Phase 1 Heritage Impact Assessment of an existing Borrow Pit site near Thaba Phatswa, FS Province.

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Summary

A Phase 1 Heritage Impact Assessment was carried out over a 5 ha - area designated for the extension of an existing borrow pit near Thaba Phatswa in the Free State Province. The footprint is primarily located on a weather-resistant dolerite intrusion with partially incorporated Molteno Formation metasediments , considered to be of low palaeontological significance. The proposed footprint will primarily impact paleontologically insignificant dolerite and associated metasediments. However, adjacent Molteno Formation outcrop is considered to be of potentially high palaeontological significance if exposed. As for potential palaeontological impact, the development may proceed, provided that future borrow pit excavations avoid sedimentary (sandstone) outcrop as far as possible, since fossil exposures may be encountered within intact Molteno Formation sediments that will require constant monitoring by a professional palaeontologist. There is no aboveground evidence of historically significant building structures older than 60 years (structures/features related to the history of the Thaba Phatswa Settlement during 19th and early 20th centuries in particular), Stone Age archaeological remains, Iron Age structures or material of cultural significance within the confines of the development footprint. As for potential archaeological impact, the archaeological and cultural component of the proposed project footprint is assigned a site rating of General Protection C (GP.C). The development may proceed, provided that all excavation activities are restricted to within the boundaries of the footprint. Chance Find Protocols for Palaeontology included.

Introduction

A Phase 1 Heritage Impact Assessment was carried out over a 5 ha - area designated for the extension of an existing borrow pit near Thaba Phatswa in the Free State Province (**Fig. 1 & 2**). The extent of the affected areas (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 during May 2016. The task involved identification of possible archaeological sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

Terms of Reference

- Identify and map possible heritage sites and occurrences using published and database 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.

Approach and Methodology

The heritage significance of the affected area was based on existing field data, database information and published literature. A field assessment, using a Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera for recording purposes followed this. Geological maps, aerial photographs and site records were integrated with data acquired during the on-site inspection. The study area is rated according to field rating categories as prescribed by SAHRA (**Table 1**).

Locality data

Maps: 1:50 000 scale topographical map 2927AC Thaba Phatswha

1:250 scale geological map 2926 Bloemfontein

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

A) 29°22'8.19"S 27° 6'12.55"E

B) 29°22'9.80"S 27° 6'23.85"E

C) 29°22'15.10"S 27° 6'23.00"E

D) 29°22'13.28"S 27° 6'12.04"E

The study area lies about 6 km south of the Thaba Phatshwa settlement on the farm Mammas Hoek 802 and about 3 km due east of the R709 provincial road bwtween Tweespruit and Hobhouse (**Fig. 3**).

Background

The study area is located within the outcrop area of the late Permian Tarkastad Subgroup (*K3u*) and overlying Triassic Molteno Formation (*K4m*) sedimentary strata of the Karoo Supergroup (Theron 1963; Johnson *et al.* 2006) (**Fig. 4**). Intrusive dykes and sills of resistant Jurassic dolerites (*Jd***)** are common in the region, but are not fossiliferous.

The Triassic Molteno Formation consists of large-scale fining-upward sequences, comprising conglomerate, sandstone, shale, and rare coal (Caincross *et al*. 1995) (**Fig. 4**). The Molteno Formation is known for its extremely rich fossil flora, silicified woods and palynormorphs (Anderson and Anderson 1984, 1985). Apart from important insect fauna, animal fossils are very sparse, including rare fish, conchostracans, bivalves as well as invertebrate trace fossils and dinosaur tracks. (MacRae, 1999; McCarthy and Rubidge, 2005; Groenewald and Groenewald 2013).

Tarkastad Subgroup sedimentary strata in the region are assigned to the *Lystrosaurus* Assemblage Zone (AZ) (Groenewald 1991, Groenewald & Kitching 1995) (**Fig. 5**). This biozone is characterized by the abundant genus *Lystrosaurus,* which represents up to 95% of the vertebrate fossils. Other common genera include *Procolophon, Moschorhinus, Proterosuchus, Lydekkerina,* and *Thrinaxodon*. Given the position of the borrow pit, the likelihood of impact on potential Quaternary fossil exposures is considered very minor.

