

**Phase 1 Heritage Impact Assessment for extension of
an existing Borrow Pit on Remainder of farm
Witfontein 444 near Viljoenskroon, FS Province.**

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28 August 2023

Summary

A Phase 1 Heritage Impact Assessment was carried out for extension of an existing Borrow Pit on Remainder of farm Witfontein 444 near Viljoenskroon, Free State Province. The affected area covers ~5 ha of low relief terrain and part of an existing borrow pit, located about 14 km south of the Vaal River, 4.3 km northwest of the R76 provincial road, and ~18 km north-northwest of the Viljoenskroon CBD. The site is underlain by arenaceous rocks of the Pretoria Group, Daspoort Formation (*Vd*, Transvaal Supergroup), considered to be of high palaeontological significance. The sedimentary rocks are capped by late Quaternary aeolian sand with little potential for Quaternary fossil preservation. There is no above ground evidence of *in situ* Stone Age archaeological material distributed as surface scatters on the landscape, prehistoric structures, graves or historically significant buildings older than 60 years within the boundaries of the study area. The proposed development will directly affect fine-grained quartzitic sandstones, which may potentially yield microbial mat features (stromatolites). Trace fossils may include wrinkle structures, sub rounded voids, small circular impressions and positive ridges on bedding surfaces. A survey of old cuttings in the existing borrow pit was hampered by a lack of well-preserved horizontal bedding surfaces. In terms of palaeontology it is recommended that development can proceed, provided that excavations into intact sedimentary rock, should preferably be monitored by a professional palaeontologist on a regular basis during the operational phase when such excavations are open. Based on surface observations, the site is regarded as of low archaeological significance and is assigned a rating of Generally Protected C. As far as the archaeological heritage is concerned, the proposed development may proceed, provided that all excavation activities are kept within the boundaries of the demarcated footprint.

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Introduction

A Phase 1 Heritage Impact Assessment was carried out for extension of an existing Borrow Pit on Remainder of farm Witfontein 444 near Viljoenskroon, FS Province (**Fig. 1**). The assessment is required as a prerequisite for new development in terms of the National Environmental Management Act and is also called for in terms of the National Heritage Resources Act (NHRA) 25 of 1999. The National Heritage Resources Act (No. 25 of 1999) identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. In this case, the proposed development triggered Section 38(1) of the Act where proposed development includes *(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length and (c) any development or other activity which will change the character of the site exceeding 5000 m² in extent; or the rezoning of a site exceeding 10 000 m².*

Terms of Reference

The task involved the following:

- Identify and map possible heritage sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential heritage resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

Methodology

The heritage significance of the affected area was evaluated on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian survey. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Maps and aerial photographs (incl. Google Earth) were consulted and integrated with data acquired during the on-site inspection. Site significance classification standards as prescribed by SAHRA (2005) were used to indicate overall significance and mitigation procedures where relevant (**Table 1**).

Site Details

The affected area covers ~5 ha of low relief terrain and part of an existing borrow pit, located about 14 km south of the Vaal River, 4.3 km northwest of the R76 provincial road, and ~18 km north-northwest of the Viljoenskroon CBD (**Fig 2 & 3**).

Maps: 1:50 000 topographical map 2726BB Viljoenskroon.

1:250 000 geological map 2726 Kroonstad

Site Coordinates (**Fig. 2**):

- A) 27° 3'17.70"S 26°53'1.41"E
- B) 27° 3'14.17"S 26°53'8.11"E
- C) 27° 3'20.15"S 26°53'12.12"E
- D) 27° 3'24.09"S 26°53'6.10"E

Background

Palaeontology

Underlying geology in the region is represented by ~2200 Ma old Transvaal Supergroup, Pretoria Group lavas (*Vh*), mudrocks (*Vs*) and quartzites (*Vd*), late Palaeozoic Karroo Supergroup remnants (Ecca Group shales, sandstone, *Pv*) and intrusive basalts of the Mesozoic Karoo Igneous Province (*Jd*) (**Fig. 4**). Ancient Vaal River terraces in the Northern Cape have previously yielded Plio-Pleistocene mammal fossils (e.g. River Gravels between Bloemhof and Kimberley), but there is currently no record of fossil-bearing alluvial deposits along the Vaal River between Leeudoringstad and Orkney.

