

**Phase 1 Archaeological Impact Assessment of the  
proposed expansion of an existing quarry near Indwe, EC  
Province.**



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## **Executive Summary**

- At the request of Eko Environmental Consultants a Phase 1 Archaeological Impact Assessment was carried out for the expansion of an existing dolerite quarry near Indwe in the Eastern Cape Province.
- A pedestrian survey revealed no evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape.
- There are also no indications of rock art, prehistoric structures or historical buildings older than 60 years within the vicinity of the study area.
- It is unlikely that the proposed development will result in any significant palaeontological or archaeological impact at the site.
- The terrain is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

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## Introduction

At the request of Eko Environmental Consultants a Phase 1 Archaeological Impact Assessment was carried out for the extension of an existing dolerite quarry near Indwe in the Eastern Cape Province (**Fig. 1**). The study is required in terms of Section 38 of the National Heritage Resources Act 25 of 1999 as a prerequisite for any development which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent. The task involved identification and mapping of possible archaeological heritage within the proposed project area, an assessment of their significance, related impact by the proposed development and recommendations for mitigation where relevant.

### Terms of Reference

- Identify and map possible archaeological sites and occurrences using available resources.

- Determine and assess the potential impacts of the proposed development on potential archaeological resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

## **Methodology**

The heritage significance of the affected area was evaluated through a desktop study and carried out 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. Relevant archaeological and palaeontological information, aerial photographs and site records were consulted and 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**).

## **Description of the Affected Area**

### **Locality data**

1 : 50 000 scale topographic map: 3127CB Indwepoort

1 : 250 000 scale geological map 3126 Queenstown

General site coordinates (**Fig. 2**):

A) 31°30'35.45"S 27°19'31.41"E

B) 31°30'46.95"S 27°19'29.92"E

C) 31°30'50.45"S 27°19'36.69"E

D) 31°30'41.62"S 27°19'37.31"E

The study area is located 5 km south of Indwe on high relief terrain facing the Doringrivier Dam towards the east (**Fig. 3 & 4**). The terrain is blanketed by a veneer of sheet wash and residual soil deposits (**Fig. 5**).

### **Geology**

The area around Indwe is largely underlain by sedimentary rocks of the Tarkastad Subgroup (Beaufort Group, Karoo Supergroup) which are capped by the basaltic Drakensberg Formation and primarily represented by numerous dolerite intrusions (**Fig 6**). The sedimentary rocks are all of Triassic age and are represented by the uppermost part of the Katberg and overlying Burgersdorp Formation (Johnson, 1984). The Katberg is defined as a sandstone – rich unit with alternating thin mudstone

layers and lenses. The overlying Burgersdorp Formation consists of alternating fine-grained sandstones and mudstones and constitutes the relatively mudstone-rich upper part of the Tarkastad Subgroup. Superficial deposits are represented by Quaternary alluvium which includes both sheet wash and valley sediments.

## **Background**

### **Palaeontology**

The Katberg mudstones are fossiliferous and are assigned to the *Lystrosaurus* Assemblage Zone ( Kitching 1977; Groenewald and Kitching 1995). The assemblage zone is characterized by an abundance of the *Lystrosaurus* in association with *Procolophon* and the absence of *Dicynodon lacerticeps*. Plant fossils recorded in the AZ include *Dadoxylon*, *Glossopteris* and *Schizoneura*. Vertebrate fossils are fairly common in the mudstones of the Burgersdorp Formation, which with the exception of its lower beds, is assigned to the *Cynognathus* AZ ( Kitching 1977; Kitching 1995). The latter is characterized by the presence of the therapsids *Cynognathus*, *Kannemeyeria* and *Diademodon* and the absence of *Lystrosaurus*. Plant fossils include *Dadoxylon*, *Dicroidium* and *Schizoneura*.

There is currently no record of Quaternary fossil localities in the vicinity of Indwe.

### **Archaeology**

The archaeological footprint of the region is largely represented by rock art sites, Stone Age cave deposits and open sites. Rock paintings are numerous in the region, but are primarily restricted to sandstone cliffs, caves and overhangs. Rock paintings have been recorded on at least 20 farms in the Indwe district (Van Riet Lowe 1941).

