

Phase 1 Heritage Impact Assessment for proposed
establishment of agricultural pivots on Farm Naauwtes
Fontein 78, Hopetown, NC Province.

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Summary

A Phase 1 Heritage Impact Assessment was carried out for the proposed installation of new irrigation pivots and associated infrastructure at two proposed sites located on the farm Naauwtes Fontein 78 near Hopetown in the Northern Cape Province. Two areas, designated Sites A and B were identified for assessment. Site A comprises four pivot footprints covering a total of 198 ha and Site B comprises two pivot footprints covering a total of 71 ha. The field assessment indicates that Sites A and B are located on fairly low topography terrain with limited outcrop visibility. The terrain is capped by a well-developed calcareous soil, and unconsolidated windblown sand with a thickness of > 80 cm. No evidence was found of *in situ* Stone Age material or capped assemblages within the sandy substrate. No fossils (Quaternary) or fossil exposures were observed in the footprint areas. There are no indications of prehistoric structures or rock art or aboveground evidence of graves or historical structures older than 60 years within the confines of the footprints. The proposed pivot development at Sites A and B will primarily affect geologically recent and culturally sterile soils (unconsolidated wind-blown sand). The footprints are not considered palaeontologically or archaeologically vulnerable and are assigned a site rating of Generally Protected C.

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Introduction

A Phase 1 Heritage Impact Assessment was carried out for the proposed installation of new irrigation pivots and associated infrastructure at two proposed sites located on the farm Naauwtes Fontein 78 near Hopetown in the Northern Cape Province (**Fig. 1**). The extent of the proposed development (over 5000 m²) falls within the requirements for a Heritage Impact Assessment (HIA) as required by Section 38 (Heritage Resources Management) of the South African National Heritage Resources Act (Act No. 25 of 1999). The site visit and subsequent assessment took place in November 2013. The task involved identification of possible archaeological and paleontological sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

Methodology

The palaeontological and archaeological significance of the affected area was based on existing field data, database information, published literature and maps. This was followed up with a field assessment by means of a pedestrian survey and investigation of all exposed sections within the footprint. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes.

Site significance classification standards prescribed by SAHRA (2005) were used to indicate overall significance and mitigation procedures where relevant (**Table 1**).

Locality Data

Maps: 1:50 000 topographical map 2923 DB Rooddam

1:250 000 geological map 2922 Prieska

The proposed development footprints are located next to the R3112 going to Prieska, about 19 km northwest of Hopetown on the farm Naauwtes Fontein 78 (**Fig. 2**). Two areas, designated Sites A and B were identified for assessment (**Fig. 3**). Site A comprises four pivot footprints covering a total of 198 ha and Site B comprises two pivot footprints covering a total of 71 ha (**Fig. 3**).

Site Centroid Coordinates

Site A, 55 ha; 29°30'29.22"S 23°56'29.88"E

Site A, 55 ha; 29°30'45.75"S 23°56'54.34"E

Site A, 15 ha; 29°30'50.25"S 23°56'31.27"E

Site A, 20 ha; 29°31'3.87"S 23°56'40.47"E

Site B, 7 ha; 29°31'5.09"S 23°58'1.62"E

Site B, 40 ha; 29°31'11.65"S 23°58'19.34"E

Background

Palaeontology

Downcutting and incision by the Orange river indicate that region is underlain by Precambrian, Ventersdorp Supergroup lavas (Allanridge Formation, *Ra*), which is composed of resistant-weathering, dark green lavas and associated pyroclastic rocks (Zawada 1992) (**Fig. 4**). Outcropping further southeast of the study area, the Ventersdorp lavas are unconformably overlain by Dwyka Group tillites of the Mbizane Formation (*C-Pd*), a largely heterolithic unit recognized in the upper part of the Dwyka Group of the Karoo Supergroup (Von Brunn & Visser 1999; Visser et al. 1977-78, 1990; Zawada 1992; Johnson et al. 2006). It represents valley and inlet fill deposits left behind on Ventersdorp basement rocks by retreating glaciers about 300 million years ago. These Dwyka-aged palaeovalleys bear evidence of glaciated pavements, consisting of well-preserved polished surfaces striations on basement rocks, which abound throughout the area (McLachlan and Anderson 1973). The Mbizane Formation is not considered to be highly fossiliferous, but low diversity non-marine ichnofossil assemblages have been recorded as well as scarce vascular plant remains associated with *Glossopteris* Flora, while palynomorphs are also likely to be present within finer-grained mudrock facies (Almond and Pether 2008).

Localized outcrops of Early Permian, Whitehill Formation mudrocks (Ecca Group, *Ppw*) generally occur near Jurassic dolerite contact zones, outcropping north, south and east of Hopetown (Zawada 1992). Fossils from the Whitehill Formation (Ecca Group) include mesosaurid reptiles, crustaceans, palaeoniscoid fish, fossil wood and leaves (*Glossopteris*), sponge spicules and ichnofossils (Cole and Basson 1991).

Dolerite, in the form of dykes and sills, is common throughout the region. Regarded as feeders of Drakensberg lavas, dolerites are not palaeontologically significant and can be excluded from further consideration in the present evaluation. On the other hand, dolerite outcrop, together with Ventersdorp andesites, can be regarded as

archaeologically significant since Stone Age lithic artifacts in the region are mostly made of andesite or hornfels, the latter being a fine-grained isotropic rock found in the hot-contact zone between the dolerites and shales in the area. As a result, stone tool factory sites are commonly found near dolerite-shale contact zones. In addition, rock engravings in the region are consistently found on dolerite.

