

Phase 1 Heritage Impact Assessment of the
proposed Orange River Solar 1 SPV facility on
Portion 18 of the farm Rooisand 387 near
Groblershoop, NC Province.

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SUMMARY

A Phase 1 Heritage Impact Assessment was carried out over an approximately 50 ha area designated for development of a 50 MW solar photovoltaic facility on Portion 18 of the farm Rooisand 387 near Groblershoop in the Northern Cape Province. The study area is located about 4 km north of Groblershoop, near the N8 national road. The study area lies on undulating terrain, incised by shallow alluvial features draining into the Orange River about 1.5 km to the west. The proposed 50 MW SPV development includes two separate areas covering approximately 50 ha in total. The study area is underlain by metavolcanic-metasedimentary bedrock of the Groblershoop Formation (Brulpan Group, Namaqua–Natal Province). The Brulpan Group has an approximate age of ~ 2000 -1780 Ma and consists almost exclusively of quartz-muscovite schist and metaquartzites. Given the metavolcanic-metasedimentary nature of the strata, the Brulpan Group is not considered to be palaeontological significant. The proposed footprints are located on high relief terrain where metavolcanic-metasedimentary rocks are capped by a thin veneer of bedrock – derived, gritty to gravelly top soils on the high ground, with surface limestones and sheetwash / alluvium predominating low-lying drainage lines. Impact on potential palaeontological heritage resources within more developed superficial sediments (Kalahari Group limestones, windblown sand & alluvium) along gullies and drainage lines is considered unlikely as development will be restricted to the high ground. There is no evidence of *in situ* Stone Age archaeological material, either as capped assemblages or distributed as *intact* surface scatters on the landscape within the boundaries of the proposed development footprints. However, low density (< 1 / 100 m) isolated finds also included a unifacially prepared Early Stone Age LCT. There are no indications of rock art (engravings), stonewalled structures or historically significant buildings older than 60 years, or aboveground evidence of graves or cairns within the boundary of the proposed footprint. Given the nature of the underlying geology, potential impact on rock engraving sites within the study area is considered unlikely. The proposed development footprint and associated access road are not considered palaeontologically or archaeologically vulnerable and is assigned a site rating of Generally Protected C. The project can proceed, but it is advised that a professional archaeologist is appointed as part of the project management plan to monitor for and map potentially rare Early Stone Age LCT occurrences at the forthcoming solar panel positions during the construction phase of the development.

TABLE OF CONTENTS

Summary	2
Introduction	4
Locality data	5
Background	6
Field Assessment.....	7
Impact Statement and Recommendation	8
References	8
Tables and Figures	10
Appendix 1: Track Log.....	19

INTRODUCTION

A Phase 1 Heritage Impact Assessment was carried out over an approximately 5.5 ha area designated for development of a 50 MW solar photovoltaic facility on Portion 18 of the farm Rooisand 387 near Groblershoop in the Northern Cape Province (**Fig. 1**). The region's unique and non-renewable archaeological and palaeontological heritage sites are 'Generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. As many such heritage sites are threatened daily by development, both the environmental and heritage legislation require impact assessment reports that identify all heritage resources including archaeological and palaeontological sites in the area to be developed, and that make recommendations for protection or mitigation of the impact of the sites.

The primary legal trigger for identifying when heritage specialist involvement is required in the Environmental Impact Assessment process is the National Heritage Resources (NHR) Act (Act No 25 of 1999). The NHR Act requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, battlefields, graves, and structures over 60 years of age, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites, palaeontological sites and objects.

The Act 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 regard, categories of development listed in Section 38 (1) of the NHR Act are:

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50m in length;
- Any development or other activity which will change the character of the site;
- Exceeding 5000 m² in extent;
- Involving three or more existing erven or subdivisions thereof;
- Involving three or more subdivisions thereof which have been consolidated within the past five years;
- Costs of which will exceed a sum set in terms of regulations by the South African Heritage Resources Agency (SAHRA).
- The rezoning of a site exceeding 10 000 m².

- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

The involvement of the heritage specialist in such a process is usually necessary when a proposed development may affect a heritage resource, whether it is formally protected or unprotected, known or unknown. In many cases, the nature and degree of heritage significance is largely unknown pending further investigation (e.g. capped sites, assemblages or subsurface fossil remains). It is also possible that a site may contain heritage resources (e.g. structures older than 60 years), with little or no conservation value. In most cases it will be necessary to engage the professional opinion of a heritage specialist in determining whether or not further heritage specialist input in an EIA process is required. This may involve site-significance classification standards as prescribed by SAHRA (2005).

Methodology

The significance of the affected area was evaluated using existing field data, database information and published literature. This was followed by a field assessment (site visit) of the affected areas. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Relevant archaeological and palaeontological information, maps, Google Earth images and site records were integrated with data acquired during the on-site inspection.

Terms of reference:

- 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.

Archaeological rating of the footprints followed SAHRA-prescribed field rating categories listed in **Table 1**.

LOCALITY DATA

1 : 50 000 scale topographic maps 2821DD Groblershoop & 2822CC Boegoeberg

1 : 250 000 scale geological map 2822 Postmasburg

The study area is located about 4 km north of Groblershoop, near the N8 national road on Portion 18 of the farm Rooisand 387 (**Fig. 2**). The study area lies on undulating terrain, incised by shallow alluvial features draining into the Orange River about 1.5

km to the west (**Fig. 3**). The proposed 50 MW SPV development includes two separate areas covering approximately 50 ha in total.

General site coordinates of the proposed development footprint (see **Fig. 2**):

- A) 28°51'14.26"S 21°59'51.56"E
- B) 28°51'23.16"S 22° 0'10.06"E
- C) 28°51'33.53"S 22° 0'8.90"E
- D) 28°51'42.67"S 22° 0'8.97"E
- E) 28°51'46.80"S 21°59'44.21"E
- F) 28°51'42.12"S 21°59'43.11"E
- G) 28°51'33.88"S 21°59'38.28"E

BACKGROUND

Palaeontology

Potential palaeontological occurrences: Late Neogene vertebrate fossils associated with intact river terrace gravels and surface limestones; Quaternary vertebrate fossils associated with Pleistocene alluvial deposits

According to the 1:250 000 geological map 2822 Postmasburg, the study area is underlain by metavolcanic-metasedimentary bedrock of the Groblershoop Formation (Brulpan Group, Namaqua–Natal Province, **Fig. 4**). The Brulpan Group has an approximate age of ~ 2000 -1780 Ma and consists almost exclusively of quartz-muscovite schist and metaquartzites (Cornell et al. 2006). Given the metavolcanic-metasedimentary nature of the strata, the Brulpan Group is not considered to be palaeontological significant (**Fig. 5**).

Archaeology

Potential archaeological occurrences: Intact Stone Age open sites; burial cairns, unmarked graves, kraals & historical stone – built structures

The Middle Orange River and Bushmanland regions have been populated more or less continuously during prehistoric times (Beaumont *et al.* 1995). According to Beaumont (1986) archaeological visibility in the region was high during the Last Glacial Maximum, a viewpoint that is in contrast to that indicated for southern Africa as a whole (Deacon and Thackeray 1984). Early Stone Age artefacts have been recorded *in situ* at Kalkgaten on the farm Ratel Draai, while Middle Stone Age and Later Stone Age sequences have been recorded from a number of cave sites on the farms Zoovoorbij, Droëgrond and Waterval in the Upington district (Beaumont et al. 1995) (**Fig. 6A**). Archaeological and historical evidence also show that the region was extensively occupied by Khoi herders and San hunter-gatherers during the last 2000 years (Smith

1995) (**Fig. 6B**). The principal Khoikhoi inhabitants of the Middle Orange River were the Einiqua who belonged to the same language group as the Namaqua and Korana, namely the Orange River Khoikhoi (Penn 2005). The Einiqua occupied the area around and east of the Augrabies Falls while the Korana occupied the Middle-Upper Orange River further to the east. A large number of burial cairns were excavated near the Orange River in the Kakamas area and appear to be related to Korana herders (Morris 1995).

