

Email: [bruce.rubidge@wits.ac.za](mailto:bruce.rubidge@wits.ac.za)

11 February 2015

Minnette Le Roux  
Shangoni Management Services Pty (Ltd)  
PO Box 74726  
Lynnwood Ridge  
0040

Dear Ms Le Roux,

**Palaeontological Desktop Report – Thandeka Shaft, Greenside Colliery**

As requested, herewith a Desktop Palaeontological Impact Assessment with regard to the development of new mine surface infrastructure such as Thandeka shaft and overhead power lines in the eMalahleni Local Municipality, in Mpumalanga Province.

Yours sincerely



**Bruce Rubidge** PhD, FGSSA, FRSSA, Pr Sci Nat

**PALAEONTOLOGICAL DESKTOP STUDY  
THANDEKA SHAFT OF GREENSIDE COLLIERY,  
EMALAHLENI LOCAL MUNICIPALITY,  
MPUMALANGA PROVINCE**

**AUTHOR:**

Professor Bruce Rubidge  
PO Box 85346  
Emmarentia

Tel: 072 575 7752

Email: [bruce.rubidge@wits.ac.za](mailto:bruce.rubidge@wits.ac.za)

**COMPILED FOR:**

Shangoni Management Services Pty (Ltd)  
PO Box 74726  
Lynnwood Ridge  
0040

Tel No.: 012 807 7036

Cell No: 083 660 0622

Fax No: 012 807 1014

Email: [minnette@shangoni.co.za](mailto:minnette@shangoni.co.za)

**DATE: 11 February 2015**

## **EXECUTIVE SUMMARY**

A desktop Palaeontological Impact Assessment was undertaken at the Greenside Colliery (Thandeka Shaft) situated southwest of Emalahleni (formerly called Witbank), Mpumalanga Province. The development is for the proposed Thandeka Shaft and overhead power lines which will be established in a project area situated between the R547 in the west and the R555 national road to in the east.

The entire study area is underlain by rocks of the Karoo Supergroup comprising sedimentary rocks of the Carboniferous Dwyka Group and Permian Vryheid Formation of the Ecca Group.

Rocks of the Vryheid Formation contain rich coal deposits which are derived from the famous Permian Glossopteris flora which has Gondwana-wide distribution. As large parts of the proposed development will be on rocks of the Vryheid Formation this has the potential to affect fossil plants.

However, as these fossils are not currently exposed, the development could enhance possibilities to discover plant fossils. If fossils are exposed in the course of the proposed development of Greenside Colliery, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