Archaeology

The alluvial formations of the Vaal River are well known yielding for an abundance of Acheulian (Early Stone Age) hand axes, cleavers and core-axes, primarily made from quartzite. Stylistically diagnostic Type Z settlements are scattered over a relatively limited area to along the Vals River in the districts of Kroonstad and Bothaville, including a few sites on the Renoster River, east of Viljoenskroon (**Fig. 5**). Type Z dwellings consisted of a cylindrical hut with stone-walled courtyards at the front and rear, representing a bilobial layout. Maggs (1976) ascribes the occupation of the sites with bilobial dwellings to early Sotho-speaking Thlaping and Rolong groups. According to radio-carbon dating and oral history, Type Z sites were occupied from the 16th and 17th to early 19th century. European settlement occurred from 1836 (Voortrekkers) while establishment of the Boer republics and the discovery of diamonds and gold further contributed to the distinctive historical character of the region. There are plentiful rock art sites with engravings recorded in the Lower Vaal River Basin including the area around Bothaville on the farms Deelfontein, Diepfontein, Doornhoek and Geelfontein and paintings around Parys on the farms Buffelskloof and Parsons Rus. There is currently no record of rock art sites in the vicinity of Viljoenskroon. The town of Viljoenskroon was laid out on the farm Mahemskuil in 1921 and attained municipal status in 1925.

Field Assessment

The site is underlain by arenaceous rocks of the Pretoria Group, Daspoort Formation (Vd, Transvaal Supergroup), considered to be of high palaeontological significance (**Fig. 6**). The sedimentary rocks are capped by late Quaternary aeolian sand with little potential for Quaternary fossil preservation. There is no above ground evidence of *in situ* Stone Age archaeological material distributed as surface scatters on the landscape, prehistoric structures, graves or historically significant buildings older than 60 years within the boundaries of the study area.

Impact Statement & Recommendation

The proposed development will directly affect a late Quaternary aeolian overburden and fine-grained quartzitic sandstones considered to be of high palaeontological significance given the latter's potential for preservation of microbial mat features (stromatolites). Trace fossils may include wrinkle structures, sub rounded voids, small circular impressions and positive ridges on bedding surfaces. A survey of old cuttings

in the existing borrow pit was hampered by a lack of well-preserved horizontal bedding surfaces. In terms of palaeontology it is recommended that development can proceed, provided that excavations into intact sedimentary rock, should preferably be monitored by a professional palaeontologist on a regular basis during the operational phase when such excavations are open.

Based on surface observations, the site is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (**Table 1**). As far as the archaeological heritage is concerned, the proposed development may proceed, provided that all excavation activities are kept within the boundaries of the demarcated footprint.

References

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DECLARATION OF INDEPENDENCE

Paleo Field Services acts as an independent specialist consultant and does 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.



28 / 08 / 2023

Tables & Figures

Table 1. Field rating categories as prescribed by SAHRA.

Field Rating	Grade	Significance	Mitigation
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

