

Phase 1 Palaeontological Impact Assessment of a
proposed new citrus packshed at Ripplemead Farm near
Peddie, EC Province



Report prepared for isiXwiba Environmental Consultants by

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Executive Summary

- A Phase 1 Palaeontological Impact Assessment was carried out at a 1 ha site where anticipated development calls for the construction of a new pack house for citrus production at Ripplemead Farm in the Keiskamma River Valley.
- There are no major palaeontological reason to halt the proposed development at the site.
- The adjoining area identified as a possible site for a new pack shed does not pose any problems in terms of palaeontological impact.
- The site is underlain potentially fossil-bearing Middleton Frm. sediments, but it is unlikely that the proposed development will affect palaeontological heritage.
- Potential palaeontological impact during the operational phase of the development is considered low. However, it is **advised that newly uncovered palaeontological material found during the course of excavation activities into sedimentary bedrock must be reported to SAHRHA, that excavations into *in situ* sediments should allow for inspection by a specialist at the appropriate time and that possible intact finds may require a Phase 2 rescue operation at the cost of the developer.**

Introduction

At the request of isiXwiba Environmental Consultants, a Phase 1 Palaeontological Impact Assessment was carried out on a 1 ha site where anticipated development calls for the construction of a new pack house for citrus production at Ripplemead Farm in the Keiskamma River Valley (**Fig. 1**). The study area was traditionally a citrus farming area before becoming part of the Ciskei. The land is still state owned and falls under the Department of Land Affairs. The three citrus farms in the Keiskamma River Valley, which formed part of the Ulimicor group, are producing citrus fruit for the export markets. All farms packed in the Ripplemead pack house in the past but over time, were forced to look at alternative pack houses due to the pack house not being suitable to packing soft citrus and lack of capital to improve the pack house. The current pack house covers $\pm 3024\text{m}^2$, was built before 1960 and is in a very bad condition.

The survey was conducted in terms of the National Heritage Resources Act 25 of 1999. A site visit and subsequent assessment took place in November 2012. The task involved identification of possible palaeontological sites or occurrences within the demarcated area, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

Description of the Affected Area

Details of the study area

1 : 50 000 topographical map: 3326 BB Breakfast Vlei.

1 : 250 000 geological map 3326 Grahamstown.

The footprint is marked by the following coordinates (**Fig. 2**):

A	S33 01 50.4 E26 58 47.3
B	S33 01 52.9 E26 58 54.3
C	S33 01 50.6 E26 59 03.7
D	S33 01 45.5 E26 59 03.9

The affected area is dominated by rolling hill topography with outcrop limited to road cuttings and streams. The site is located on gently sloping open farmland situated about 500m from the Keiskamma River (**Fig. 3**). Drainage is limited to a furrow that

feeds into the Keiskamma Rivier. Pockets of alluvial sediments are concentrated along low-lying drainage lines feeding into the river. Residual soils are shallow around the pack shed ($\leq 200 - 300$ mm) where it unconformably overlies Karoo bedrock (**Fig. 4**). Vegetation cover comprises mostly summer-rainfall grasses with *Acacia natalitia* predominating along water courses.

Methodology

The baseline study involved a pedestrian survey of the demarcated area. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera, were used to record relevant data. The foot survey was preceded by a basic assessment of the topography and geology of the area, using geological (1:250 000) maps as well as review of the literature on the geological formations exposed in the region. Relevant palaeontological information were assimilated for the report and integrated with data acquired during the on-site inspection.

Geology and Palaeontology

The geology of the area has been described by Mountain (1974) and Johnson and Le Roux (1994). The site is underlain by sedimentary rocks of the Middleton Formation of the Adelaide Subgroup (*Pm*, Beaufort Group) (**Fig. 5**), which is made up of upward-fining, lenticular sandstone grading into mudstone, with prominent red-coloured mudstone beds which was deposited in sub-aerial fluvial environments (**Fig 6**). The formation represents a period when plant and animal life flourished along meandering rivers and semi-permanent lakes under semi-arid conditions. Jurassic-age dolerite intrusions (*Jd*), are confined to Beaufort Group strata and occur in the form of dykes and sills. A dolerite outcrop is located near the northeastern boundary of the study area (**Fig. 7**). Although dolerite can be excluded from further consideration in the present assessment, the mudstone adjacent to dolerite intrusions has been metamorphosed, which may be favorable for the preservation of *in situ* vertebrate remains.