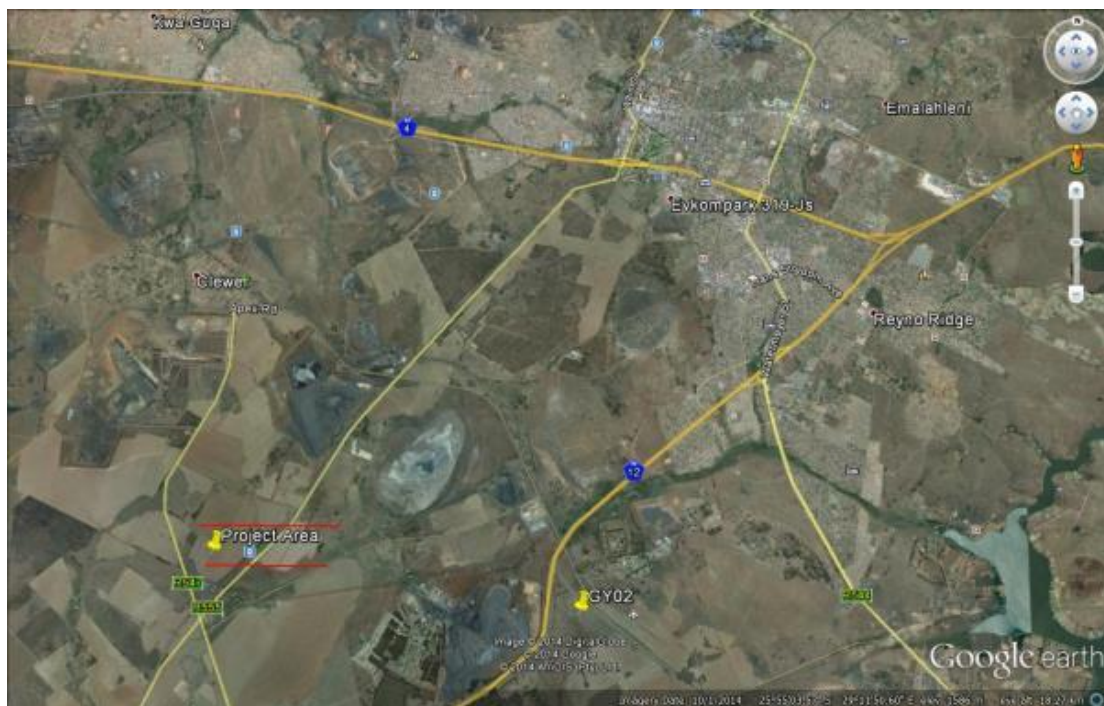
## TABLE OF CONTENTS

Background of development .....	5
Details of the study area .....	6
Geological Setting .....	6
Palaeontological Heritage .....	7
Recommendation .....	7
Conclusion .....	8
Bibliography .....	8

## REPORT

### Background information of the development

This desktop report is part of a Heritage Impact Assessment to determine the effect that the proposed development of Greenside Colliery will have on palaeontological heritage. The study was commissioned by Shangoni Management Services Pty (Ltd).



*Figure 1: Site Locality of Greenside Colliery showing the positions of the proposed Thandeka shaft and overhead powerlines.*

The proposed Thandeka shaft development of Greenside Collieries Project Area is situated between the R547 in the west and the R555 national road to in the east (2529CC Witbank, 1: 50 000 topographical map; 2528 Pretoria, 1: 250 000 map) (Figure 1). The development will occur on Portion 28 of the Farm Blaauwkrans 323 JS and comprises the construction of a Ventilation Shaft and overhead power lines. The Thandeka Shaft Project includes the construction of a Ventilation Shaft and overhead power lines at Greenside Colliery. The Ventilation Shaft will be 4.5m in diameter with a depth of 45m to 60m. The 22kv power line from Umlalazi Substation to the Thandeka Shaft will be 1 613m long and the 22kv power line from the Cairns Substation to the Thandeka Shaft will be 3 286m long.

## Details of the study area

The Greenside Colliery development (Thandeka project) area is positioned in eMalahleni Local Municipality within the Springs-Witbank Coalfield of Mpumalanga Province (Figure 2). It is situated on Portions 28 of the Farm Blaauwkrans 323 JS within the boundaries of the eMalahleni Local Municipality, and is covered by the 1:50 000 topographical map Sheet 2529CC Witbank. The current developed portion of the ventilation shaft site covers about 1.4 ha and will extend to a depth of 45m to 60m below the surface.