The Thaba Phatswa settlement takes its name from the mountain Thaba Phatswa, which is of Setswana or Sesotho origin and means ‘long black mountain’ (Ellenberger 1992). In 1940, ten Afrikaans ‘coloured’ families had been relocated to the Thaba Phatswa settlement from a nearby farm (Brakfontein no. 140) and from the Transkei (Murray 1992). The greater majority of these so-called coloureds are descendants of Carolus Baatje’s followers, the so-called Newlanders who have lived in the Caledon River valley since the 1830’s (Erasmus 2019). The settlement was developed in 1940 on the farms Thaba Patchoa, Thaba Potchoaberg, Mammashoek, and Dassiehoek. The original owner of Thaba Phatswa was Mr Stephanus Koko, a son from the Barolong chief Moroka’s fourth house (Murray 1992). These farms initially stayed in the possession of the Barolong as South African Native Trust (SANT) land, whereafter it was purchased by the former Department of Land Affairs and transferred it to the Department of Coloured Affairs (Murray 1992). A successful land claim has seen the transfer of these three farms in 2004 to the Boitumelo Communal Property Association, an association consisting of 44 families who have lived on and exploited the land as tenants.

The archaeological footprint in the area are primarily represented by Stone Age archaeological localities, rock art sites and an extensive footprint related to the distribution of Iron Age settlements and early history of Sotho-speaking communities along the Caledon River Valley. Previously recorded Stone

Age sites in the region are found at Bokpoort, Orange Springs Fort Savange, Leliehoek and Rose Cottage Cave. In addition to Later Stone Age levels with European and Iron Age artifacts, Rose Cottage Cave also has a long cultural sequence incorporating several MSA and LSA industries ranging from ca. 70 ka to around 10 ka ago. Rock shelters associated with more recent hunter – gatherer activities are found at Rooikrans, Mauermanshoek, Westbury and Tienfontein. Historical accounts of the middle Caledon Valley indicate that hunter-gatherers survived as communities until the end of the Basuto Wars and the establishment of European farms in 1869. Stow (1905) records traditions about the last "Bushmen" inhabitants of the Korannaberg/Viervoetberg (Mequatling) situated between Excelsior and Labybrand, and the Platberg situated about 4 km south of Ladybrand.

Numerous rock art sites have been recorded in the region with over 30 farms, listed in the Ladybrand district (Van Riet Low 1941).

A number of Iron Age settlements, which resemble Maggs's Type V settlement pattern in many aspects of their material culture, are found in the Caledon Valley and surrounds, including those at Mequatling and Tihela. According to historical accounts, the southward migration of early Sotho- speaking communities led to at least one group reaching the Caledon Valley about the mid- seventeenth century and occupying most of the upper and middle parts of the valley by 1800 AD. A major event to take place among the indigenous tribes of the interior highveld of South Africa before the coming of European settlers was the Difaqane raids and wars. Precipitated by the rise of Shaka's Zulu empire among the coastal Nguni-speaking peoples, it resulted in the creation of large-scale refugee communities that were continued and extended over the whole interior by resident Southern Sotho-speaking peoples who could not resist the advanced military and political system of the Nguni invaders, but rather led to the segmentation of the Southern Sotho into numerous antagonistic communities scattered along the Caledon River Valley. One group was the Leghoya who in 1810 or 1812, were finally conquered and completely absorbed by the Taung under their chief, Moletsane, with whom they settled at Mequatling, to the west of Ladybrand, in 1837. Although the Leghoya were subjects of Moletsane they lived as separate pockets among the Taung and actually retained their own chief. In 1869, by the Treaty of Aliwal North, Moletsane's territory, which had previously been part of Basutoland, was ceded to the Orange Free State, and Moletsane with his Taung and Leghoya followers moved into south Basutoland, between Mafeteng and Mohale's Hoek, where he was granted land by Moshesh.

Field Assessment and Recommendations

The footprint is primarily located on a weather-resistant dolerite intrusion with partially incorporated Molteno Formation metasediments , considered to be of low palaeontological significance (**Fig. 6 & 7**). There is no above-ground evidence of historically significant building structures older than 60 years,

Stone Age archaeological remains, Iron Age structures or material of cultural significance within the confines of the development footprint.

The proposed footprint will primarily impact paleontologically insignificant dolerite and associated metasediments. However, adjacent Molteno Formation outcrop is considered to be of potentially high palaeontological significance if exposed (**Fig. 8 & 9).**

As for potential archaeological impact, the archaeological and cultural component of the proposed project footprint is assigned a site rating of General Protection C (GP.C). The development may proceed, provided that all excavation activities are restricted to within the boundaries of the footprint.

As for potential palaeontological impact, the development may proceed, provided that borrow pit excavations avoid sedimentary (sandstone) outcrop as far as possible, since fossil exposures may be encountered within intact Molteno Formation sediments that will require constant monitoring by a professional palaeontologist.