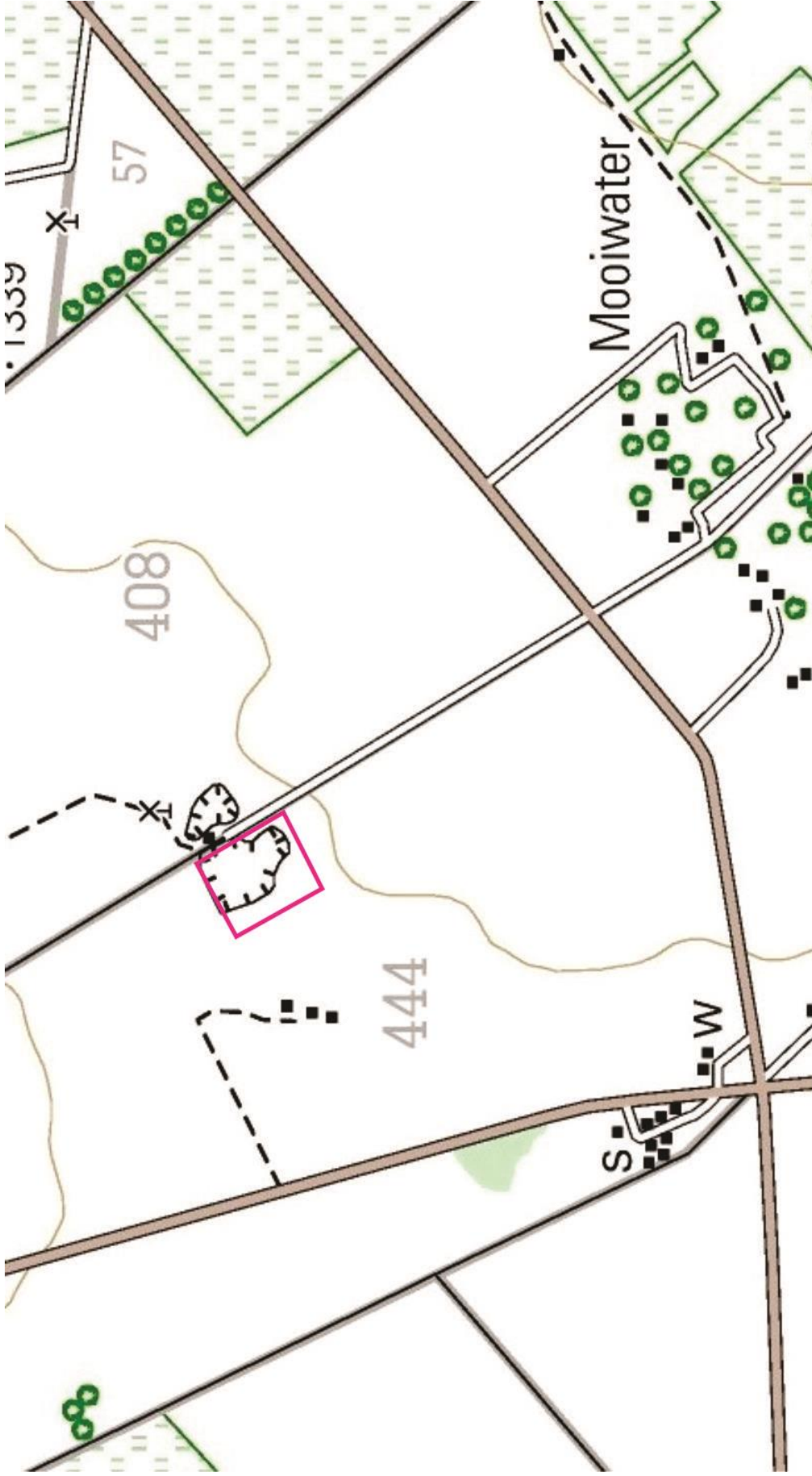


Figure 1. Position of proposed borrow pit development marked on portion of 1:50 000 topographic map 2726BB Viljoenskroon.



Figure 2. Aerial view of study area.

