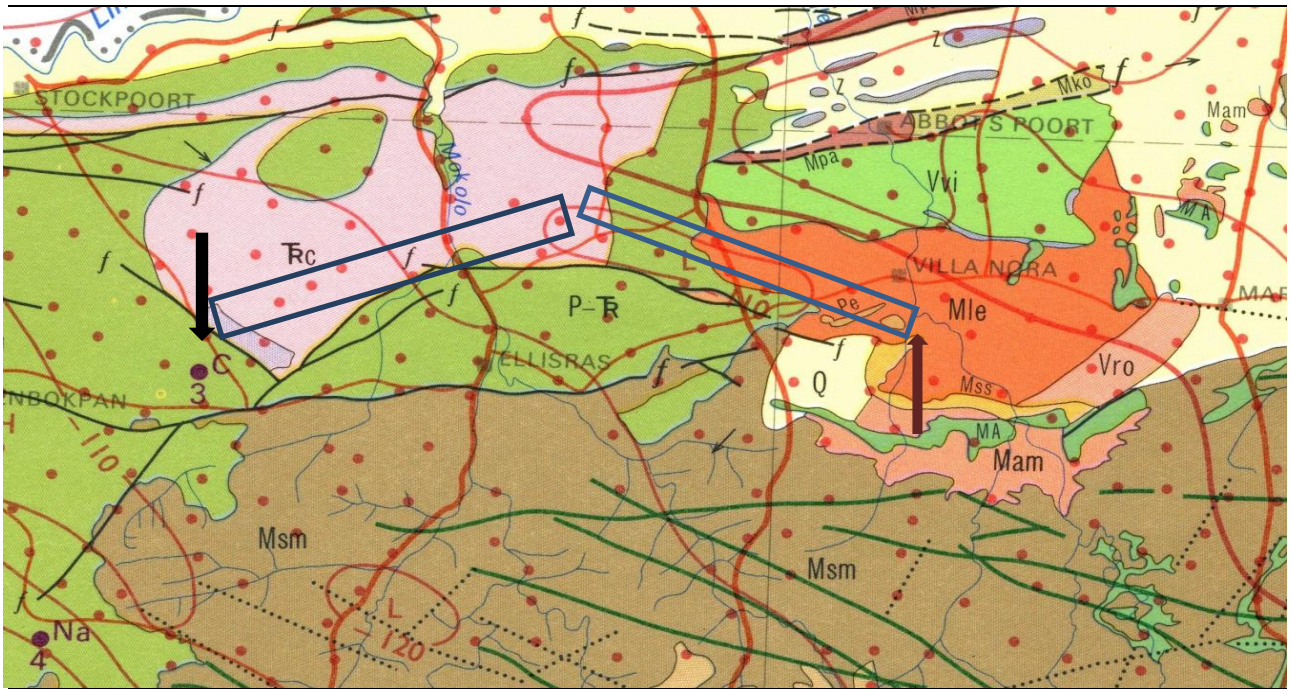

Figure 4 -Geological map of southern Limpopo showing the proposed area for the Borutho and Witkop transmission line. Borutho is indicated by the blue arrow in the upper left of the map, and Witkop in the lower right. Broad bands are shown for the transmission line. Note that there are no formations young 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-Al: Explanation Of Symbols for the Geological Map and Approximate Ages with the References: Brandl Et Al., 2006. Barker Et., 2006; Buchanan, 2006; Cawthorn Et El., 2006.

Symbol	***Group/Formation***	***Lithology***	***Approximate Age***
Q	Quaternary	Alluvium, sand, calcrete	Neogene (last 25 Ma)
Msm	Sandriviersberg & Moglalkwena Fm	Sandstone, conglomerate	1700-2000 Ma Waterberg Group
P-Tr	Permo-Triassic undifferentiated	Shale, sandstone, mudstone, coal	Ca. 300-200 Ma
Trc	Clarens Formation	Sandstone, siltstone	Upper Triassic – Jurassic (ca. 200-175Ma)
Mle	Lebowa Granite Suite	hornblende and biotite granites	>2000 Ma

4. CONCLUSIONS

The rocks in the region around Witkop are much too old (Archaean in age) to contain fossils. North of Lephalale the rocks are from the aeolian Clarens Formation and not suitable for preserving fossil plants, and only rarely vertebrates, however none has been reported. Towards the west the rocks are undifferentiated Permo-Triassic sandstones, shales, mudstones and deeply buried coals, also with no record of fossils.

5. RECOMMENDATIONS

Since the excavations required for erecting pylons are only a few metres deep they will not impact on any potentially fossiliferous sediments, therefore, the proposed project may proceed as far as the palaeontological assessment is concerned. If in the very 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.

6. REFERENCES

Barker, O.B., Brandl, G., Callaghan, C.C., Eriksson., van der Neut, M., 2006. The Soutpansberg and Waterberg Groups and the Blouberg Formation. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp301-318.

Cawthorn, R.G., Eales, H.V., Walraven, F., Uken, R., Watkeys, M.k., 2006. The Bushveld Complex. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp261-281.

Cowan, R., 1995. History of Life. 2nd Edition. Blackwell scientific Publications, Boston. 462pp.

Johnson, M.R., van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H.deV., Christie, A.D.M., Roberts, D.L., 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 / Council for Geoscience, Pretoria. Pp 461 – 499.

Taylor, T.N., Taylor, E.L., Krings, M. 2009. Palaeobotany. The Biology and Evolution of Fossil Plants. 2nd Edition. Academic Press, Burlington, MA. 1230 pp.