Chance Find Protocols for Palaeontology

1. If, in the event that fossil material is discovered within or found eroding out of intact sedimentary rocks during the operational phase, it will in all probability resemble impressions of plants fish or sauropod trackways on flat-surfaced rocks, rocks that resemble tree stumps, or objects with smooth rounded projections like molluscs that have been laterally compressed.
2. If any newly discovered palaeontological resources prove to be significant, a Phase 2 rescue operation may be required subject to permits issued by South African Heritage Resources Agency (SAHRA).
3. The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application.
4. In the meantime, *ex situ* remains (fossils that were exposed and removed during the operational phase) must be wrapped in paper towels or heavy duty tin foil and stored in a safe place until the palaeontologist can inspect it. The material should not be washed or cleaned in any way.
5. In situ material remains (fossils that were identified or exposed, but not removed during the operational phase) 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.

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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 and have no interest in secondary or downstream developments resulting from 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

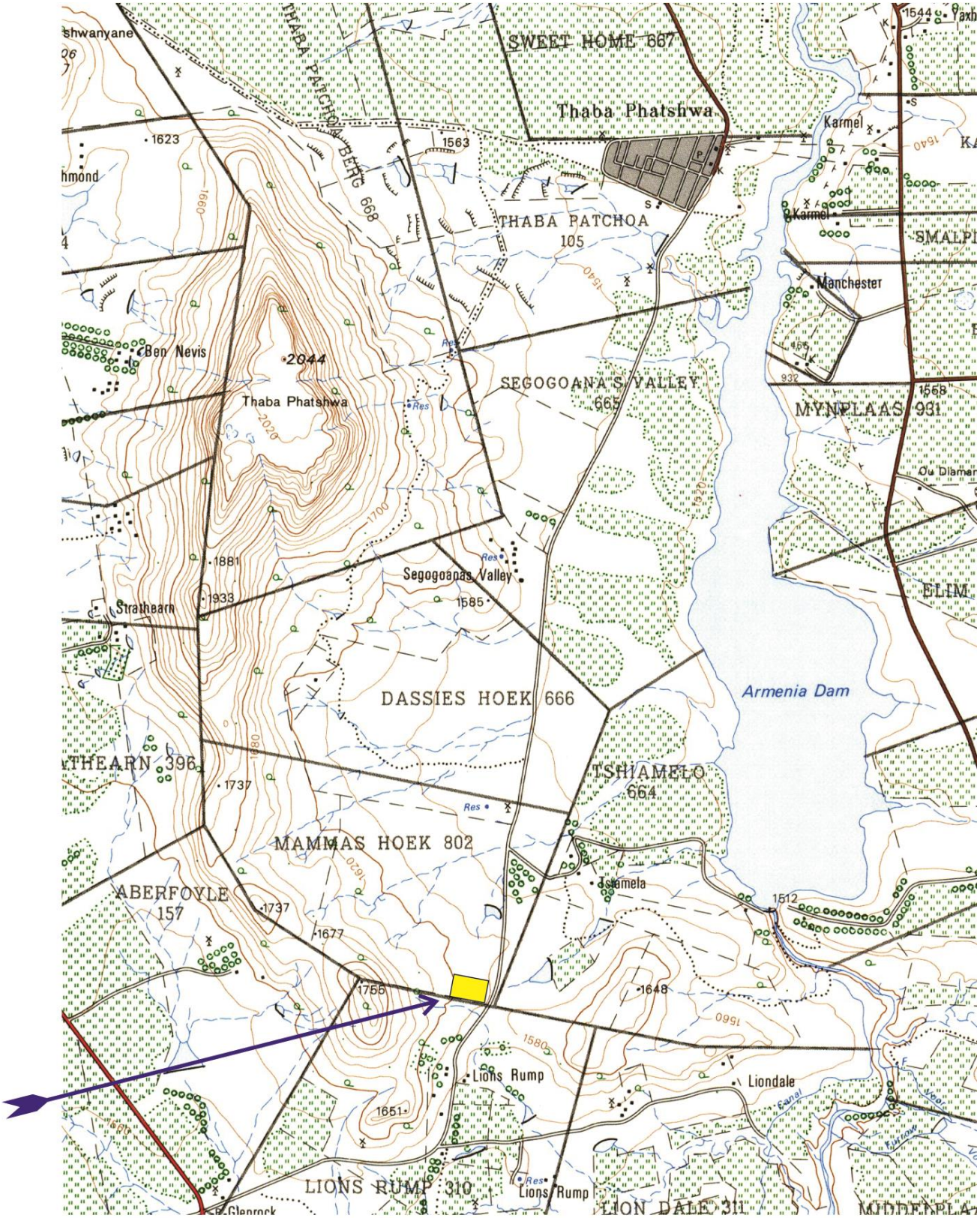


Figure 1. Map of the study area marked on portion of 1:50 000 scale topographic map 2927AC Thaba Phatswa.