The characteristics of the terrain and underlying geology suggest that impact on potential rock art localities is highly unlikely.

The Groblershoop area was also previously occupied by Tswana-speaking (Tlhaping and Tlharo) communities who settled in the Langeberg region to the northeast throughout the late 18th century. The Tlhaping and Tlharo branches, who entered the northern Cape from the north at the beginning of the 17th century, reached as far south as Majeng (Langeberg), Tsantsabane (Postmasburg) and Tlhake le Tlou (Danielskuil) by the beginning of the 18th century (Snyman 1986). A large Tlhaping settlement was established at Nokaneng, about 85 km northeast of Groblershoop, while the Tlharo largely occupied the Langeberg region between Ditlou (Olifantshoek) and Dibeng (Deben) (Maingard 1933). After clashes with the Koranna, who moved into the area after 1770, the Tlhaping and Tlharo temporarily abandoned Nokanna and the Langeberg at around 1790 to settle around Dithakong (Kuruman) only to return again to the Langeberg at the beginning of the 19th century (Humphreys 1976). With the annexation of the region south of the Molopo and north of Griqualand West by the British in 1885, the area became known as British Bechuanaland. Several reservations were established but following a revolt in 1895 known as the Langeberg Rebellion, the reservations were confiscated by the British colonial government, divided up into farms and offered to white settlers (Snyman 1986).

FIELD ASSESSMENT

The proposed footprints are located on high relief terrain where metavolcanic-metasedimentary rocks are capped by a thin veneer of bedrock – derived, gritty to gravelly top soils on the high ground, with surface limestones and sheetwash / alluvium predominating low-lying drainage lines (**Fig. 7**). There is no evidence of *in situ* Stone Age archaeological material, either as capped assemblages or distributed as *intact* surface scatters on the landscape within the boundaries of the proposed development footprints. However, low density (< 1 / 100 m) isolated finds also included a unifacially prepared Early Stone Age LCT (**Fig 1**). There are no indications of rock art (engravings), stonewalled structures or historically significant buildings older than 60 years, or aboveground evidence of graves or cairns within the boundary of the proposed footprint.

IMPACT STATEMENT AND RECOMMENDATION

The proposed development footprint is underlain by palaeontologically insignificant metamorphic rocks. Impact on potential palaeontological heritage resources within more developed superficial sediments (Kalahari Group limestones, windblown sand & alluvium) along gullies and drainage lines is considered unlikely as development will be restricted to the high ground. The field assessment provided no aboveground evidence of prehistoric structures, buildings older than 60 years, or material of cultural significance or *in situ* archaeological sites within the study area. Given the nature of the underlying geology, potential impact on rock engraving sites within the study area is considered unlikely. The proposed development footprint and associated access road are not considered palaeontologically or archaeologically vulnerable and is assigned a site rating of Generally Protected C (**Table 1**). The project can proceed but it is advised that a professional archaeologist is appointed as part of the project management plan to monitor for and map potentially rare Early Stone Age LCT occurrences at the forthcoming solar panel positions during the construction phase of the development.

REFERENCES

- Beaumont P.B. 1986. Where did all the young men go during 0-18 Stage 2? *Palaeoecology of Africa and the surrounding islands* 17: 79 – 88.
- Beaumont, P.B., Smith, A.B. & Vogel, J.C. 1995. Before the Einiqua: the archaeology of the frontier zone. In: Smith, A.B. (ed.) Einiqualand: studies of the Orange River frontier. pp. 236-264. Cape Town: University of Cape Town Press.
- Cornell, D.H., et al., 2006. The Namaqua-Natal Province. . In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 325-379.
- Deacon, H.J. and Thackeray, J.F 1984. *Late Quaternary environmental changes and implications from the archaeological record in southern Africa*. In: J.C. Vogel (ed). Late Cainozoic Palaeoclimates of the Southern Hemisphere Balkema, Rotterdam. pp. 375 – 390.
- Maingard, L.F. 1933. The Brikwa and the ethnic origins of the BaTlaping. *South African Journal of Science* 30, 597 – 602.
- Morris, A.G. 1995. The Einiqua: an analysis of the Kakemas skeletons. In: In: Smith, A.B. (ed.) Einiqualand: studies of the Orange River frontier. pp. 110 - 164. Cape Town: University of Cape Town Press.
- Penn, N. 2005. The Forgotten Frontier: Colonist and Khoisan on the Cape's Northern Frontier in the 18th Century. Ohio University Press.

