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20 January 2013

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Dear Ms Berjak,

Palaeontological Desktop Report – Vaalbult Colliery

As requested, herewith a Desktop Palaeontological Impact Assessment with regard to the proposed development of the Vaalbult Colliery, Albert Luthuli Local Municipality in Mpumalanga Province.

Yours sincerely

Bruce Rubidge PhD, FGSSA, FRSSA, Pr Sci Nat

**PALAEONTOLOGICAL DESKTOP STUDY
VAALBULT COLLIERY,
ALBERT LUTHULI LOCAL MUNICIPALITY,
MPUMALANGA PROVINCE**

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EXECUTIVE SUMMARY

A desktop Palaeontological Impact Assessment was undertaken on the proposed Vaalbult Colliery, Albert Luthuli Local Municipality, Gert Sibande District, Mpumalanga situated approximately 13 km to the west of Carolina in Mpumalanga Province. The proposed development is for a new opencast and high wall (underground) coal mine.

The entire study area is underlain by rocks of the Karoo Supergroup comprising sedimentary rocks of the Permian Vryheid Formation.

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.

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 usually well preserved and are not currently exposed, the development of a coal mine will enhance possibilities to discover plant fossils. If fossils are exposed in the course of expanding the mining development at the Vaalbult Colliery 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

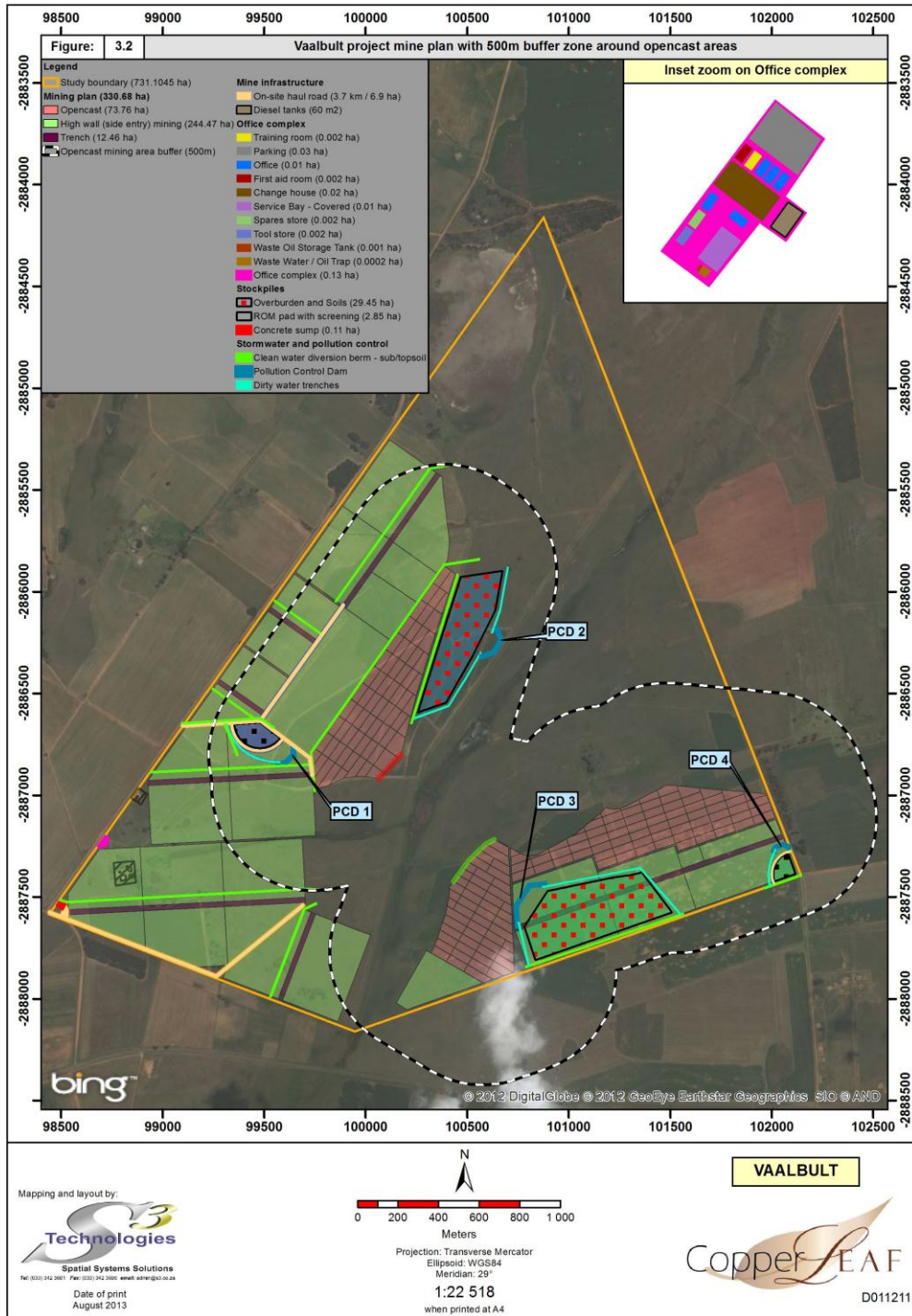


Figure 1: Proposed mine plan and surface infrastructure of the Vaalbult Colliery. The property boundary is shown in orange