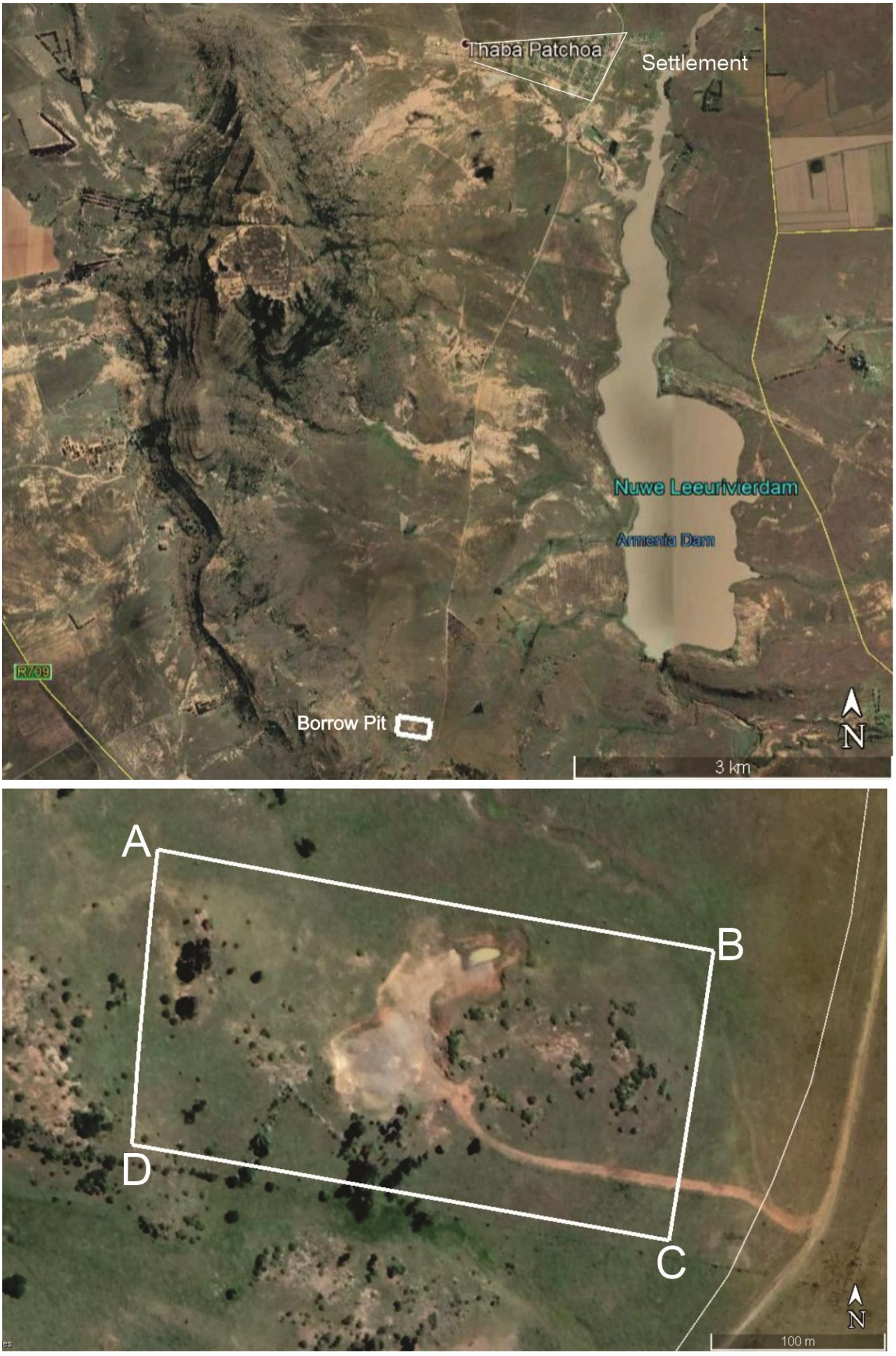
