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Dear Ms Bate,

Palaeontological Desktop Report – Access Brown Shaft II Coal Mine

As requested, herewith a Desktop Palaeontological Impact Assessment with regard to the proposed development of the Access Brown Shaft II Coal Mine in the Steve Tshwete Local Municipality, Mpumalanga Province.

Yours sincerely

Bruce Rubidge PhD, FGSSA, FRSSA, Pr Sci Nat

**PALAEONTOLOGICAL DESKTOP STUDY
ACCESS BROWN SHAFT II COAL MINE IN THE STEVE TSHWETE LOCAL
MUNICIPALITY, MPUMALANGA PROVINCE.**

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EXECUTIVE SUMMARY

A desktop Palaeontological Impact Assessment was undertaken on the proposed Access Brown Shaft II Coal Mine in the Steve Tshwete Local Municipality, Nkangala District Municipality Mpumalanga Province, situated south of Middelburg. The proposed development involves the development of a new underground coal mine with typical supporting infrastructure.

Following the geological map (2528 Pretoria and 2628 East Rand sheets 1:250 000 Geological Series, Geological Survey) the entire study area is underlain by sedimentary rocks of the Permian Vryheid Formation of the Ecca Group of the Karoo Supergroup.

The coal from the Vryheid Formation of the Ecca Group is derived from the famous Permian *Glossopteris* flora which has Gondwana-wide distribution. As the proposed development is to mine coal it has the potential to affect fossil plants.

The process of coal mining has the potential to destroy palaeontological heritage, and by its nature coal mining will destroy plant fossils. However, as these fossils are not currently exposed, the development of a coal mine will in fact enhance possibilities to discover plant and possibly other fossils. If fossils are exposed in the course expanding the mining development at Brown Shaft II Coal Mine a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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REPORT

Background Information of the development

This desktop report is part of a Heritage Impact Assessment to determine the effect of the development of the Brown Shaft II Coal Mine on palaeontological heritage. The proposed development south of Middelburg in the Nkangala District Municipality, Mpumalanga Province comprises the development of a new underground coal mine (Figure 1). This development will occur on Portion 7 of the farm Wolwefontein 471 JS (Title Deed T16028/2008).

Mining will be conducted by means of underground mining methods, using the Bord and Pillar mining technique. A new access incline shaft with a depth of approximately 50m with associated surface infrastructure will be constructed for assessing the coal reserves to be mined at the proposed underground mining area. The target coal seam lies between 45m and 50m. The geology above the target coal seam (approximately 40m) will not be disturbed during mining, with the exception of the access incline shaft area.

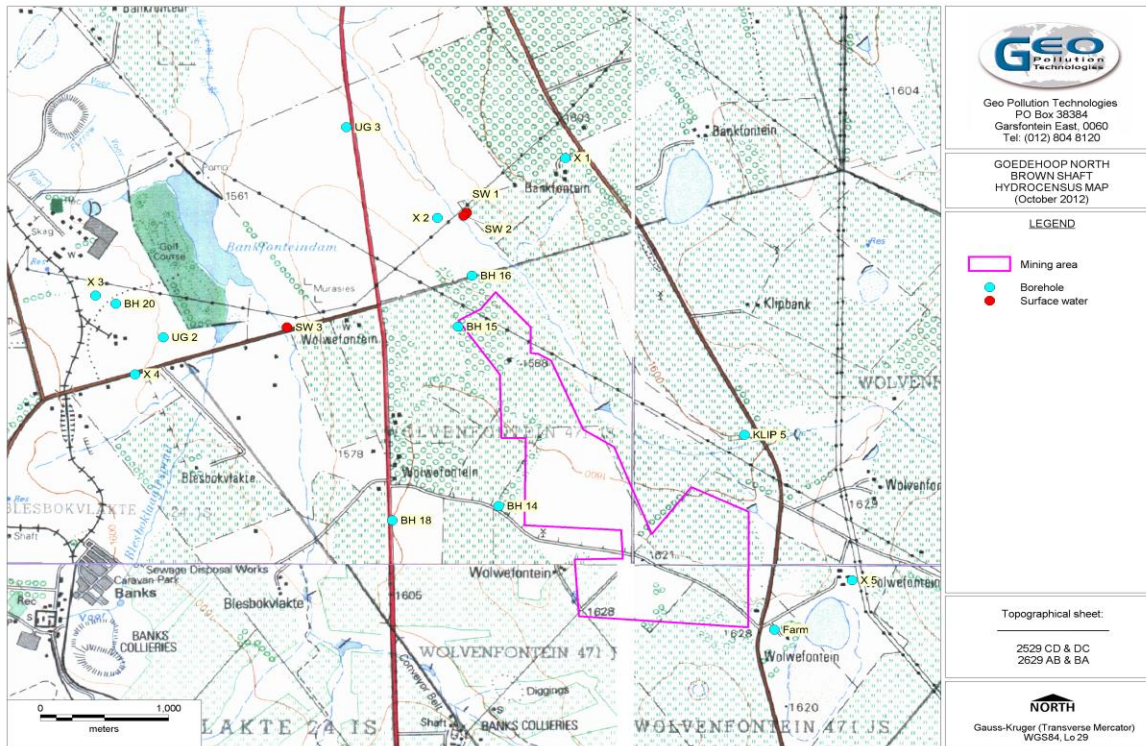


Figure 1: 1:50 000 topographic map showing the position of the proposed new mining development.