## **Field Assessment**

The study area is located on dolerite bedrock. Dolerite is not palaeontologically significant and can be excluded from further consideration in the present evaluation. It is however moderately significant from an archaeological point of view as many Stone Age quarry sites (knapping sites) are found at the foot of dolerite hills where hornfels outcrop occur as a result of contact metamorphism following the intrusion of dykes and sills. Stone Age lithic artifacts in the region are mostly made of the fine-grained, isotropic hornfels. Several uncapped and heavily rolled hornfels stone tools were recorded during the pedestrian survey, but no evidence was found of *in situ*

Stone Age archaeological material, capped or distributed as surface scatters on the landscape (**Fig. 7 & 8; Table 2**). There are also no indications of rock art, prehistoric structures or historical buildings older than 60 years within the vicinity of the study area. An old road and several modern herder fireplaces were recorded along the southern periphery of the study area (**Fig. 9 – 11; Table 2**).

### **Impact Statement**

Potential impacts are summarized in **Table 3**. It is unlikely that the proposed development will result in any significant palaeontological or archaeological impact at the site. The terrain is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

### **Recommendation**

The site has been sufficiently recorded, mapped and documented in terms of conditions necessary for a Phase 1 Archaeological Impact Assessment. There are no major archaeological or palaeontological grounds to suspend the proposed development provided that mining activities are kept within the existing boundaries.

### **References**

- Groenewald G.H. and Kitching J.W. 1995. Biostratigraphy of the Lystrosaurus AZ. In: B.S. Rubidge (ed.) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 35 – 39.
- Johnson M.R. 1984. *The geology of the Queenstown Area*. Geological Survey. Dept. of Mineral and Energy Affairs.
- Kitching, J.W. 1977. *The distribution of the Karoo Vertebrate fauna*. BPI Memoir 1 Wits.
- Kitching J.W. 1995. Biostratigraphy of the Cynognathus AZ. In: B.S. Rubidge (ed.) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 40 – 45.
- Van Riet Lowe, C. 1941. *Prehistoric Art in South Africa*. Archaeological Series No. V. Bureau of Archaeology, Dept. of the Interior. Pretoria.

## Tables and Figures

**Table 1.** Field rating categories as prescribed by SAHRA.

<b>Field Rating</b>	<b>Grade</b>	<b>Significance</b>	<b>Mitigation</b>
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