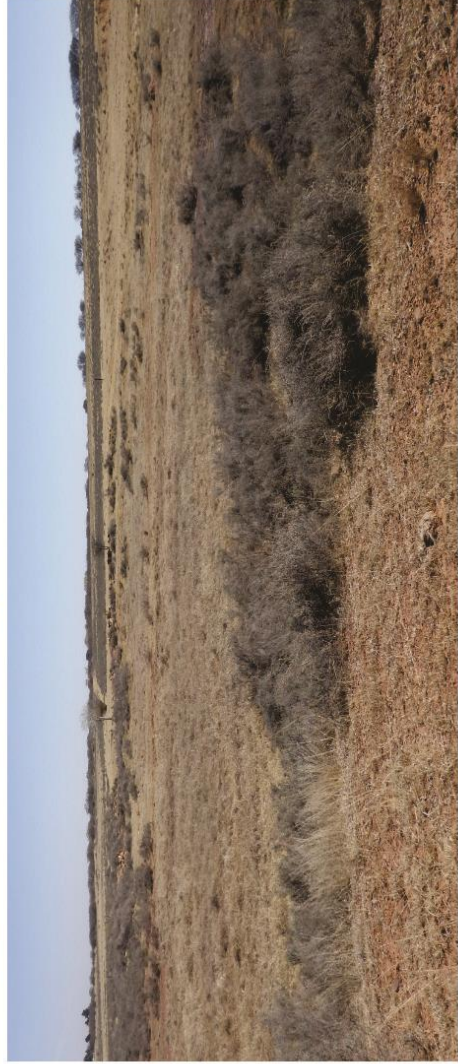


Figure 3. General view of site, looking west towards existing pit (above), and northwest towards new extension area (below).