According to the 1:250 000 geological map 2922 Prieska, the study areas are mantled by unconsolidated Kalahari Group sand (*Q_s*) and alluvium along stream incisions associated with the nearby Orange River.

To the northwest of Hopetown the landscape is dissected by the ancient Koa Valley, a Miocene relic with remnants of Cenozoic fluvial deposits that has produced fossil vertebrate bone as well as fossil wood. Southwards, the Koa Valley joins an extensive system of pans fossil where vertebrate fossil remains have been identified. No fossils have been explicitly reported from Quaternary alluvial deposits near Hopetown yet, but a variety of fossil fauna have been retrieved from alluvial gravel terraces along the Lower Vaal River basin northeast of Kimberley (Cooke 1949; Maglio and Cooke 1978; Partridge and Maud 2000). Here, gravel terraces contain sandy lenses that have yielded several extinct vertebrate taxa including proboscidians (*Mammuthus subplanifrons* and *Elephas iolensis*), suids (*Notochoerus capensis*) and a variety of bovids.

Archaeology

The Stone Age archaeological footprint is well-represented north of Hopetown and around Kimberley by Early and Middle Stone Age localities from lacustrine and alluvial contexts as well as rock engravings on dolerite outcrop (**Fig. 6 & 7**). Engraving sites have been recorded on a number of farms in the Hopetown district, including Beeshoek, Brandfontein Disselfontein, Doornbult Karee Kloof, Lemietskop and Rooikop (**Fig. 8**). Archaeological records and historical eyewitness accounts show evidence of Bushman hunter-gatherer and Khoi herder occupation in the region prior to European settlement (Sampson 1972; Elphick 1977). Early travellers frequently encountered Koranna, Griqua and Bushmen groups in the region (Burchell 1824; Skead 2009). Iron Age occupation is absent from the region as the most southerly distribution of Iron Age settlement in the northern Cape was limited to north of the Orange River by the end of 18th century (Maggs 1974; Humphreys 1976). The Orange River area between Douglas and Hopetown also lies within the confines of the

historical Albania settlement of Griqualand West that lasted from 1866 to its demise in 1878 (**Fig. 9**) (Kurtz 1988).

Hopetown itself was established in 1854. The town experienced a boom after the discovery of diamonds 1866 and 1868, which led to the famous diamond rush of the 1870's. The historical Orange River Station and blockhouse lie on the southern bank of the Orange River, 12 kilometres east of Hopetown. South of the station lies the Doornbult concentration camp, established in 1901 by the British, which housed at least 1600 people during the Anglo-Boer War.

Field Assessment

The field assessment indicates that Sites A & B are located on fairly low topography terrain with negligible outcrop visibility (**Fig. 10**). The terrain is capped by a well-developed calcareous soil, and unconsolidated windblown sand with a thickness of > 80 cm (**Fig. 10**). No evidence was found of *in situ* Stone Age material or capped assemblages within the sandy substrate. No fossils (Quaternary) or fossil exposures were observed in the footprint areas. There are no indications of prehistoric structures or rock art or aboveground evidence of graves or historical structures older than 60 years within the confines of the footprints.

Impact Statement and Recommendation

The field assessment indicates that the proposed pivot development at Sites A and B will primarily affect geologically recent and culturally sterile soils (unconsolidated wind-blown sand) (**Table 1**). The footprints are not considered palaeontologically or archaeologically vulnerable and are assigned a site rating of Generally Protected C (**Table 1**).

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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.

