

# **Phase 1 Palaeontological Impact Assessment for the construction of a proposed new Vodacom mast and associated container in Carltonville, Merafong City Local Municipality Gauteng Province.**

Report prepared by Palaeo Field Services, PO Box 38806 Langenhovenpark 9330.

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## **Summary**

The investigation indicates that Erf 957 is underlain by Malmani Subgroup dolomites that are considered to be of high palaeontological sensitivity with a high likelihood that stromatolitic fossil assemblages may be present in most of the outcrop areas of the unit. Given the nature and relatively small scale of the development, potential impact on palaeontological heritage resources within the proposed development footprint is considered low. However, any activity that will require > 1m deep excavations that exceeds depths of >1 m into unweathered sedimentary bedrock within the proposed development footprint will require once off monitoring by a professional palaeontologist in case of chance exposure of stromatolitic fossil remains, while such excavations are still open. The palaeontologist must apply for a valid collection / removal permit from SAHRA if fossil material is found during the construction phase of the development. In the unlikely event of fossil discovery within the Quaternary overburden (i.e. modern-looking but more or less lithified animal bones and teeth), elsewhere during the exploration phase of the development, a professional palaeontologist must be called in immediately to confirm and record the finds. In the meantime, *ex situ* remains must be wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. *In situ* material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

## **Introduction**

The report is an assessment of potential palaeontological impact with regard to the proposed construction of a 30m lattice mast with antennae mounted onto the mast, and container

housing associated equipment. The size of the base station (fenced area) in which the mast and associated equipment will be placed will measure 8m x 10m (80m<sup>2</sup>). The site is located on Erf 957 Oberholzer Ext 1 in Carletonville in the Merafong City Local Municipality area (**Fig. 1**). Two alternative positions were identified on this erf. The preferred site is adjacent the New Apostolic Church South East Africa along Piet Retief Street and alternative 2 is located next to the substation along Van Riebeeck Street.

Site Coordinates: 26°21'4.33"S 27°22'32.23"E

## **Methodology**

The assessment was carried out in accordance with National Heritage Resources Act 25 of 1999 with the aim to assess the potential impact on palaeontological heritage resources that may result from the proposed development. The palaeontological significance of the affected areas were evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature.

## **Assumptions and Limitations**

The presentation of geological units present within the study area is derived from the 1:1 000 000 scale map of South Africa and the 1:250 000 scale geological map 2626 Wes-Rand, which may vary in their accuracy. It is also assumed, for the sake of prudence, that fossil remains are always uniformly distributed in fossil-bearing rock units, although in reality their distribution may vary significantly.

## **Background**

According to the 1:250 000 scale geological map 2626 Wes Rand of the area, the proposed development footprint lies within the outcrop area of the Chuniespoort Group of the early Proterozoic Transvaal Supergroup (Erikson *et al.* 2006) (**Fig. 2**). The underlying bedrock is represented by Malmani Subgroup dolomites and limestones, subordinate chert, minor carbonaceous shale and quartzites (*Vmd*, Button 1973). The carbonate rocks of the Malmani Subgroup consist of stromatolite- and microfossil-bearing dolomite, dolomitic limestone and chert members that were formed by the precipitation of carbonate rocks when colonies of shallow marine to intertidal stromatolites and organic walled microfossils thrived in shallow, tropical marine environments at the beginning of the Proterozoic Eon, sometime between 2.6 Ga and 2.4 Ga to form the earliest extensive carbonate reefs. Stromatolites are layered

mounds, columns, and sheet-like sedimentary rocks and can be up to several tens of metres across (Truswell and Erikson 1972; Klein et al. 1987). They were originally formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe that lives today in a wide range of environments ranging from shallow marine conditions to lakes, rivers, and even soils. Cyanobacteria peaked during the time of the Transvaal Supergroup dolomite deposition when vast quantities of O<sup>2</sup> were produced, resulting in the precipitation of massive iron and manganese deposits. Abundant domes of fossil stromatolites may be observed within the Malmani Subgroup dolomites.

There is currently no record of Quaternary vertebrate fossils or sites in the region and the likelihood of impact on such remains resulting from the proposed development is considered to be very low.

### **Field Assessment**

The study area has been degraded by residential development and is covered by a substantial superficial overburden, where no fossils were observed (**Fig 3**).

### **Impact Statement Recommendation**

The Malmani Subgroup dolomites are considered to be of high palaeontological sensitivity with a high likelihood that stromatolitic fossil assemblages may be present in most of the outcrop areas of the unit. Given the nature and relatively small scale of the development, potential impact on palaeontological heritage resources within the proposed development footprint is considered low. However, any activity that will require > 1m deep excavations that exceeds depths of >1 m into unweathered sedimentary bedrock within the proposed development footprint will require once off monitoring by a professional palaeontologist in case of chance exposure of stromatolitic fossil remains, while such excavations are still open. The palaeontologist must apply for a valid collection / removal permit from SAHRA if fossil material is found during the construction phase of the development. In the unlikely event of fossil discovery within the Quaternary overburden (i.e. modern-looking but more or less lithified animal bones and teeth), elsewhere during the exploration phase of the development, a professional palaeontologist must be called in immediately to confirm and record the finds. In the meantime, *ex situ* remains must be wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. *In situ* material must be kept in place and protected from further damage by covering it with light

but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

## References

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## DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project and have no conflicting interests in the undertaking of the activity.