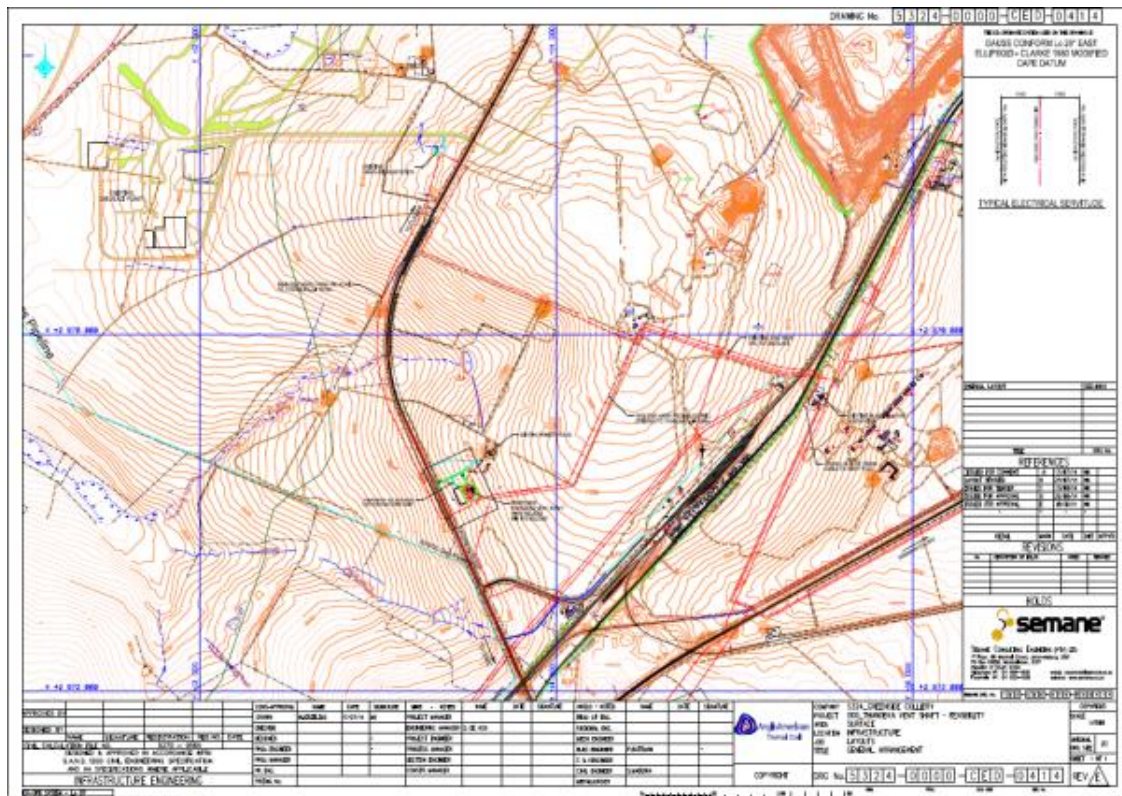


Figure 2: 1:50 000 topographical (Sheet 2529CC) showing the position of the Greenside Colliery development (outlined in black)

## Geological Setting

The entire study area is underlain by rocks of the Karoo Supergroup comprising sedimentary rocks of the Carboniferous Dwyka Group and the Vryheid Formation of the Permian Ecca Group (Figure 3). The diamictites of the Dwyka Group were deposited in a grounded glacial setting and the mudrocks, coals and sandstones of the Vryheid Formation were deposited in a delta plain depositional environment.