26 / 10 / 2021

Tables & Figures

Table 1. Archaeological 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

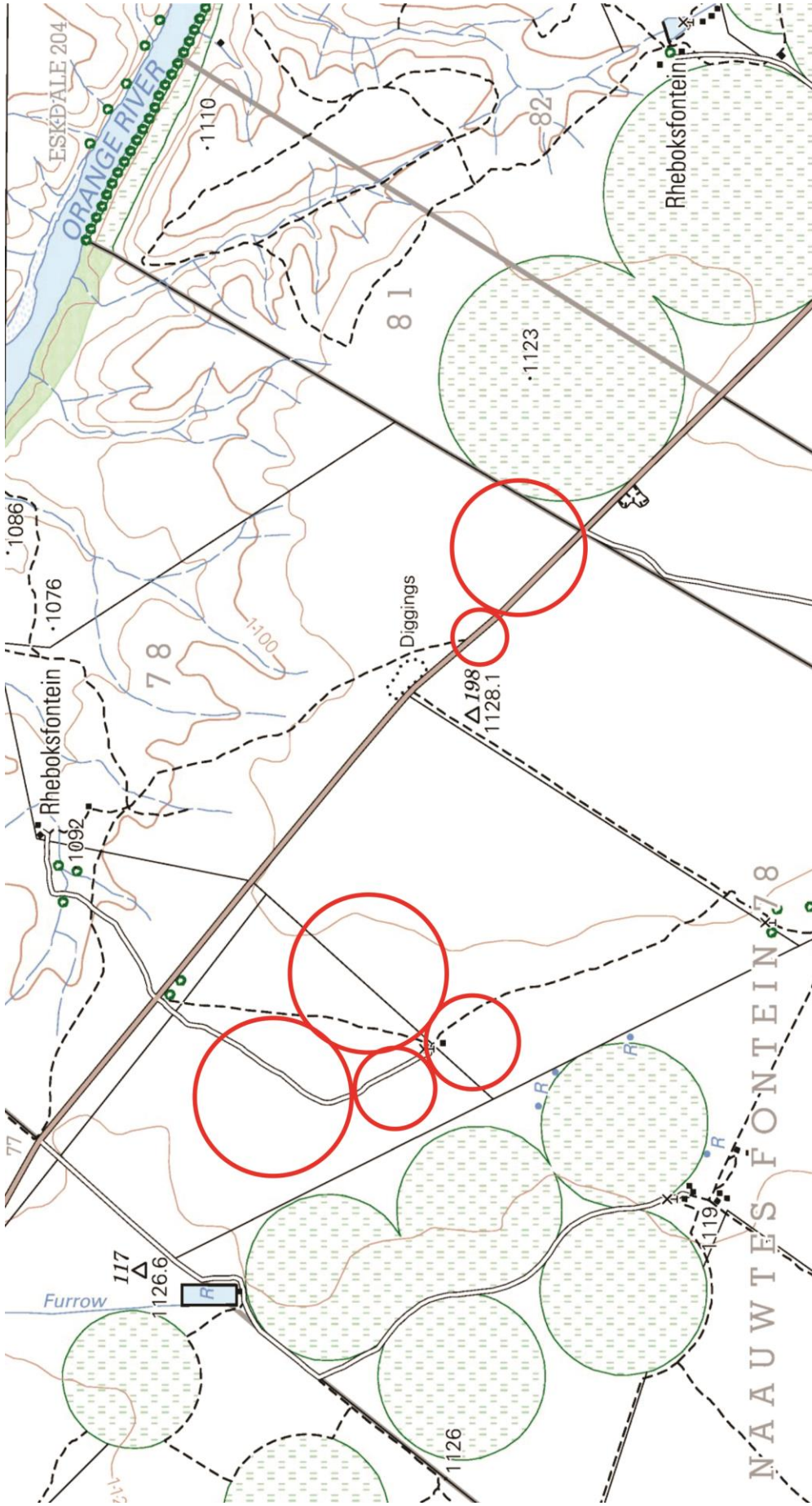


Figure 1. Map of the proposed pivot footprints (portion of 1:50 000 scale topographic map 2923DB Rooidam).