Access Brown Shaft II shaft complex will comprise the incline shaft, a ventilation shaft, power lines, water pipelines, workshop, administration buildings, access and service

roads, overland conveyor belt, conservancy tank, general and hazardous waste collection facilities, surface fuel and oil storage tanks.

The area on which the proposed Access Brown Shaft II will be constructed is currently used for the cultivation of hay grass.

The study was commissioned by Geovicon Environmental Pty (Ltd) for Anglo Operations (Pty) Ltd - Bank Colliery's Access Brown Shaft II project and I was asked to provide a desk top assessment of the affect that the proposed development will have on the palaeontological heritage.

Details of the study area

The study area is situated on Portion 7 of the farm Wolwefontein 471 JS (Title Deed T16028/2008) and is covered by the 1:50 000 topographical map sheet 2529 CD & DC and 2629 AB & BA.

Geological Setting

The entire study area is underlain by rocks of the Karoo Supergroup comprising sedimentary rocks of Permian Vryheid Formation (Figure 2). The area is covered by vegetation and there are not good rock outcrops. The rocks of the Vryheid Formation of the Eccca Group were deposited in a delta plain depositional environment.

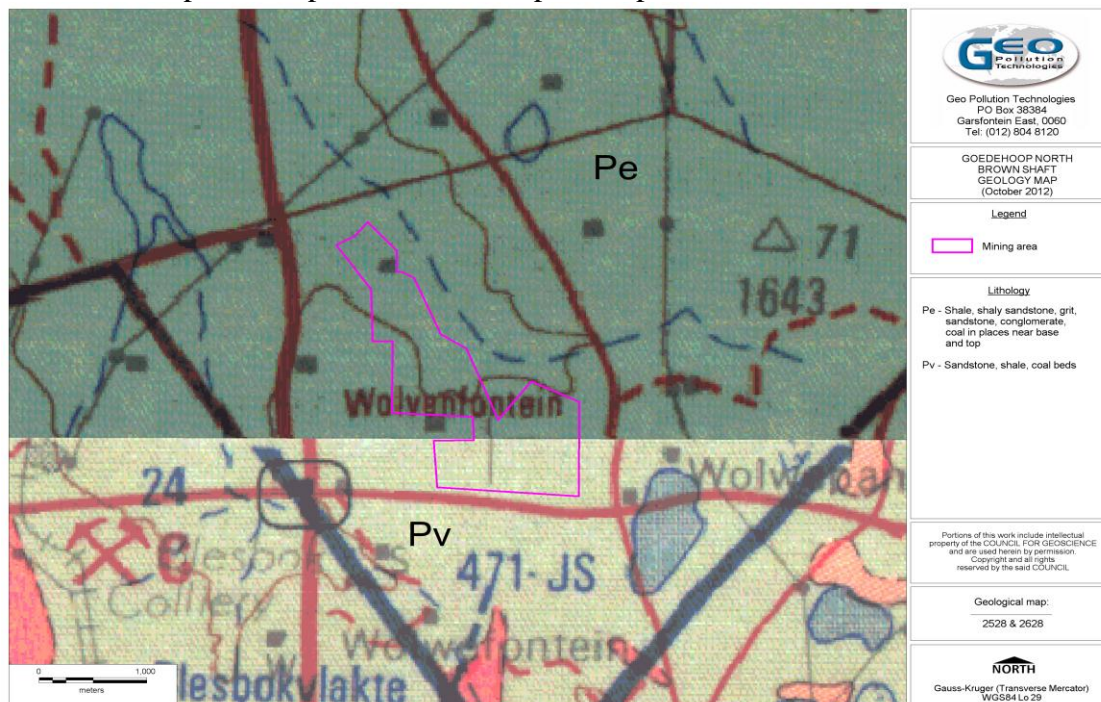


Figure 2: Map showing the geology of the study area indicating that the entire study is Permian deposits of the Vryheid Formation of the Eccca Group, Karoo Supergroup (Maps 2528 Pretoria; 2628 East Rand).

Palaeontological Heritage

The rocks 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 and is the reason for the coal mining operations. 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

Because important plant fossil localities are known from the Ecca Group the proposed mining development activities may expose fossil bearing rocks of the Karoo Supergroup which are not currently visible as they are covered by soil and vegetation.

If construction activities expose extensive mudrocks of the Karoo Supergroup, it will create a unique opportunity to explore the area for fossils. It is thus recommended that, should fossils be exposed, 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).

Conclusions

The proposed development of Brown Shaft II Coal Mine south of Middelburg in the Nkangala District Municipality, Mpumalanga Province will cover Permian-aged sedimentary rocks of the Karoo Supergroup. There is a good possibility that the rocks could contain fossil plant material of *Glossopteris* flora. It is considered that the development of the coal mine as set out in Figure 1 should proceed, but that if fossils are uncovered in the course of construction activities, the developer immediately calls in a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils.

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