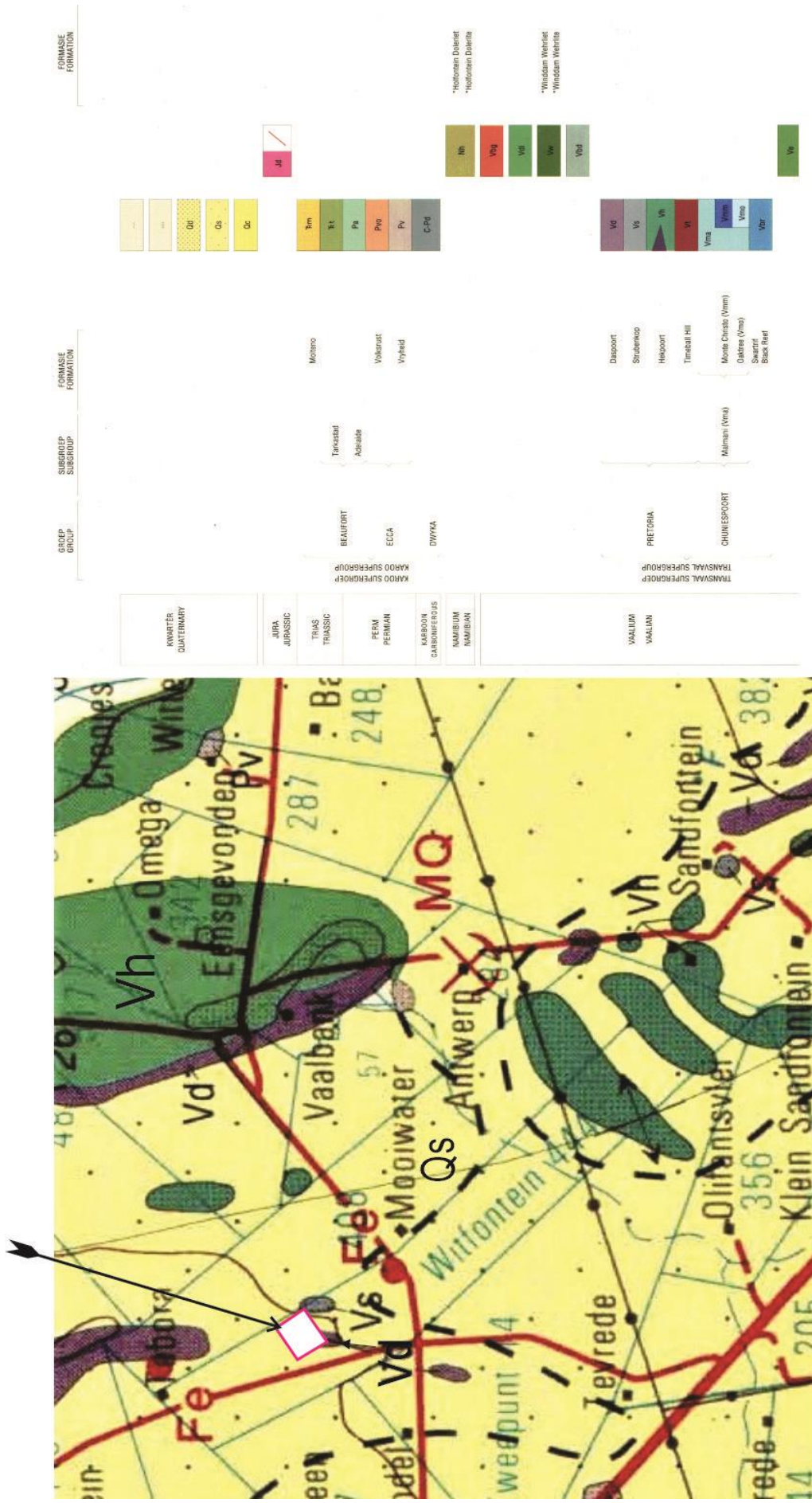


Figure 4. Position of proposed borrow pit development marked on portion of 1:250 000 geological map 2726 Kroonstad.

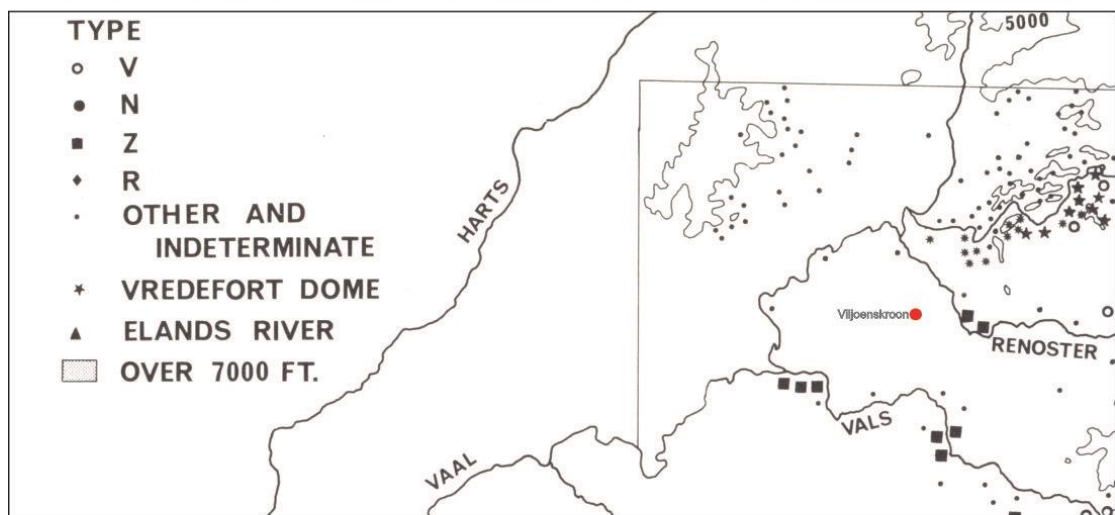
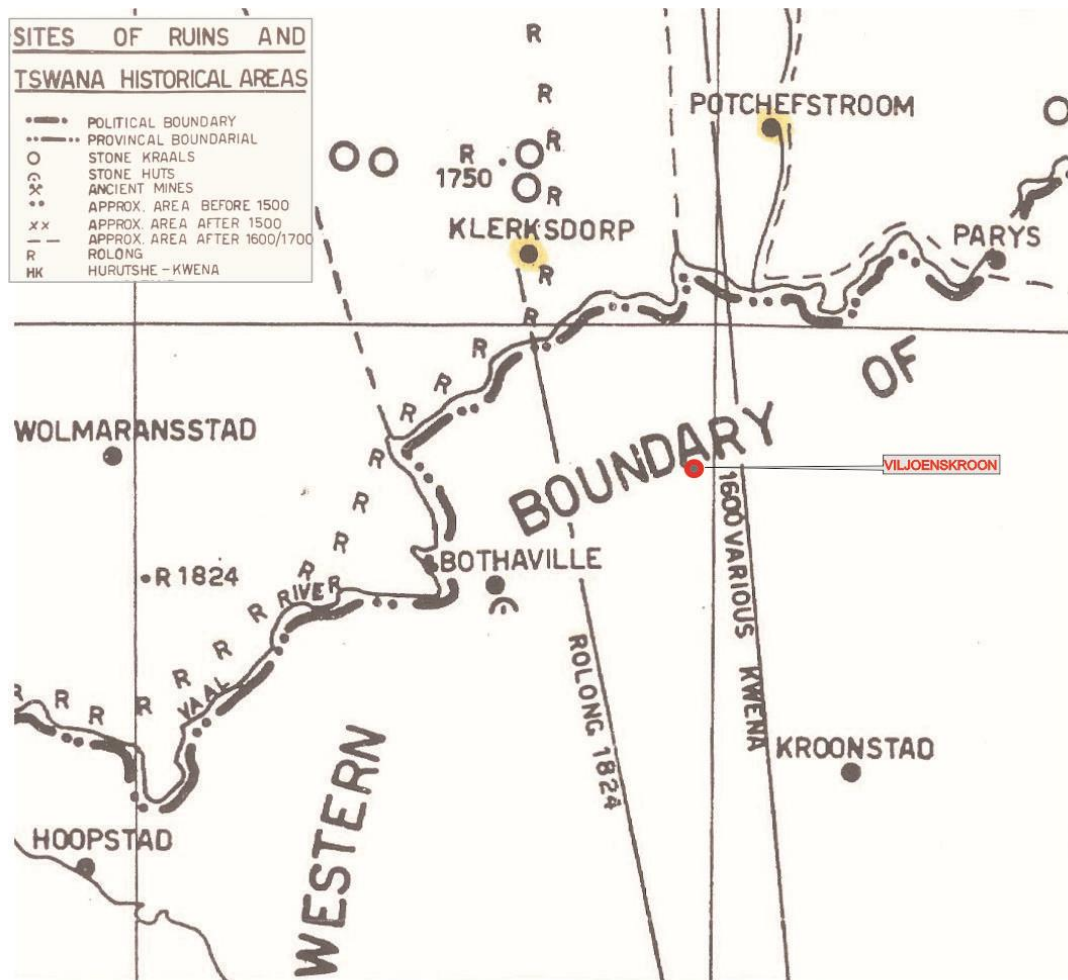