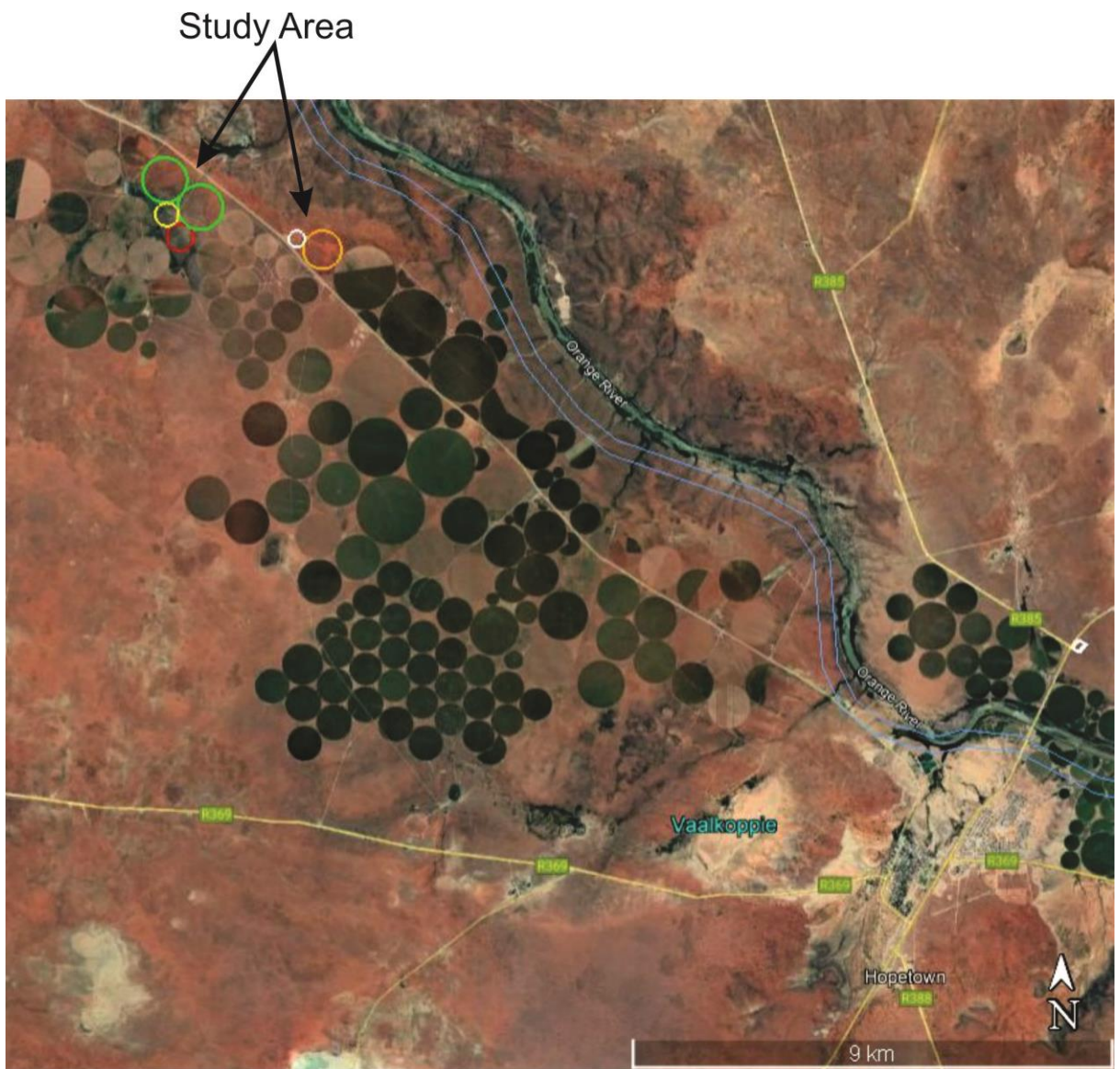


Figure 2. Position of study area in relation to Hopetown.

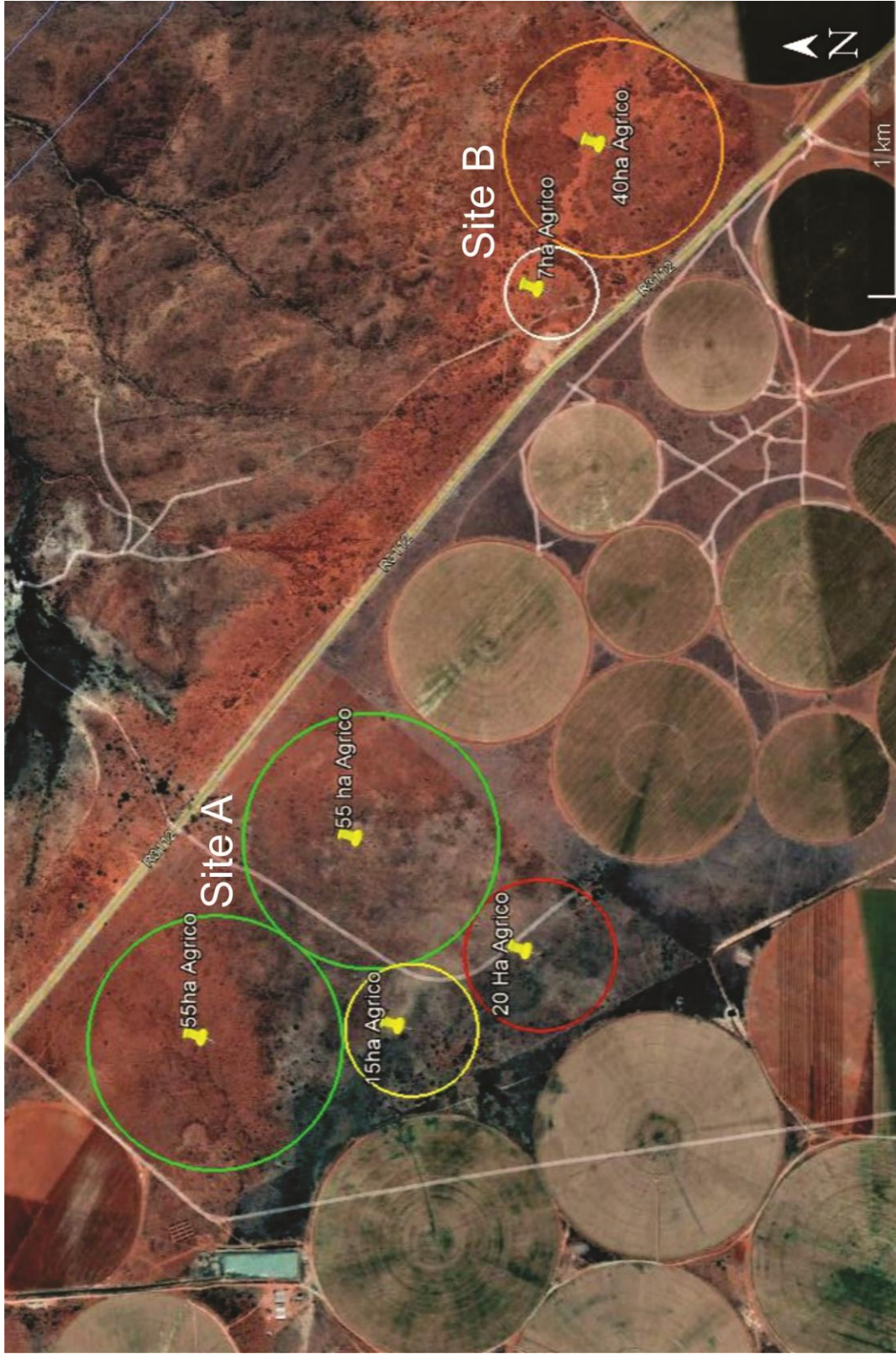


Figure 2. Aerial view of the study areas.