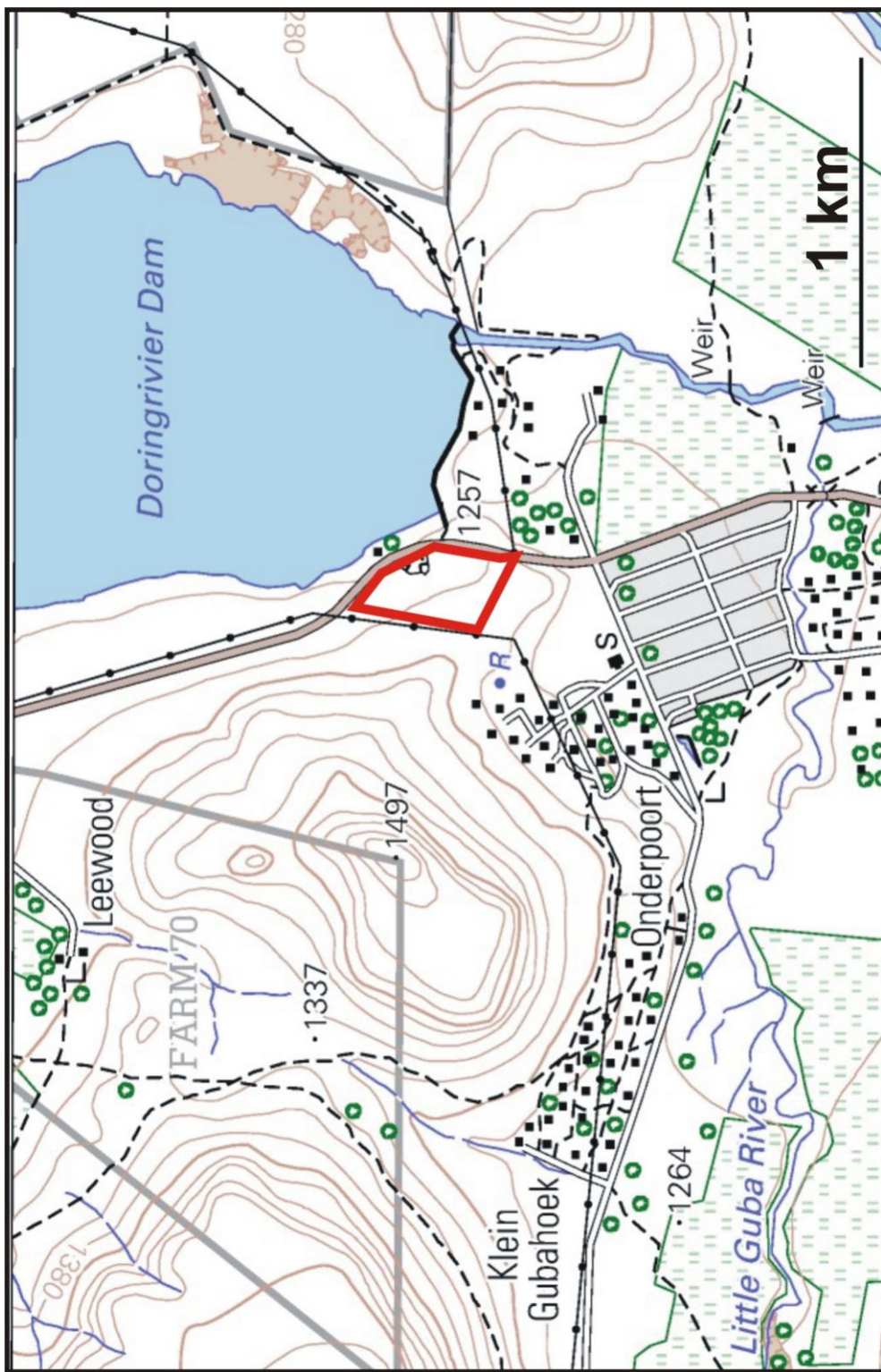


Figure 1. Position of the quarry site (portion of 1:50 000 scale topographic map 3127CB Indwepoort).



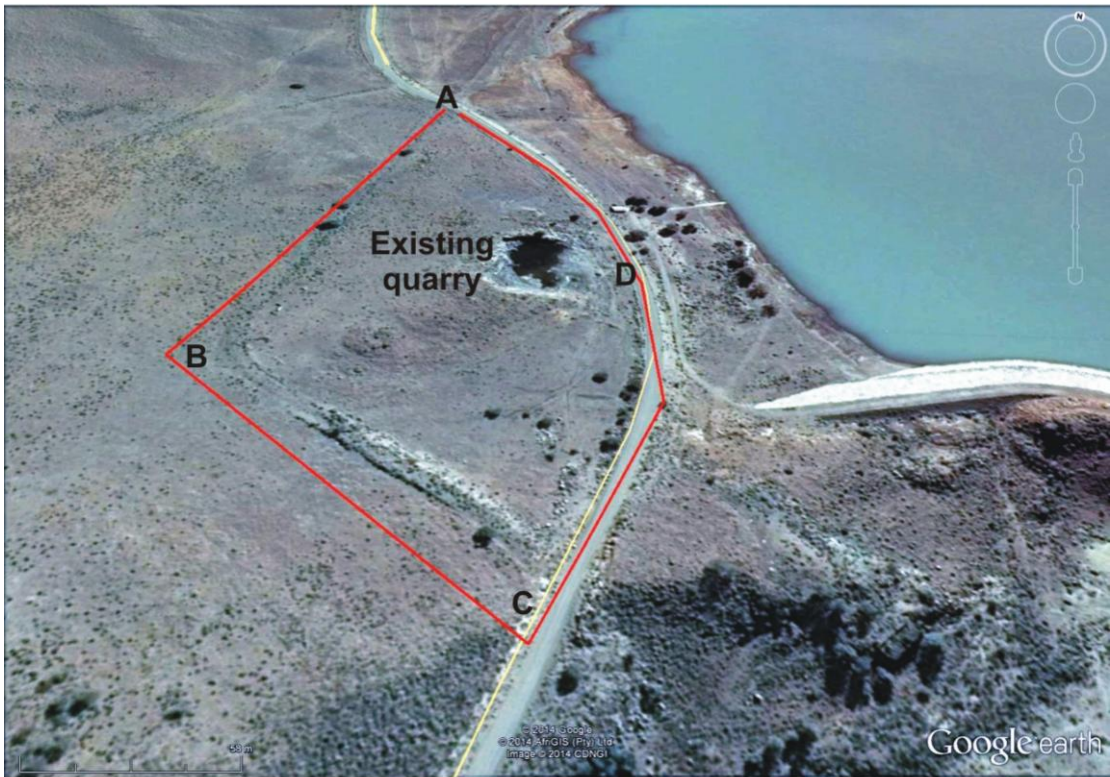


Figure 2. Aerial view of the study area.