Figure 5. LIA sites in the Viljoenskroon region indicated on portion of maps provided by Breutz (1956) and Maggs (1976).

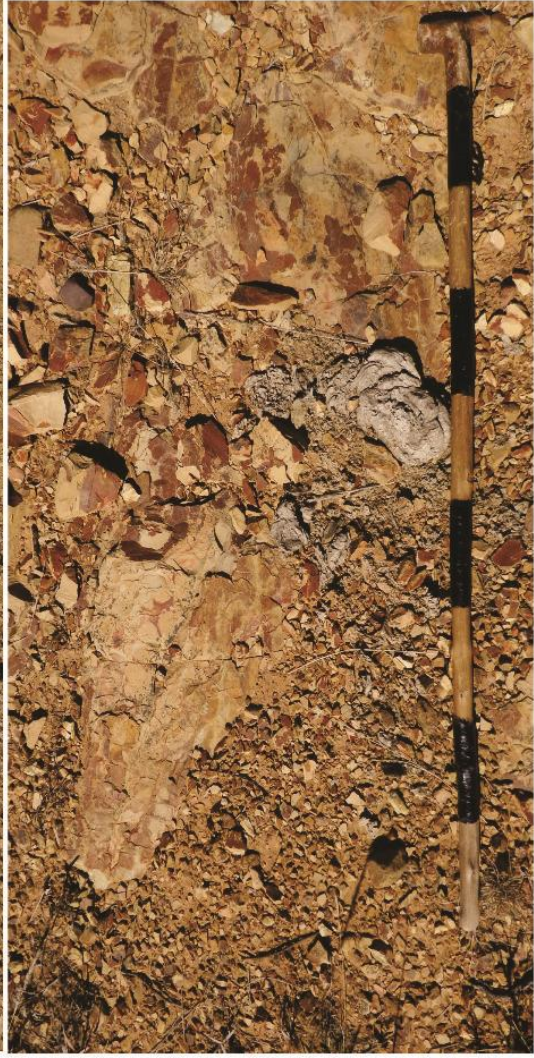


Figure 6. Planar-bedded, fine-grained and oxide-coloured quartzitic sandstone of the Daspoort Formation.