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Figure 1. Aerial view of Erf 957 in Carletonville.



Figure 2. Preferred alternative (top) and site alternative 2 (below).

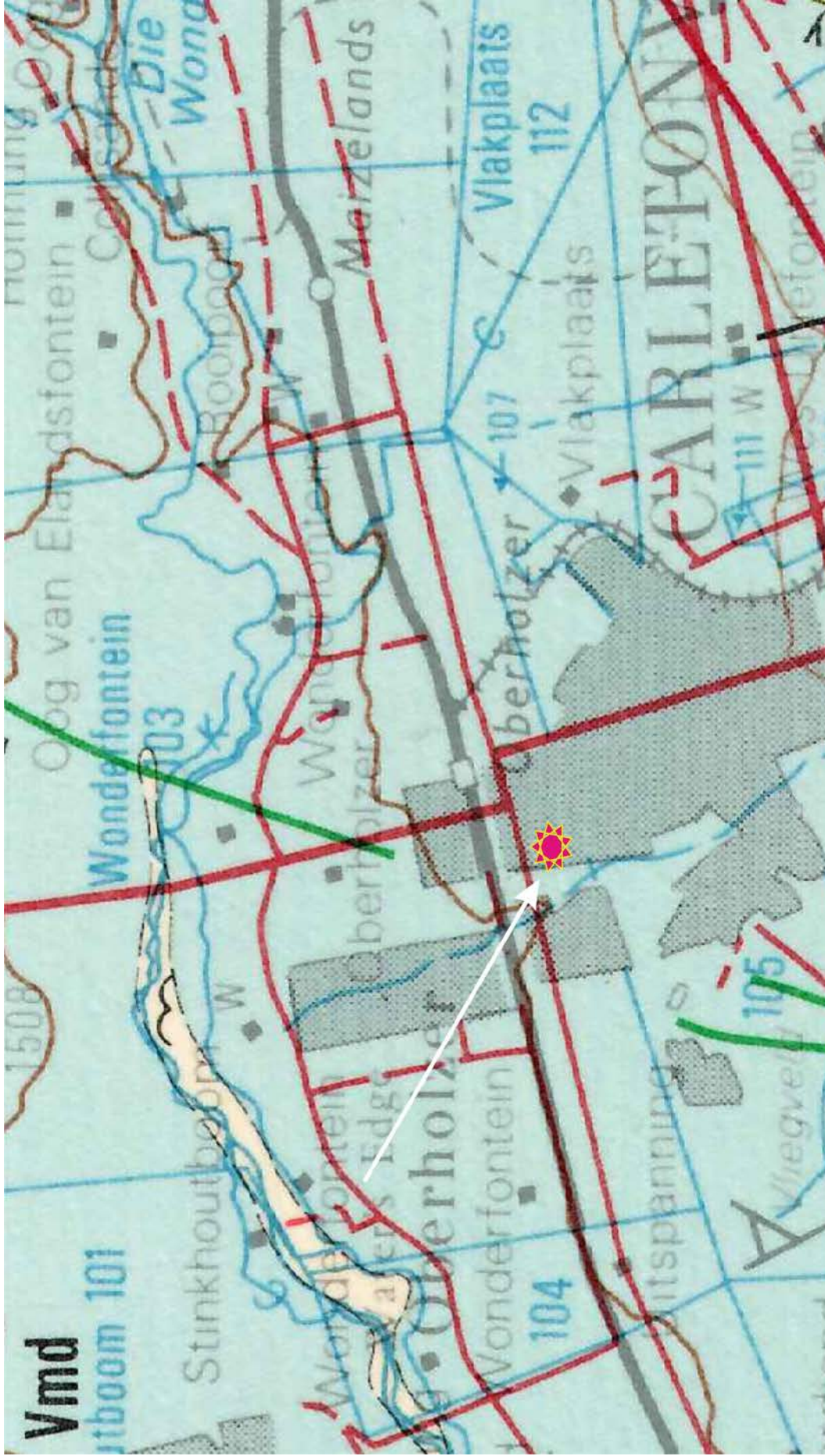


Figure 3. According to the 1:250 000 scale geological map 2626 Wes Rand, the proposed development footprint lies within the outcrop area of the Chuniesspoort Group of the early Proterozoic Transvaal Supergroup. The underlying bedrock is represented by Malmani Subgroup dolomites and limestones, subordinate chert, minor carbonaceous shale and quartzites (Vmd).



Figure 4. General view of the preferred alternative area, looking east (top), north (center) and northeast (bottom).





Figure 5. General view of the alternative 2 area, looking south (top) and south-west (below).