Figure 3. The existing quarry, looking southwest.



Figure 4. View from the study area, looking southeast towards the Doringrivier Dam.





Figure 5. The site is covered by a thin capping of sheet wash and residual soils.



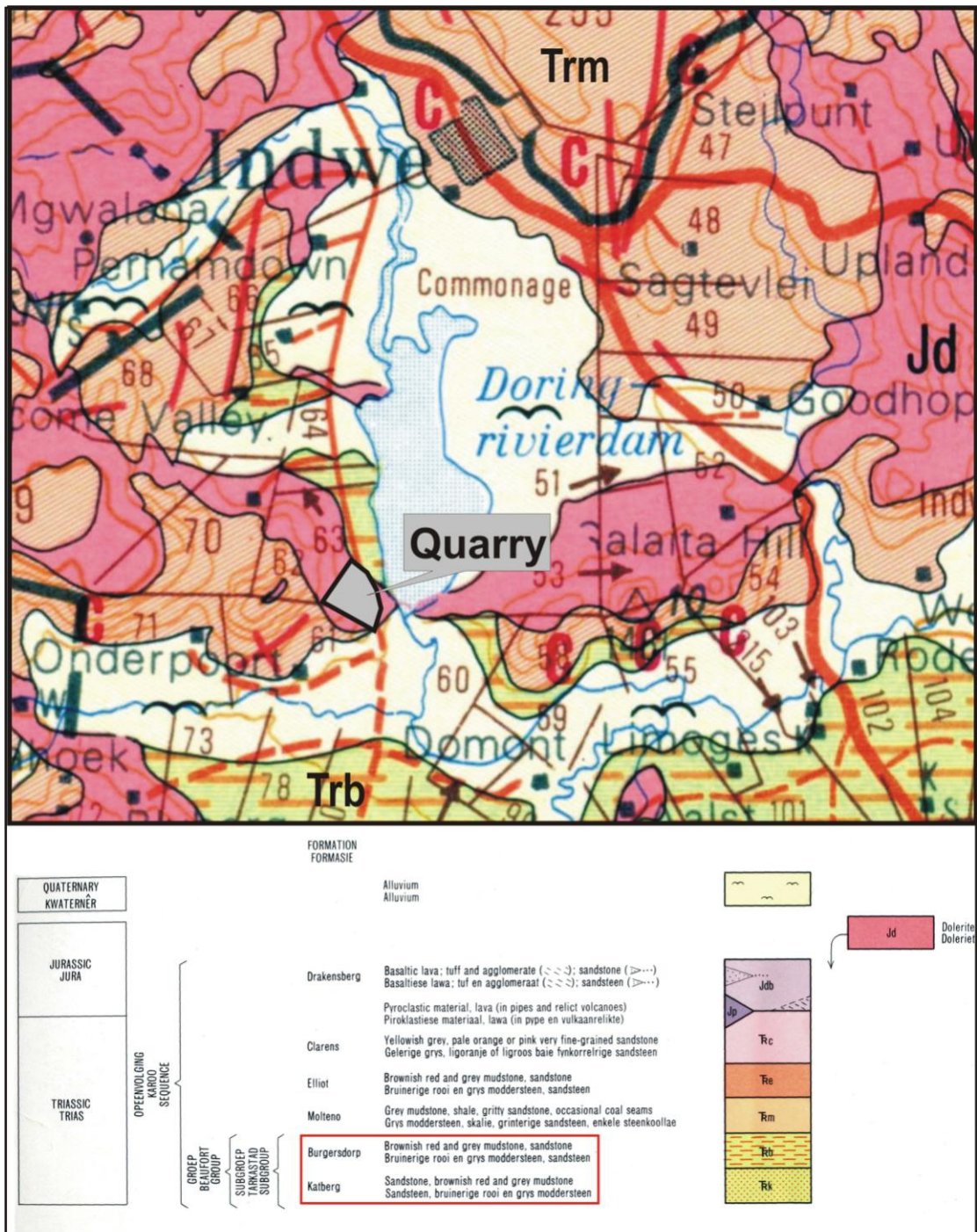


Figure 6. Geological map of the area south of Indwe (portion of 1:250 000 scale geological map 3126 Queenstown).