Background information of the development

This desktop report is part of a Heritage Impact Assessment to determine the effect that the development of the proposed Vaalbutt Colliery will have on palaeontological heritage. The proposed colliery will be situated approximately 13 km west of Carolina within Mpumalanga Province and comprises the development of a new opencast and high wall (underground) mine (Figure 1). This upgrade will occur on portions 1, 9 and 10 of the Farm Vaalbutt 3 IT within the Albert Luthuli Local Municipality, Gert Sibande District, Mpumalanga (DMR reference MP30/5/1/2/2/10067MR).

The study was commissioned by CopperLeaf Consulting, Hilton and I was asked to provide a desktop assessment of the affect that the proposed development will have on the palaeontological heritage.

Details of the study area

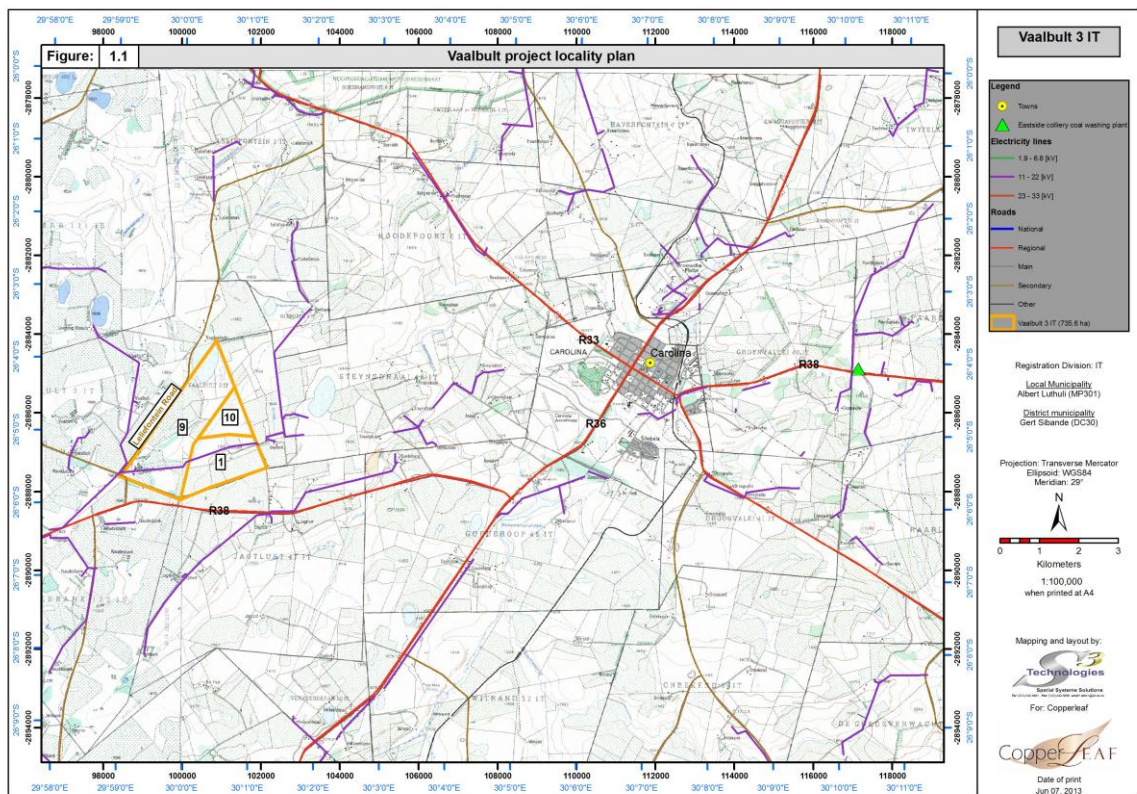


Figure 2: Topographic map showing the position of the proposed Vaalbutt Colliery (outlined in orange).