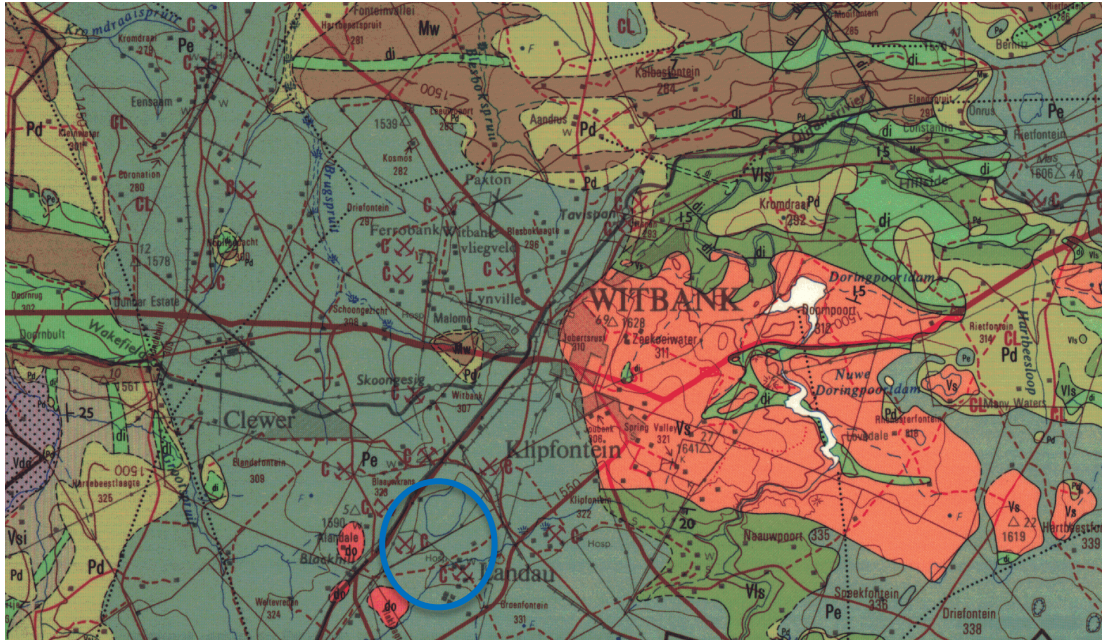


Figure 3: Geological map showing the position of Greenside Colliery Operations (outlined in blue) in relation to the regional geology.

### Palaeontological Heritage

The coarse grained diamictites of the Dwyka Group, which are positioned well below surface in the study area, are unlikely to contain fossils and in any case will not be exposed by the proposed development. The overlying rocks of the Vryheid Formation of the Ecca Group are renowned for their wealth of plant fossils of the famous Gondwanan *Glossopteris* flora which has been described from Permian-aged rocks. This flora is the source of the coal which is mined from the Vryheid Formation in South Africa. Within the Vryheid Formation there are occurrences of well-preserved elements *Glossopteris* flora comprising wood and/or leaves. Large collections of fossil flora from this Formation are present in the collections of the Council for Geoscience in Pretoria and the Evolutionary Studies Institute at the University of the Witwatersrand in Johannesburg.

### Recommendation

In the documentation supplied regarding the development it is stated that the Project Area is situated on an undulating stretch of grassland on the Eastern Highveld between the R547 in the west and the R547 provincial road in the east. The grass veld in the Project Area has largely been transformed into maize fields. The Project Area has been scarred by open cast coal mining as well as underground coal mining

activities. As the proposed Thandeka development will involve excavation into rocks of the Ecca Group it is possible that the development will have an impact on palaeontological heritage.

This will create a unique opportunity to explore the area for fossils. It is thus recommended that, should fossils be exposed in the process of development, a qualified palaeontologist be contacted to assess the exposure for fossils before further development takes place so that the necessary rescue operations are implemented. Depending on the nature of the fossils discovered this could entail excavation and removal to a registered palaeontological museum collection. A list of professional palaeontologists is available from South African Heritage Resources Agency (SAHRA).

## **Conclusion**

The proposed development of Greenside Collieries will cover Carboniferous to Permian-aged sedimentary rocks of the Dwyka and Ecca groups (Vryheid Formation) of the Karoo Supergroup. There is a good possibility that the rocks of the Vryheid Formation in the study area could contain fossil plant material of *Glossopteris* flora. As these fossils are not currently exposed, the development could enhance possibilities to discover plant fossils. If fossils are exposed in the course of the Thandeka development, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

## **Bibliography**

Almond J.E., de Klerk B, and Gess R.W. (in prep). Palaeontological heritage of the Eastern Cape. SAHRA technical report.

Catuneanu O., Wopfner H., Eriksson P.G., Cairncross B & Rubidge B.S., Smith, R.M.H., and Hancox P.J. 2005. The Karoo basins of south-central Africa. *Journal of African Earth Sciences*, 43, 211-253.

Johnson M.R., van Vuuren C.J., Visser J.N.J., Cole, D.I., Wickens H.deV., Christie A.M., Roberts D.L. & Brandl G. 2006. Sedimentary rocks of the Karoo Supergroup. *In: Johnson MR, Anhaeusser and Thomas RJ (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria. 361-500.*



Mac Rae C. 1999. *Life etched in stone: fossils of South Africa*. The Geological Society of South Africa, Johannesburg, pp 305.

McCarthy, T.S. and Rubidge, B.S. 2005. *The story of Earth and Life – a southern African perspective on the 4.6 billion year journey*. Struik Publishers, Cape Town. pp 333.

Partridge TC, Botha GA, and Haddon IG. 2006. Cenozoic deposits of the interior. *In: Johnson MR, Anhaeusser and Thomas RJ (Eds). The Geology of South Africa*. Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria. pp. 585-604.