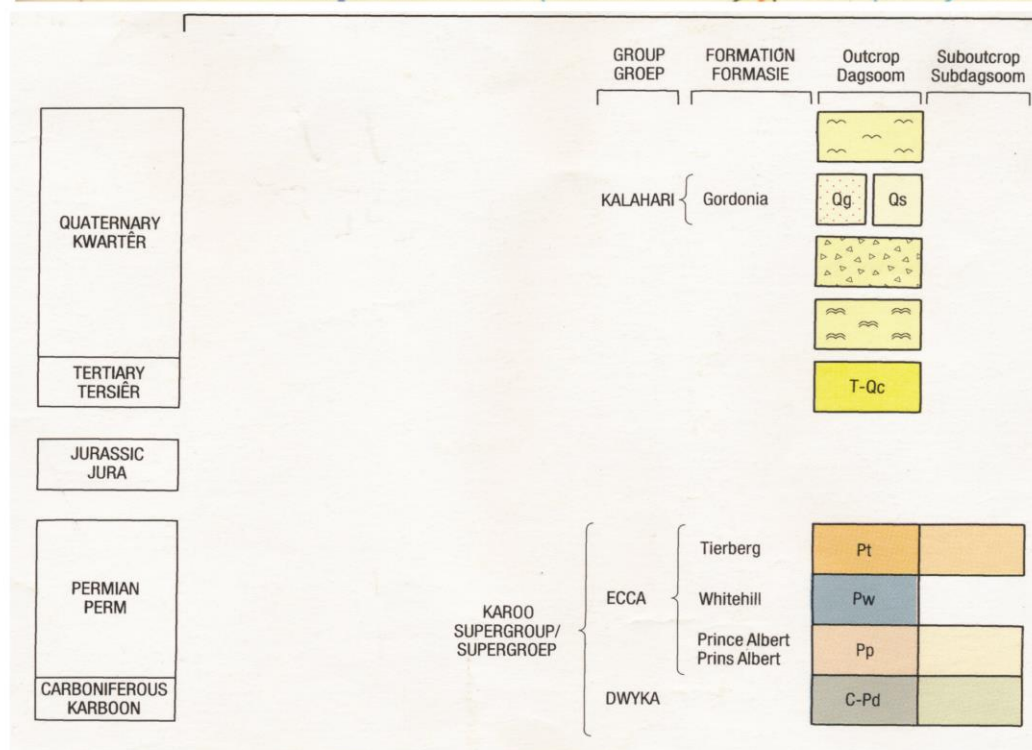
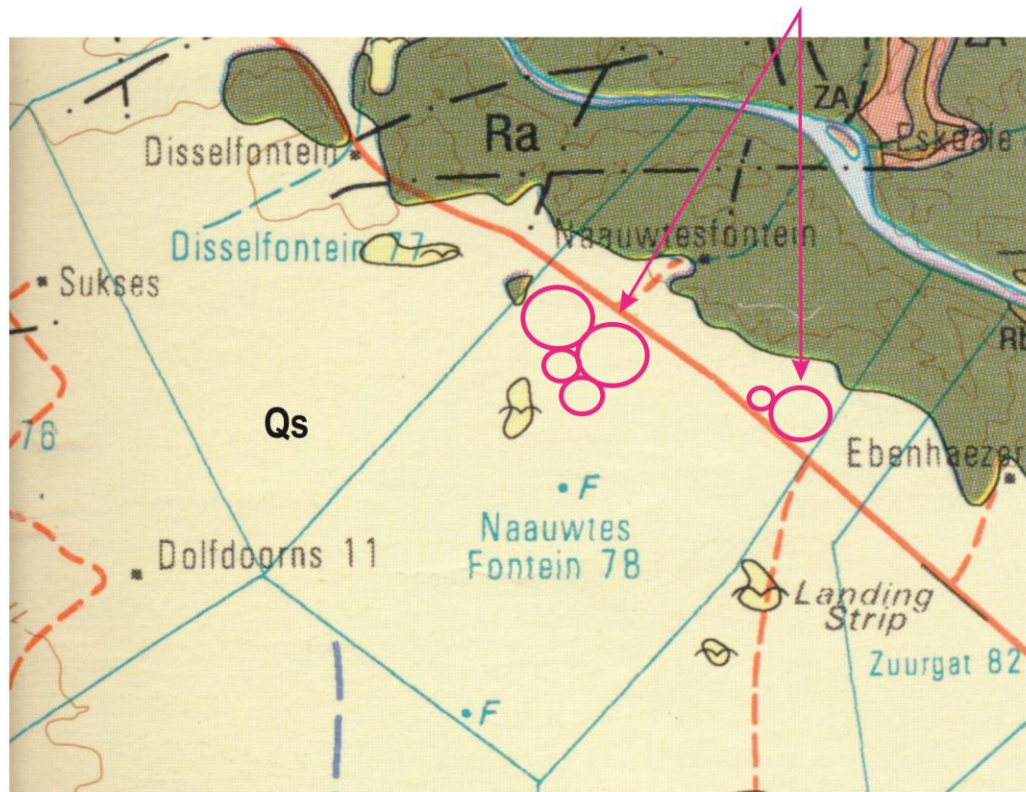


Figure 4. Portion of 1: 250 000 geological map 2922 Prieska (Council for Geoscience, Pretoria). The area around Hopetown is underlain at depth by Precambrian lavas of the Allanridge Formation (Ventersdorp Group, *Ra*) as well as Dwyka tillites (Mbizane Formation, *C-Pd*) and basal Eccla mudrocks (Whitehill Formation, *Ppw*) of the Karoo Supergroup. The basement lavas and Karoo sediments are largely overlain by Late Cenozoic (Quaternary) deposits made up of calcretes, surface limestones (*Qc*), and Kalahari Group wind-blown sand (*Qs*) in the vicinity of the study area.