SAHRA, 2005. Minimum Standards for the Archaeological and the Palaeontological Components of Impact Assessment Reports.

Smith, A. 1995. Archaeological observations along the Orange River and its hinterland
In: Smith, A.B. (ed.) Einiqualand: studies of the Orange River frontier. pp. 265 - 300.
Cape Town: University of Cape Town Press.

Snyman, P.H.R. 1986. Die Langeberg – rebellie en die totstandkoming van
Olifantshoek. *Contree* 20: 16 – 26.

DECLARATION OF INDEPENDENCE

Paleo Field Services act as an independent specialist consultant and do not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. Paleo Field Services has no interest in secondary or downstream developments as a result of the authorization of this project.

TABLES AND 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

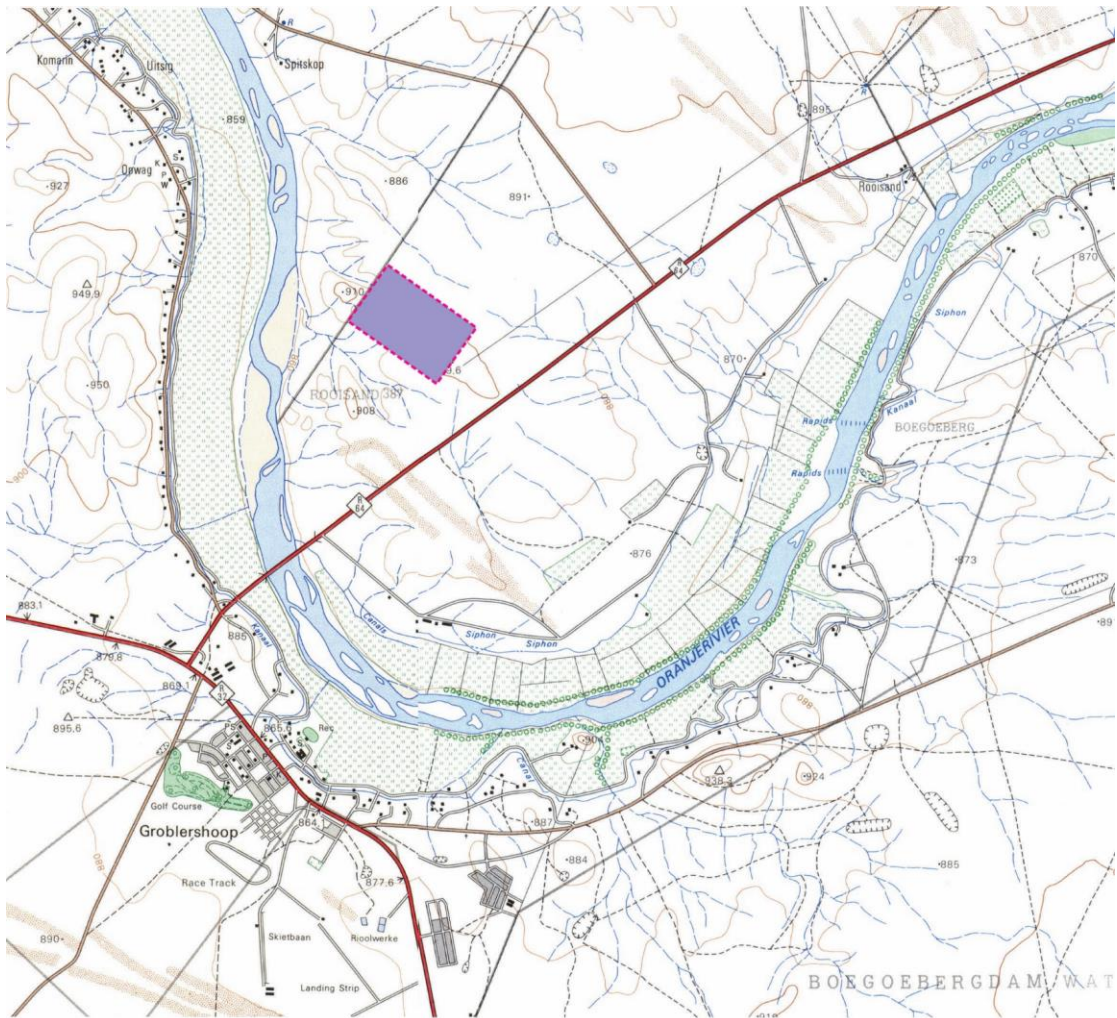


Figure 1. Map of the study area marked on portions of 1:50 000 scale topographical maps 2821DD Groblershoop & 2822CC Boegoeberg).