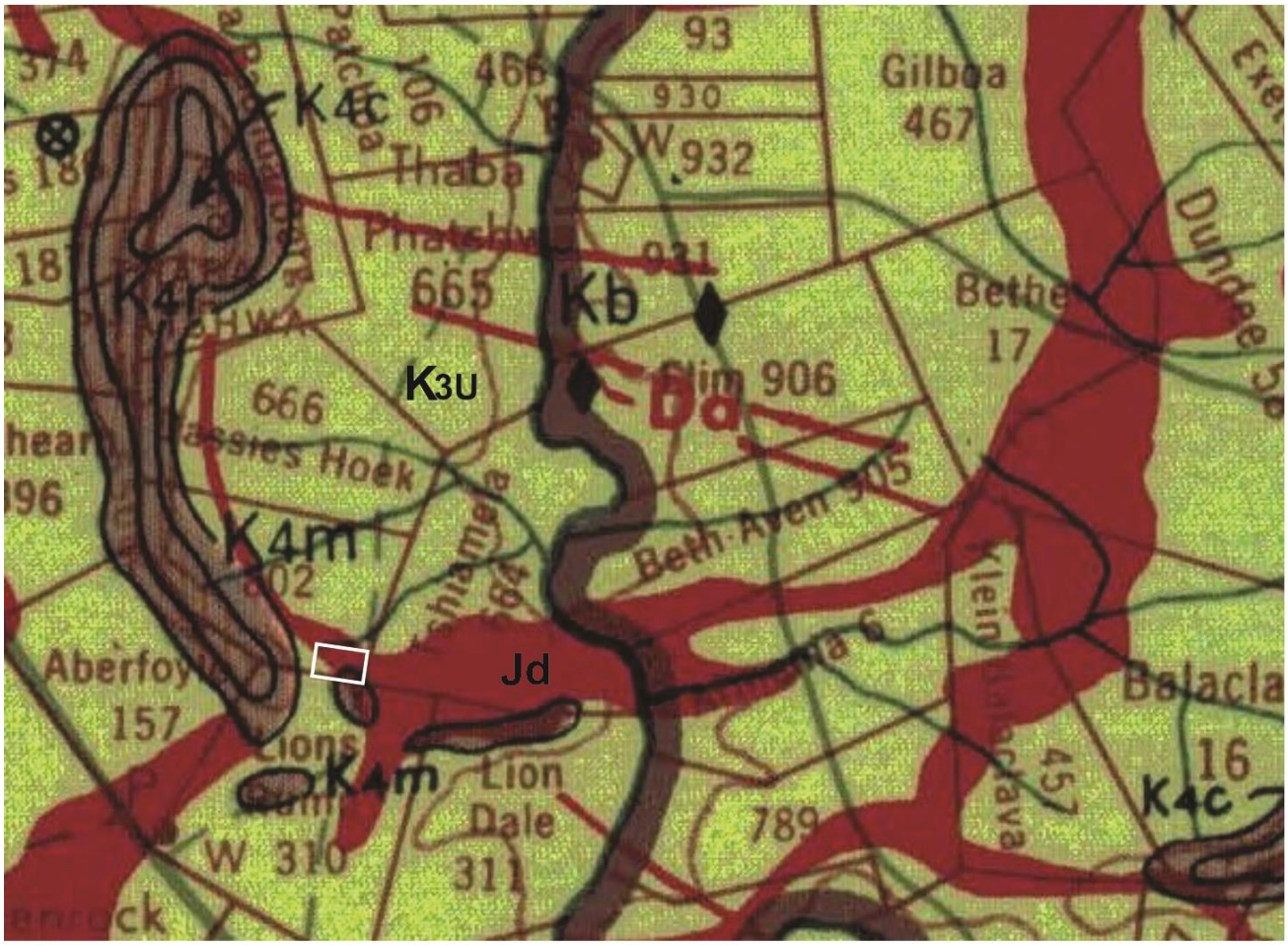