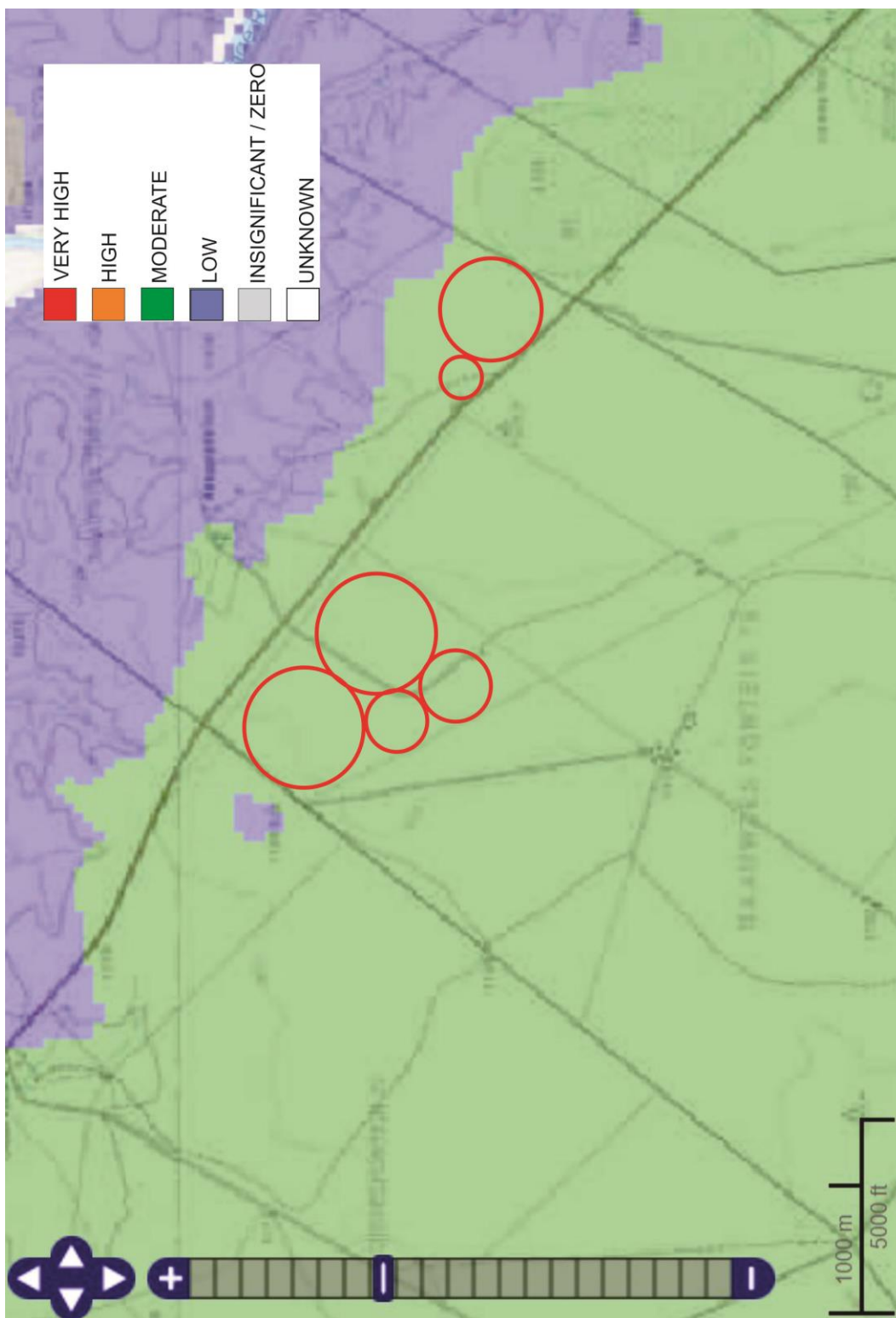


Figure 5. SAHRIS palaeosensitivity map of the study area (2021).



1. Pniel, Nooitgedacht & Powers Site - ESA, MSA and LSA
2. Canteen Koppie - ESA
3. Rooidam - ESA
4. Biesiesput - MSA
5. Driekopseiland - Glacial striations, rock engravings
6. Doornlaagte - ESA
7. Kareevloer - ESA, MSA
8. Alexandersfontein - 'palaeo-lake'
9. Liebensraum - ESA
10. Wildebeestkuil - Rock engravings
11. Witpan - Rock engravings
12. Orange River Station, Blockhouse & Concentration Camp

Figure 6. The Stone Age archaeological footprint is well-represented north of Hopetown and around Kimberley by Early and Middle Stone Age localities from lacustrine and alluvial contexts as well as rock engravings on dolerite outcrop.



Figure 7. Individual or scatters of weathered Early and Middle Stone Age artifacts, made from Ventersdorp diabase, are a common feature generally associated with Orange River terrace and associated alluvial deposits between Hopetown and Douglas.



Figure 8. Rock engravings are common in high relief rocky terrain around Hopetown. Above depictions are representations of eland (*Taurotragus oryx*) located near the Orange River about 20 km northwest of Hopetown.
Scale 1 = 10 cm.