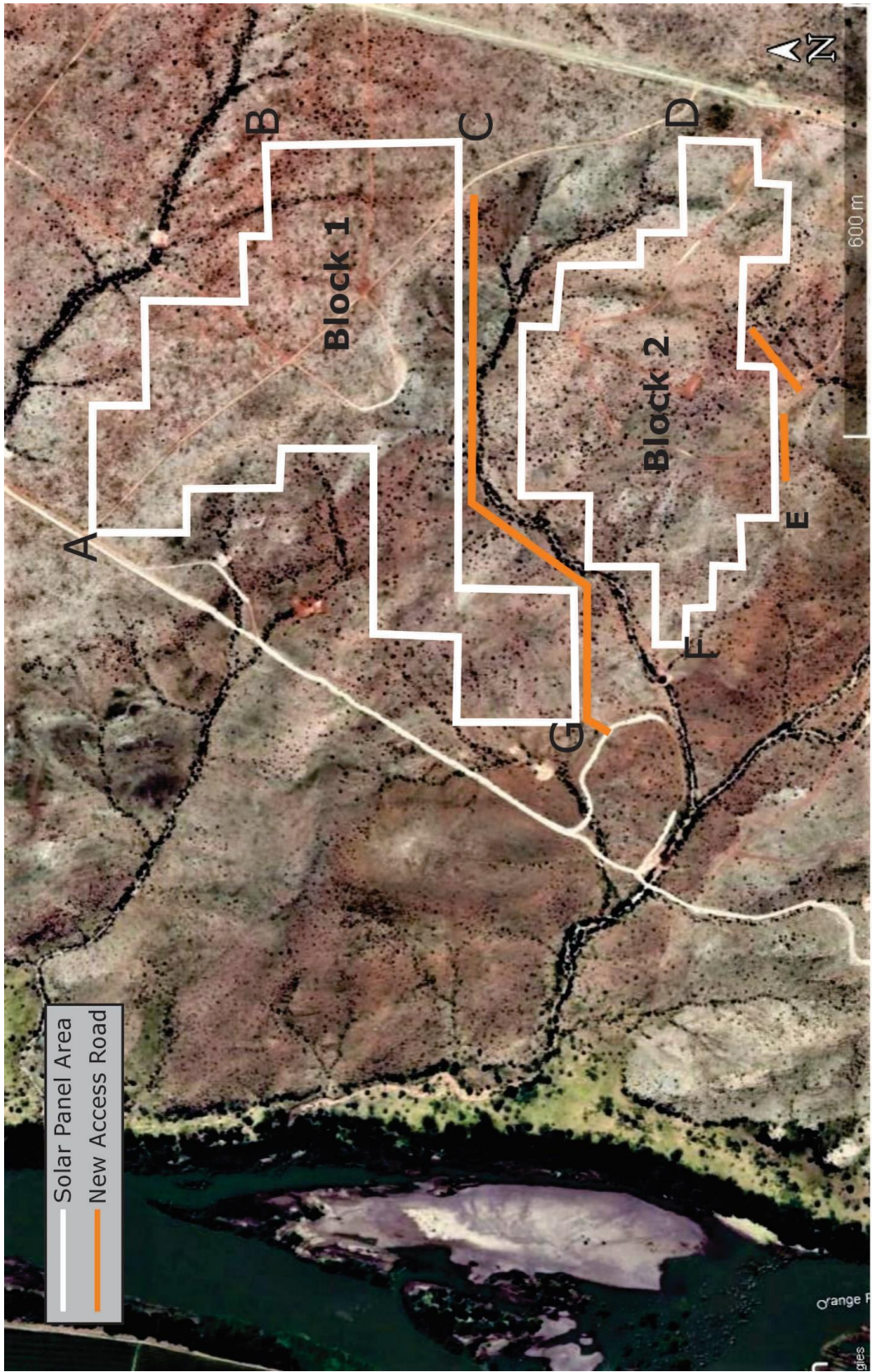


Figure 2. Aerial view and layout of the proposed development.



Figure 3. General view of sites Block 1 & 2, looking north (above) and south (below).

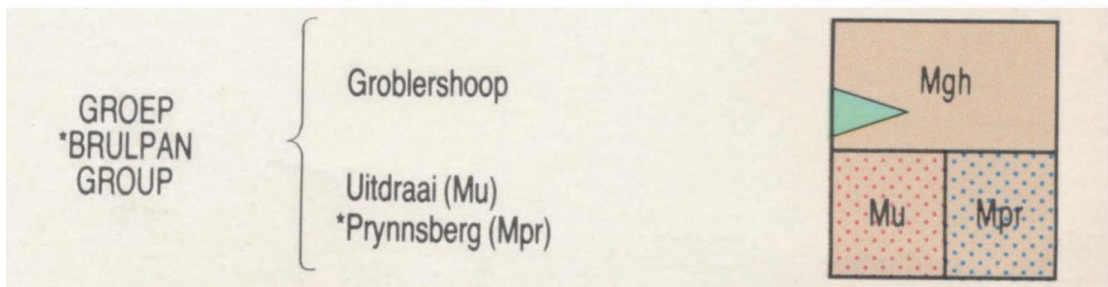


Figure 4. Portion of 1:250 000 scale geological map 2822 Postmasburg. The study area (star) is underlain by underlain by metavolcanic-metasedimentary bedrock of the Groblershoop Formation (*Mg*, Brulpan Group, Namaqua–Natal Province).