Figure 2. Aerial view and layout of the site.

Figure 3 General view of the site, looking northeast (above) and southeast (below).



	Dolerite, overprinted on geological formations Doleriet, oorgedruk op geologiese formasies	Jd		
K4d	Basaltic lava Basaltiese lawa	Drakensberg Stage Etage Drakensberg	Stormberg Series Serie Stormberg	KARROO SYSTEM SISTEEM KAROO
K4c	Massive sandstone, thin shale Massiewe sandsteen, dun skalie	Cave Sandstone Stage Etage Holkranssandsteen		
K4r	Purple shale and mudstone; thin sandstone Pers skalie en moddersteen; dun sandsteen	Red Beds Stage Etage Rooilae		
K4m	Feldspathic sandstone and grit, green shale Veldspatiese sand- en grintsteen, groen skalie	Molteno Stage Etage Molteno (Molteno Frm)		
K3u	Purple and green shale, thick sandstone beds Pers en groen skalie, dik sandsteenlae	Upper Stage Boonste Etage (Tarkastad Subgroup)	Beaufort Series Serie Beaufort	
K3m	Sandstone, shale and mudstone Sandsteen, skalie en moddersteen	Middle Stage Middelste Etage (Tarkastad Subgroup)		
K3l	Sandstone, shale and mudstone Sandsteen, skalie en moddersteen	Lower Stage Onderste Etage (Adelaide Subgroup)		
K2u	Mudstone, shale Moddersteen, skalie	Upper Stage Boonste Etage	Ecca Series Serie Ecca	

Figure 4. The study area is located within the outcrop area of the late Permian Tarkastad Subgroup (*K3u*) and overlying Triassic Molteno Formation (*K4m*) sedimentary strata of the Karoo Supergroup (portion of 1:250 scale geological map 2926 Bloemfontein).

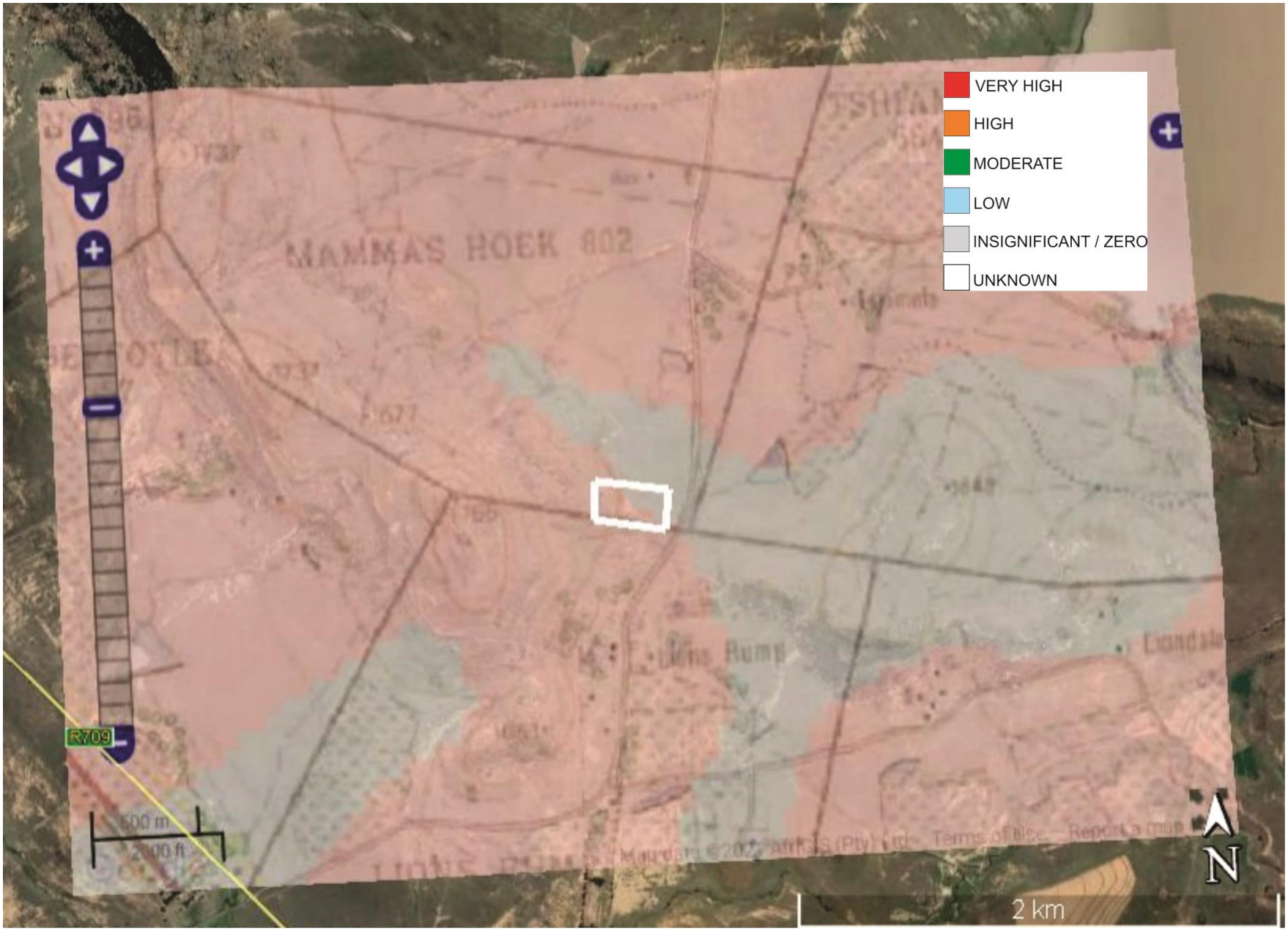


Figure 5. SAHRIS palaeosensitivity map overlay.