The study area of the proposed Vaalbutt Colliery is situated west of Carolina in the Albert Luthuli Local Municipality, Gert Sibande District, Mpumalanga Province

(Figure 2). It is to be situated on portions 1, 9 and 10 of the Farm Vaalbilt 3 IT, and is covered by the 1:50 000 topographical maps (2629BB Komkrans (1996) and 2630AA Carolina (1985)). The proposed mining right area covers approximately 730 ha of which 74 ha is opencast, 12.5 ha is trenching and 245 ha is high wall/auger mining (Figure 1). There will be no processing of coal on site, and the run of mine coal will be sold to Eastside Colliery approximately 22km east of the site along the R38.

Geological Setting

The entire area is underlain by rocks of the Karoo Supergroup comprising sedimentary rocks of the Permian Vryheid Formation as depicted on Figure 3 (1:250 000 Geological Maps (Sheets 2628 East Rand, 1986 and 2630 Mbabane, 1984)). The mudrocks, coals and sandstones of the Vryheid Formation were deposited in a delta plain depositional environment. There is a possibility that Quaternary alluvial deposits may be present along the banks of water courses.

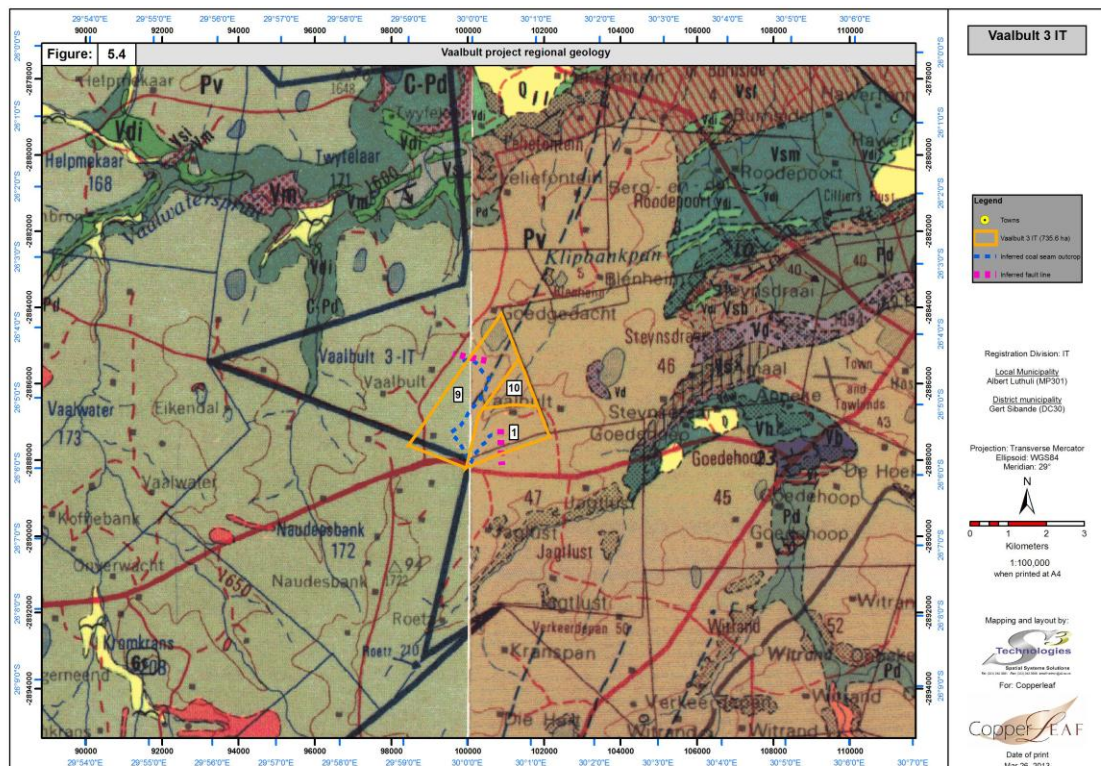


Figure 3: Geological map (compilation of sheets 2628 East Rand & 2630 Mbabane) showing the position of the proposed Vaalbilt Colliery (outlined in orange) in relation to the regional geology.

The Vaalbult Colliery will be situated entirely on rocks of the Vryheid Formation which in the study area comprise mainly argillaceous units of carbonaceous shales and siltstones as well as arenaceous sandstones ranging in grain size from coarse to fine grained.

Palaeontological Heritage

The 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 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 (formerly Bernard Price Institute for Palaeontological Research) at the University of the Witwatersrand in Johannesburg.

Recommendation

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

If mining construction activities expose extensive outcrops of the Vryheid Formation, 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 the Vaalbult Colliery will cover Permian-aged sedimentary rocks of the Vryheid Formation of the Karoo Supergroup. There is a good possibility that the rocks of the Vryheid Formation could contain fossil plant material of *Glossopteris* flora. 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 usually well preserved and are not currently exposed, the development of a coal mine will in enhance possibilities to

discover plant fossils. If fossils are exposed in the mining development at Vaalburg Colliery a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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