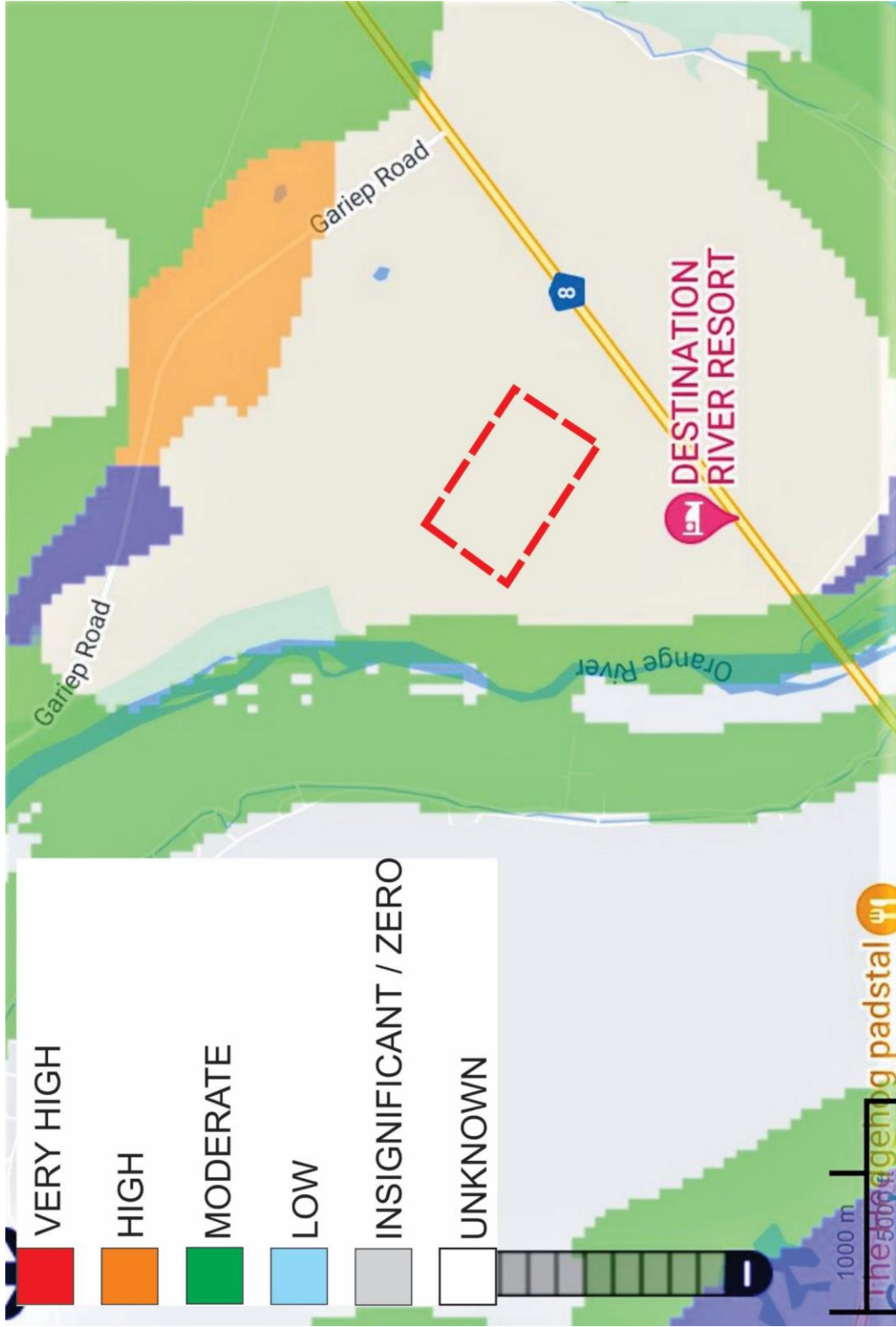


Figure 5. Study area marked on SAHRIS palaeosensitivity map (Sahris 2022)