Compared to the rest of the Karoo Basin, the former Ciskei and Transkei areas of the eastern Eastern Cape are hardly known palaeontologically and any material that may be recovered from this region are of considerable research value. The mid-Permian Middleton Frm. (Adelaide Subgroup) can be biostratigraphically subdivided to include the upper *Pristerognathus Assemblage Zone (AZ)*, the *Tropidostoma AZ*, as

well as the lower *Cistecephalus* AZ (Rubidge 1995). These zones are characterised by a varying suite of therapsid fossils mainly represented by the Dicynodontia, Gorgonopsia and Therocephalia. Ichnofossil occurrences are known from the uppermost *Pristerognathus* AZ (Bordy *et al.* 2011). Fish, amphibians and Glossopteris plant fossils are also known from these assemblages.

There are currently no records of late Cenozoic / Neogene fossil occurrences in the immediate region.

Results of Survey

Where in evidence, Middleton Formation outcrop were investigated for traces of plant and vertebrate fossils, vertebrate burrows, and other ichnofossil occurrences. No fossil occurrences were observed during the pedestrian survey. Although located outside the development footprint, there is also no indication for the accumulation and preservation of intact fossil material within more recent, Quaternary alluvial deposits concentrated along low-lying drainage areas (**Fig. 8**).

Statement of Significance and Recommendations

There are **no major palaeontological grounds to suspend the** proposed development, but any development that may require excavations exposing intact, fossiliferous deposits are of palaeontological interest. Despite the lack of fossil evidence confirmed by the field survey, the possibility still exist that fossils could be encountered **during excavations into bedrock**. This is because fossils can be occur as localized occurrences in mudrock units over variable distances.

Potential palaeontological impact during the operational phase of the development is considered low. However, it is **advised that newly uncovered palaeontological material found during the course of excavation activities into sedimentary bedrock must be reported to SAHRHA, that excavations into *in situ* sediments should allow for inspection by a specialist at the appropriate time and that possible intact finds may require a Phase 2 rescue operation at the cost of the developer.**

References

- Bordy, E.M., Linkermann, S. and Prevec, R. 2011. Palaeoecological aspects of some invertebrate trace fossils from the Mid to Upper Permian Middleton Formation, Eastern Cape, South Africa. *Journal of African Earth Sciences* 61, 238 – 244.
- Johnson, M.R. and Le Roux F.G. 1994. The Geology of the Grahamstown area. Geological Survey, Pretoria.
- Mountain, E.D. 1974. The geology of the area around East London, Cape Province. Geological Survey, Pretoria.
- Rubidge, B. S. 1995. (ed.) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 1 – 45.