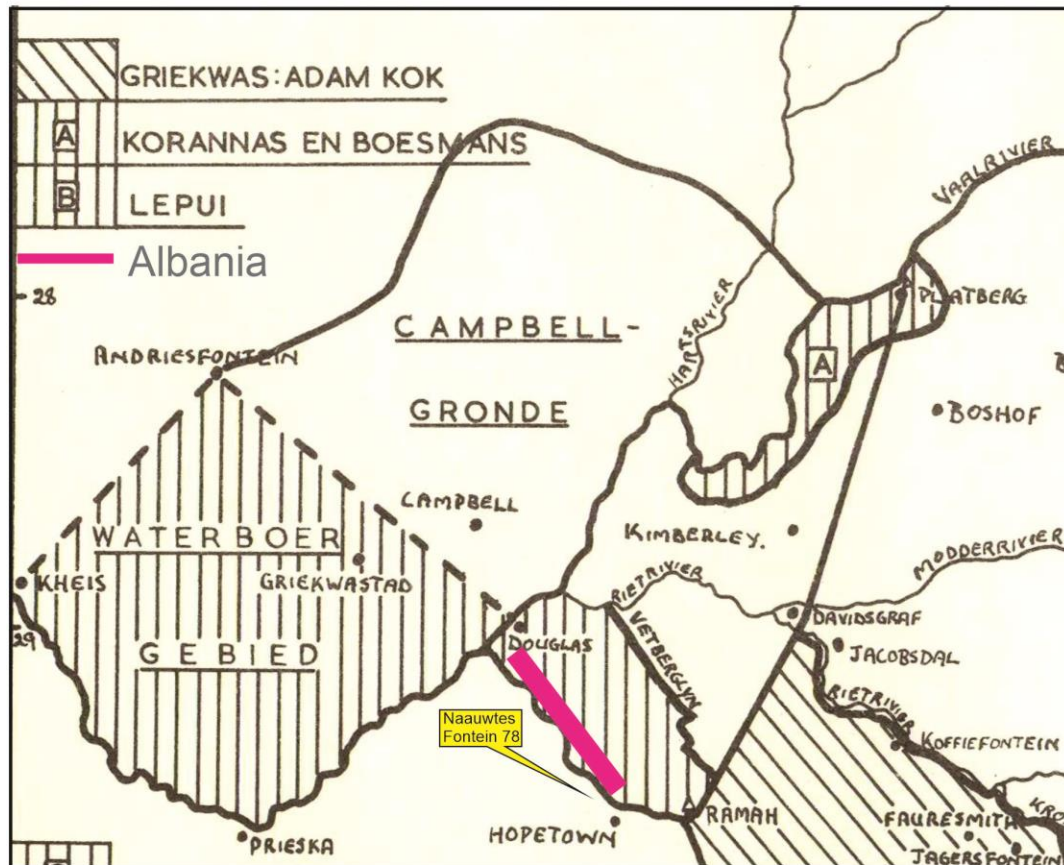
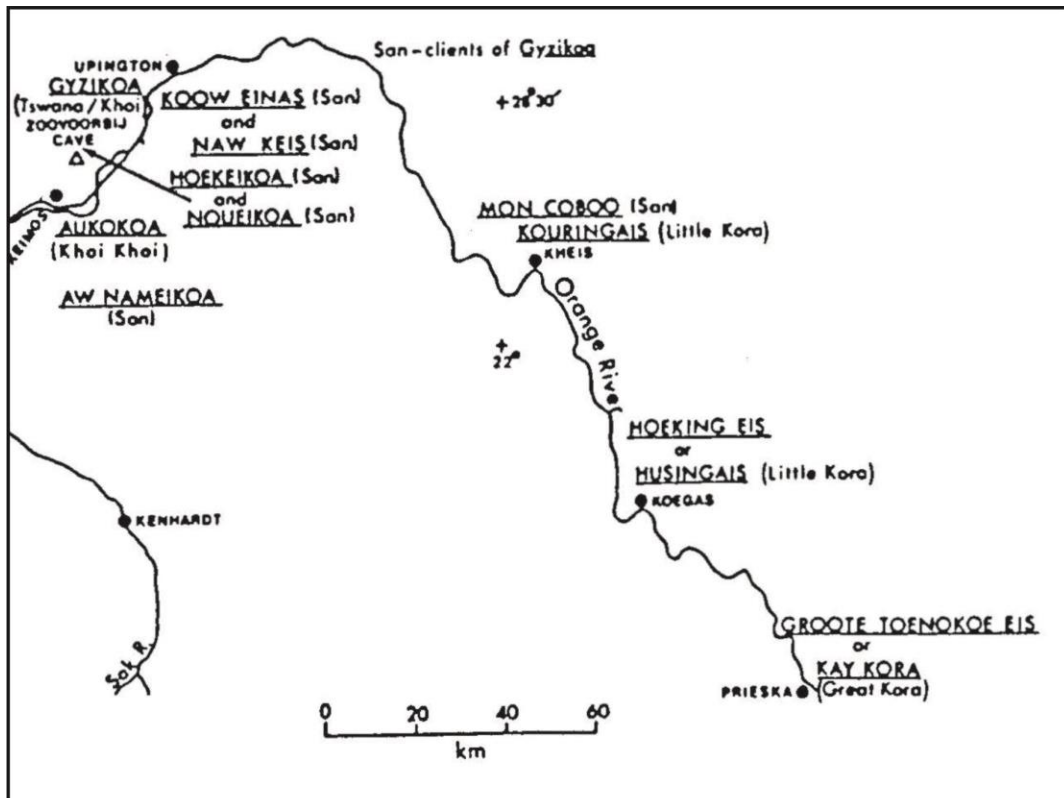