Figure 6. Dolerite exposures within existing borrow pit area, looking west (above) and north (below).

Figure 7. Partially incorporated Molteno Formation metasediments.
Scale 1 = 10 cm.

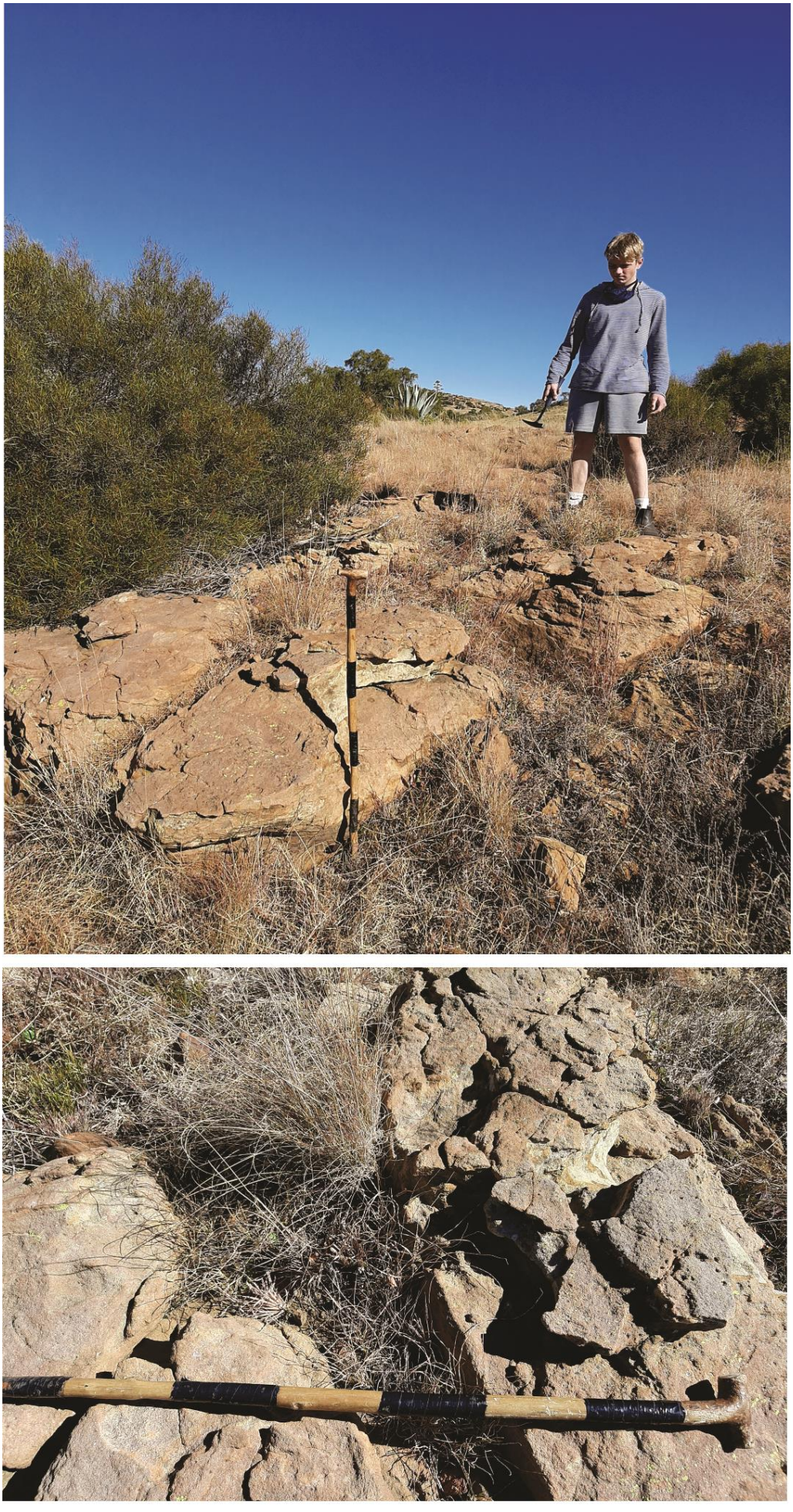


Figure 8. Intact, coarse-grained Molteno Formation sandstone outcropping to the west, south and east of the existing borrow pit.
Scale 1 = 10 cm.