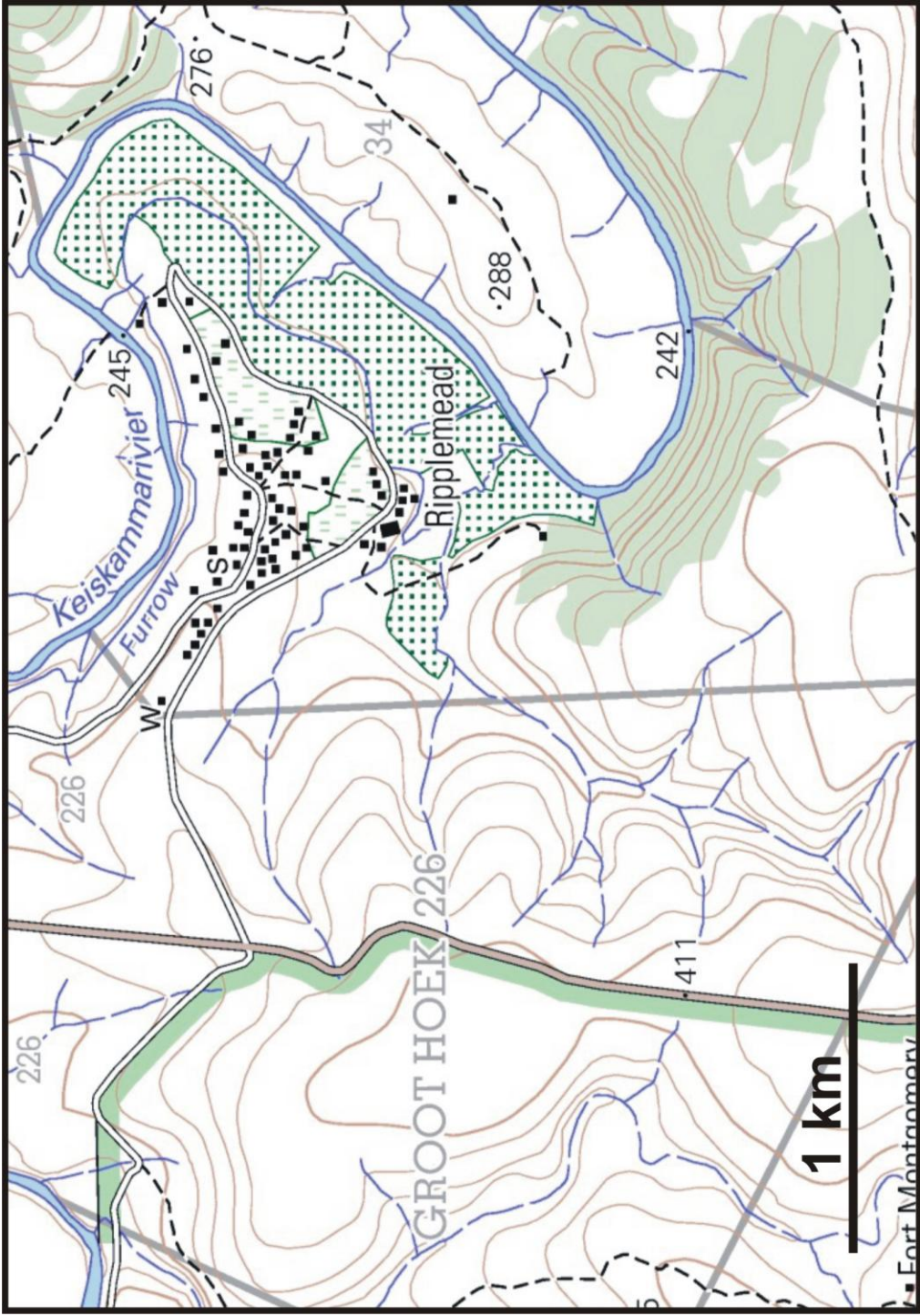


Figure 1. Portion of 1 : 50 000 scale topographic map of showing the location of the Ripplemead. site.