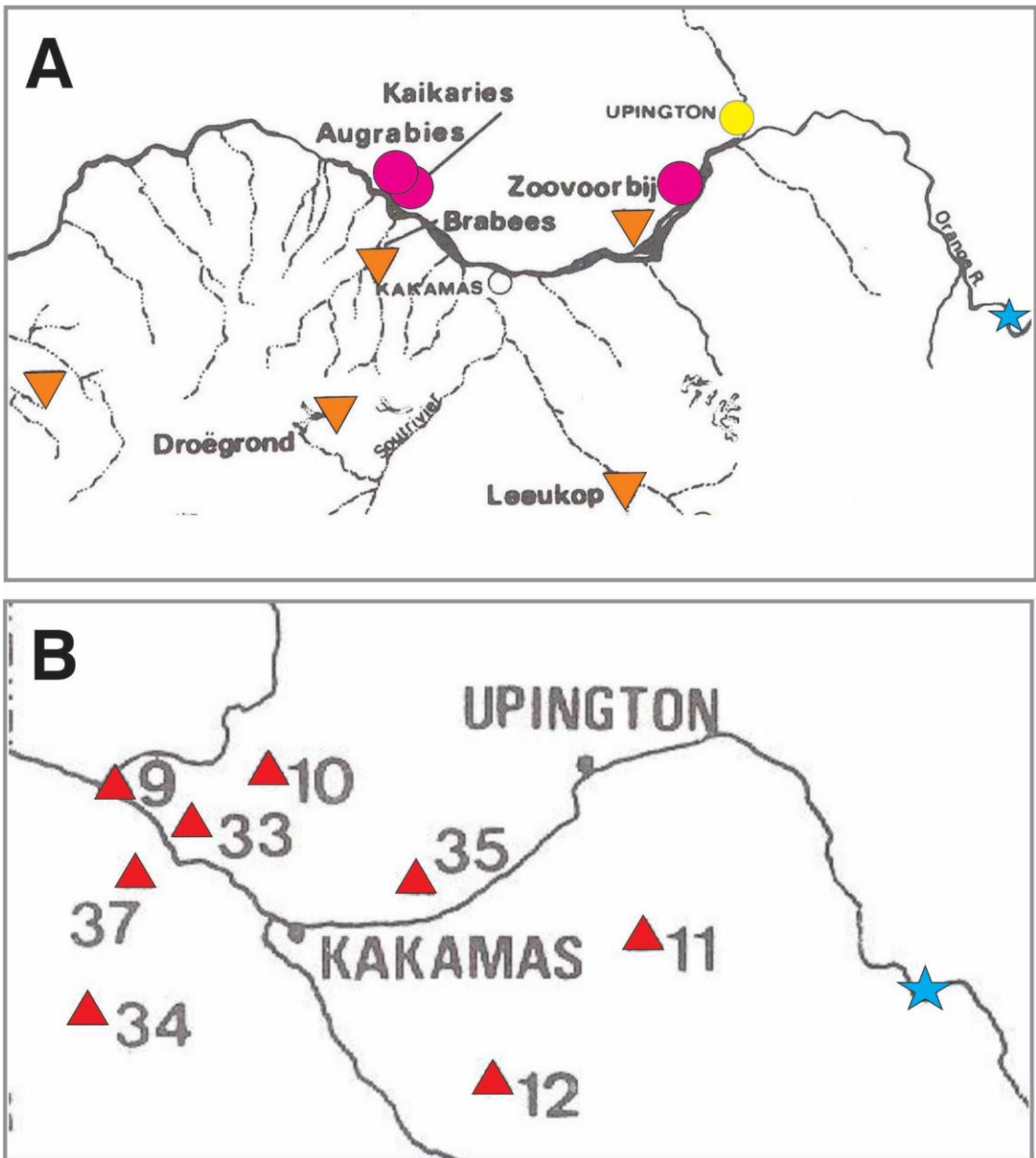


Figure 6. Location of known of Stone Age, pastoralist and burial sites in the region in relation to position of study area (blue star). Maps after Beaumont et al. 1995 and Smith 1995.



Figure 7. Schists exhibiting foliation with partings along well-defined planes (above), quartz veins outcropping on the high ground (below left) and bedrock – derived, gritty to gravelly top soils (below right).



Figure 9. A unifacially prepared quartzite LCT (left), small quartzite core (top right), weathered flake blade and scraper on banded ironstone (center & bottom right).

APPENDIX 1: TRACK LOG

Index	Coordinates
1	S28 51.853 E22 00.174
2	S28 51.766 E22 00.163
3	S28 51.712 E22 00.048
4	S28 51.654 E21 59.937
5	S28 51.644 E21 59.769
6	S28 51.741 E21 59.621
7	S28 51.750 E21 59.704
8	S28 51.793 E21 59.805
9	S28 51.727 E21 59.873
10	S28 51.817 E21 59.946
11	S28 51.861 E22 00.106
12	S28 51.716 E21 59.962
13	S28 51.885 E22 00.174
14	S28 51.607 E22 00.234
15	S28 51.560 E22 00.149
16	S28 51.408 E21 59.986
17	S28 51.408 E21 59.984
18	S28 51.488 E21 59.923
19	S28 51.578 E22 00.078
20	S28 51.523 E21 59.817
21	S28 51.628 E21 59.687
22	S28 51.602 E21 59.668
23	S28 51.478 E21 59.824
24	S28 51.433 E21 59.875
25	S28 51.324 E21 59.929
26	S28 51.272 E21 59.847
27	S28 51.319 E22 00.002
28	S28 51.370 E21 59.972
29	S28 51.394 E22 00.083
30	S28 51.510 E22 00.198