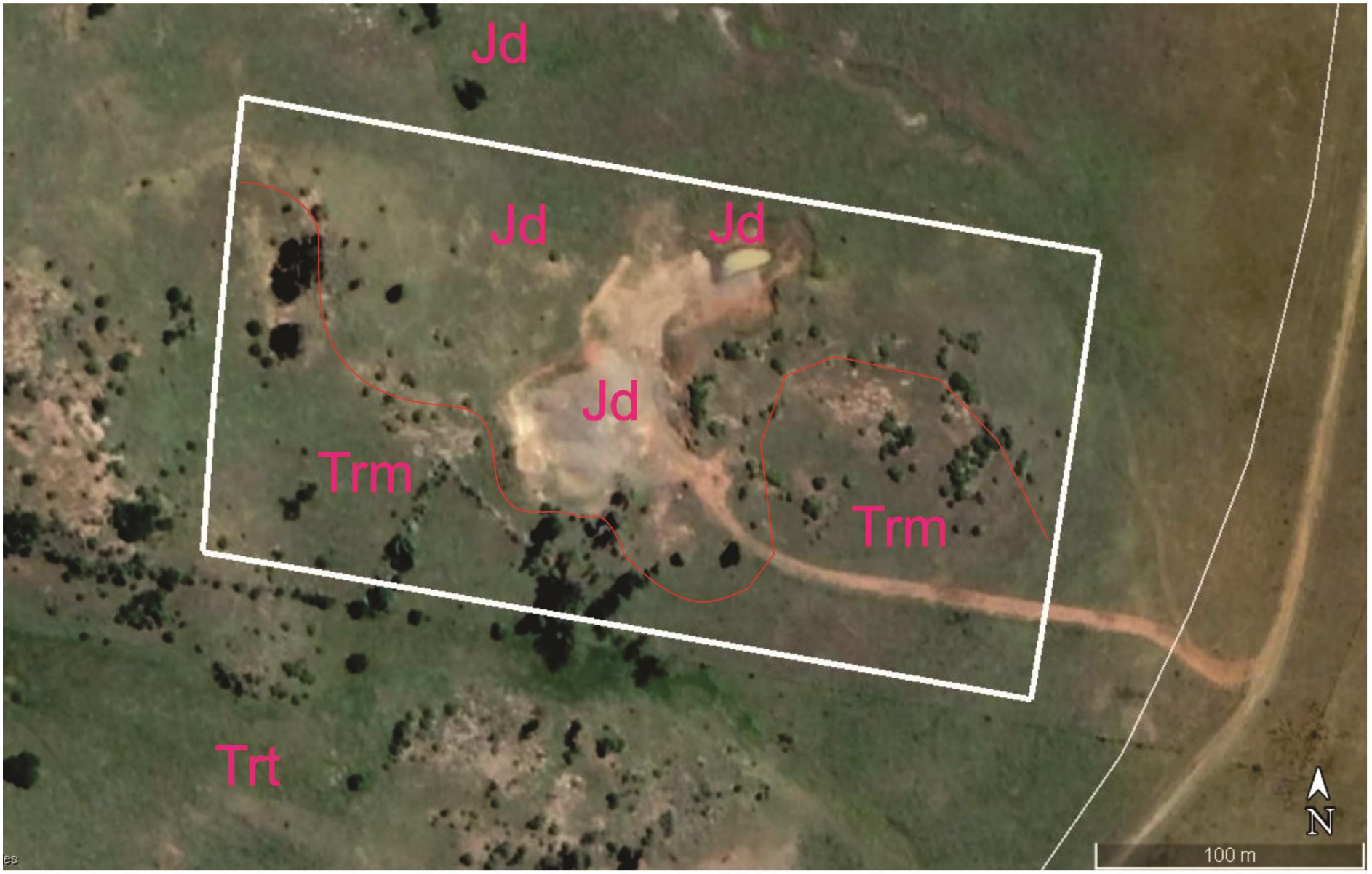


Figure 9. Distribution of potentially fossil-bearing sedimentary rock (*Trt, Trm*) and volcanic rock (dolerite, *Jd)* based on field assessment.