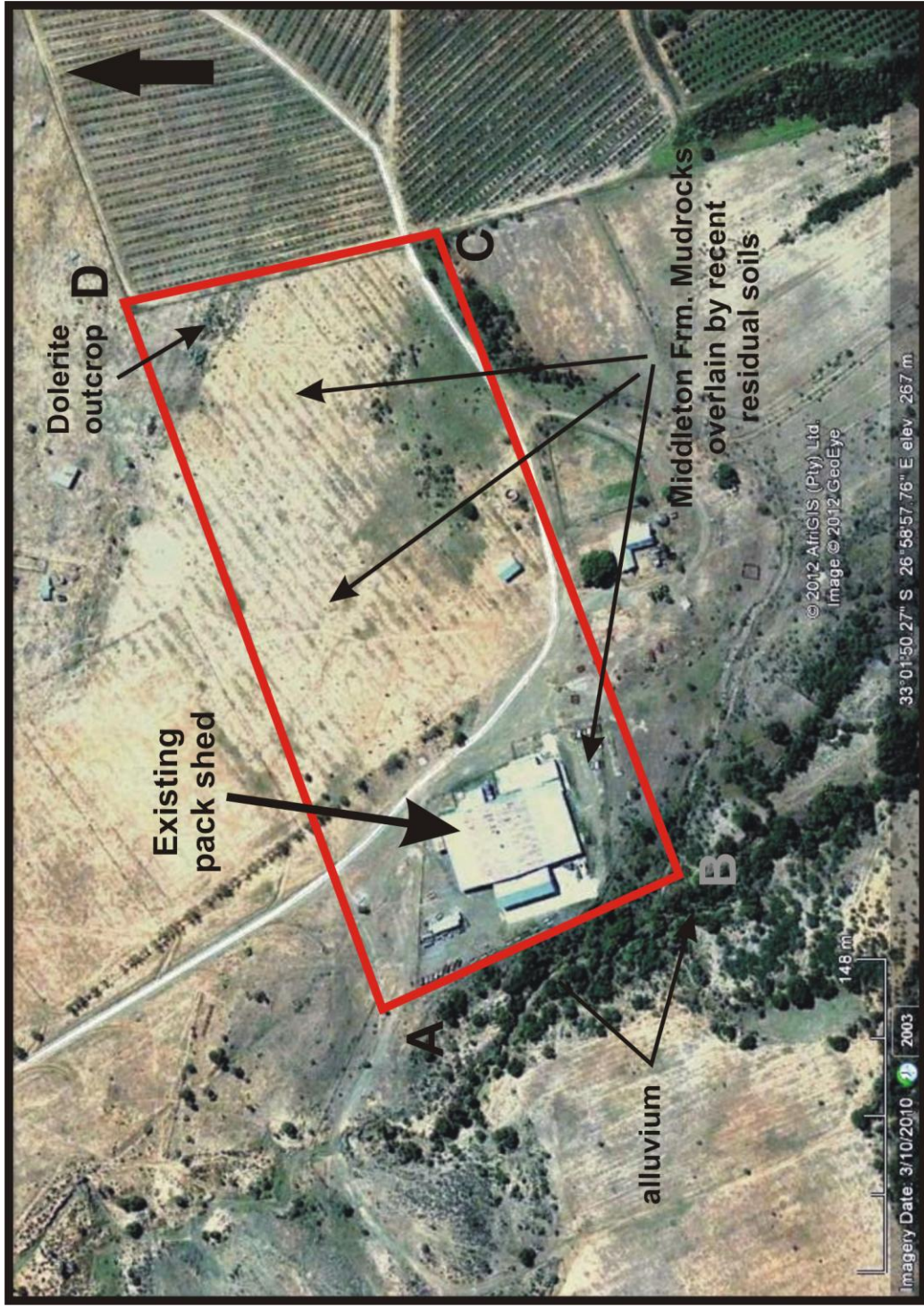


Figure 2. Aerial view of the study area.



Figure 3. Panoramic view of the site, looking west-southwest. The existing packshed is visible in the foreground.

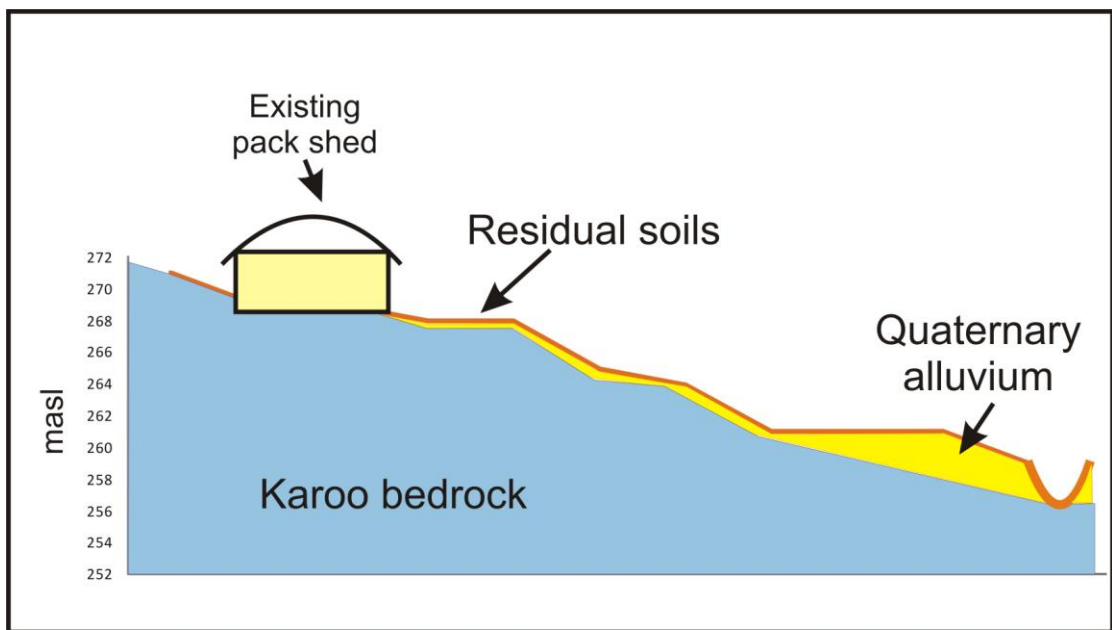


Figure 4. Schematic diagram of study area , looking east. Residual soils are shallow around the pack shed (≤ 200 300 mm) where it unconformably overlies Karoo bedrock. Alluvial sediments are concentrated along low-lying drainage lines feeding into the river.