Figure 7. Surface scatters of multiple or singular stone tools, including flakes, cores, core reduced pieces and other informal tools.



Figure 8. Surface scatters of singular stone tools, including small cores, irregular flakes and retouched flake blades.





Figure 9. Modern circular fireplaces used by cattle herders.





Figure 10. Remnants of an old road situated along the southern boundary of the study area.



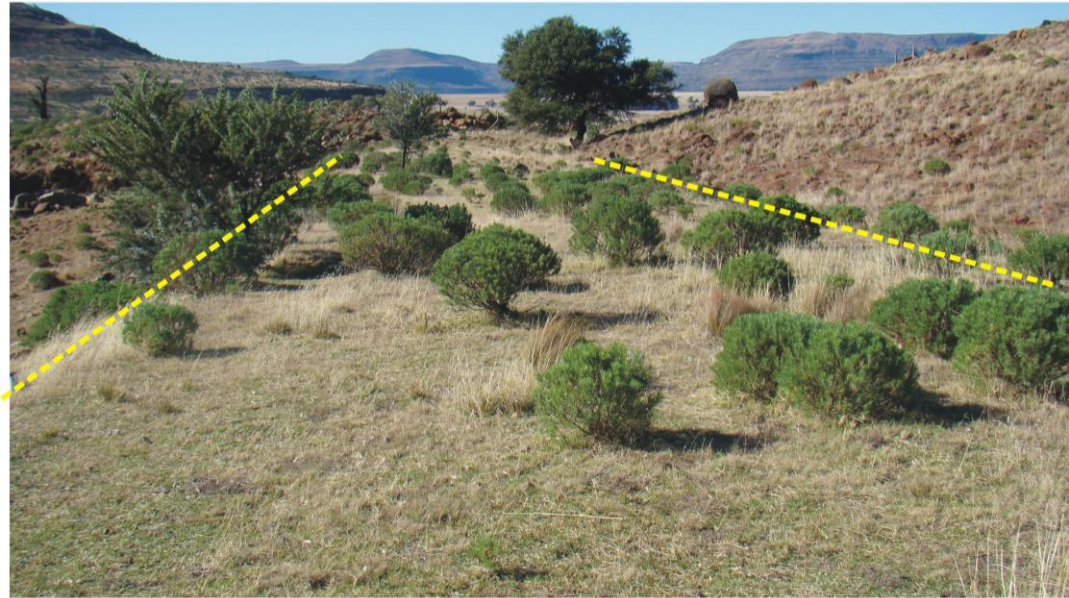


Figure 11. Old road looking northwest (above) and southeast (below).

**Table 2.** Features recorded during the foot survey.

<b>Feature</b>	<b>GPS #</b>	<b>Coordinates</b>
Herder Fireplaces	685	S31 30 50.1 E27 19 29.9
Ex situ stone tool scatter	686	S31 30 48.4 E27 19 29.1
Ex situ stone tool scatter	687	S31 30 42.1 E27 19 27.9
Ex situ stone tool scatter	688	S31 30 40.2 E27 19 29.3
Old Road	689	S31 30 48.2 E27 19 33.9

**Table 3.** Summary of Impact in terms of Extent (the size of the area that will be affected by the impact), Intensity (the anticipated severity of the impact), Duration (the timeframe during which the impact will be experienced), Reversibility of impacts, Probability, Confidence, Mitigation and Site Rating.

<b>Impact</b>	<b>Extent</b>	<b>Intensity</b>	<b>Duration</b>	<b>Reversibility</b>	<b>Probability of impact</b>	<b>Confidence</b>	<b>Mitigation</b>	<b>Rating</b>
Impact of proposed quarry expansion on palaeontology	Local	High	Permanent	Non-reversible	Improbable	High	None	Generally Protected C (GP.C)
Impact of proposed quarry expansion on archaeology	Local	High	Permanent	Non-reversible	Improbable	High	None	Generally Protected C (GP.C)