Figure 9. Historical maps based on eyewitness accounts show Bushman hunter-gatherer and Khoi herder occupation in the region prior to European settlement, e.g. Khoisan societies along the Orange River between Upinton and Prieska c. 1779 (above) while early travelers frequently encountered permanently settled Koranna, Griqua and Bushmen groups in the region c. 1850's. The historical Albania settlement of Griqualand West that lasted from 1866 until its demise in 1878 (below).



Figure 10. General view of Site A, 55 ha (North), looking west (above) and Site A, 55 ha (South) looking north (below).



Figure 11. General view of Site A, 20 ha footprint, looking northwest (above) and Site A 15 ha footprint, looking east and north (below).
Scale 1 = 10 cm.



Figure 12. General view of Site B, looking south and north (above left & right) and east (below).

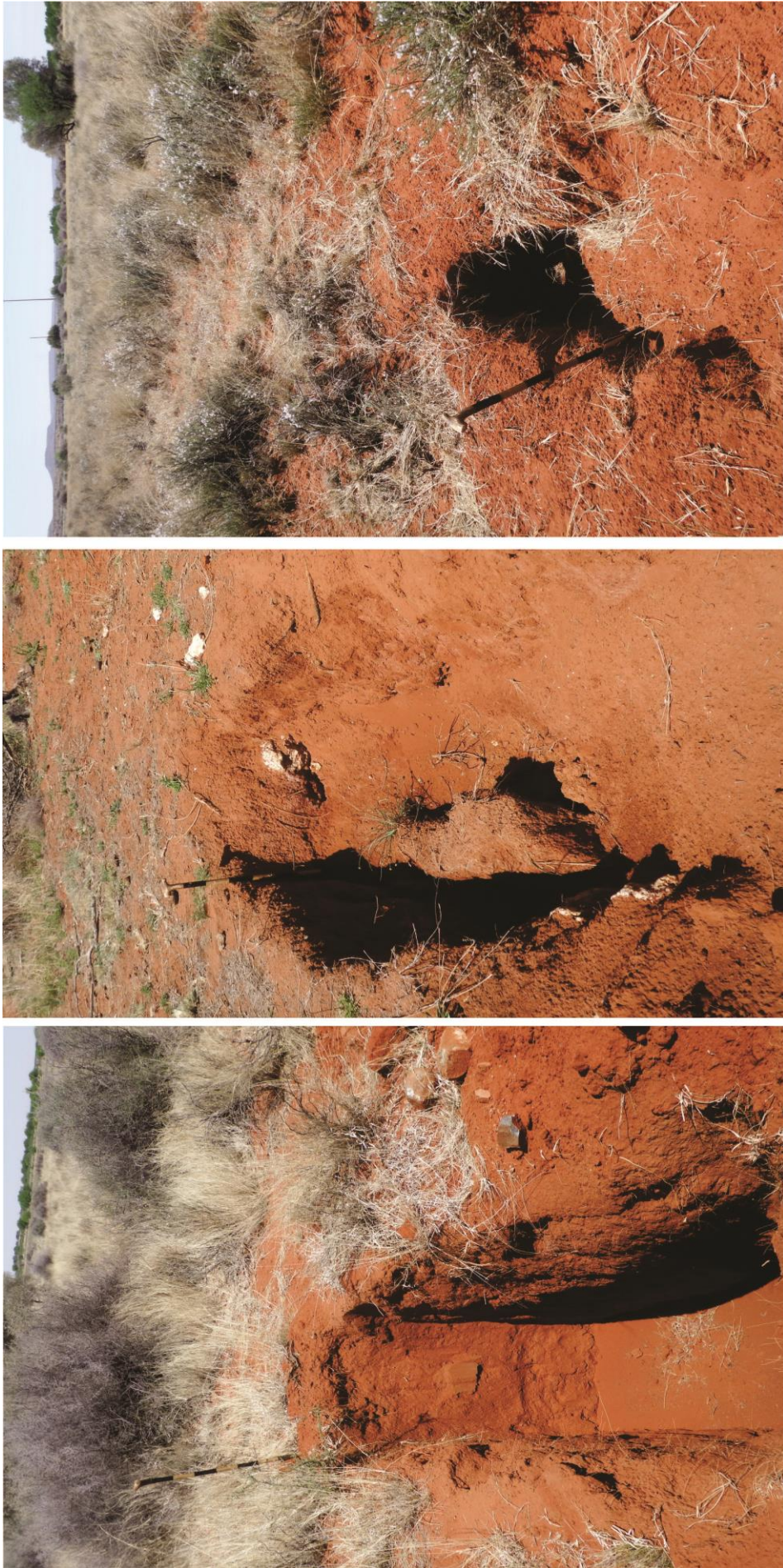


Figure 13. Sites A & B are capped by a well-developed, unconsolidated windblown sand with a thickness of > 80 cm .
Scale 1 = 10 cm.