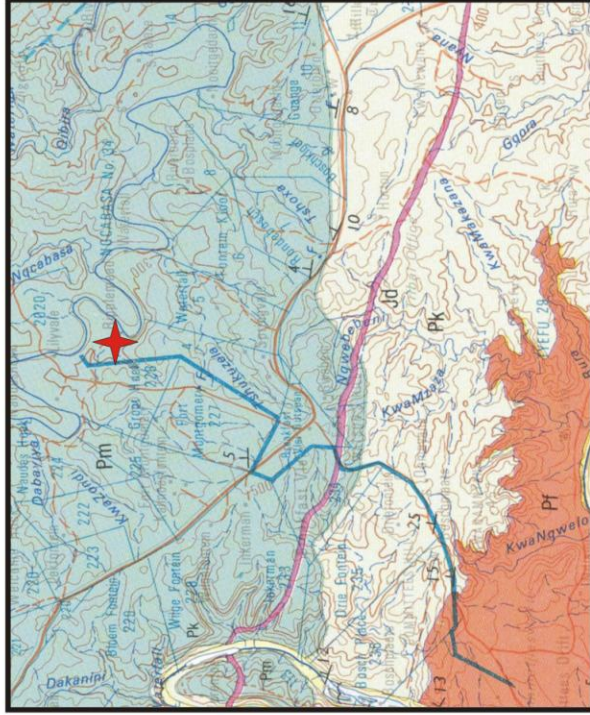
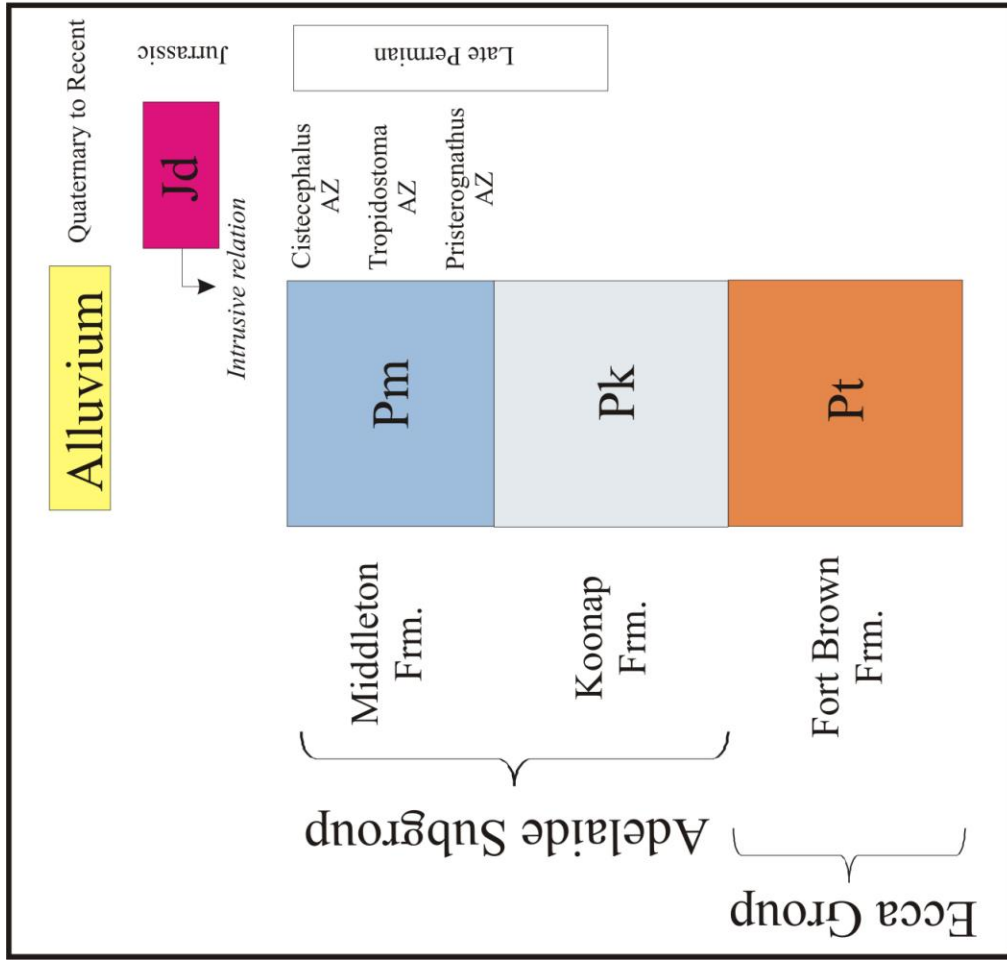


Figure 5. Schematic representation of the geology around the survey area.



Figure 6. The site is underlain by sedimentary rocks of the Middleton Formation of the (Adelaide Subgroup, Beaufort Group), which is made up of upward-fining, lenticular sandstone grading into mudstone, with prominent red-coloured mudstone beds



Figure 7. A dolerite outcrop, heavily overgrown is located near the northeastern boundary of the study area (A & B).

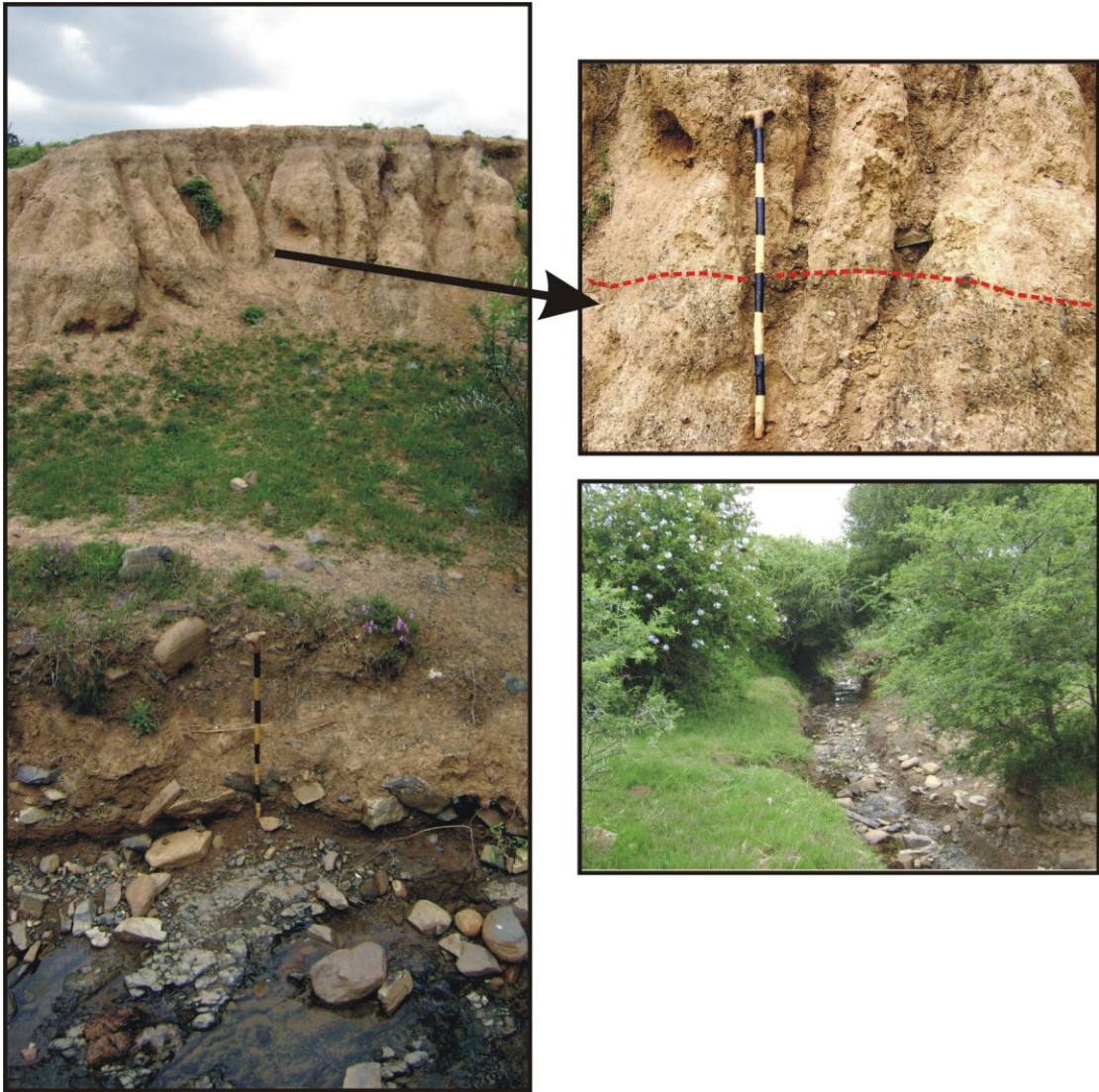


Figure 8. Drainage is limited to a furrow that feeds into the Keiskamma Rivier (above). The Quaternary-age alluvial sediments are not fossiliferous. *In situ* Stone Age cultural remains are absent.