# Phase 1 Archaeological Impact Assessment of two borrow pits on communal ground near Musong, Herschel District, EC Province.



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### **Executive Summary**

A Phase 1 Archaeological Impact Assessment was carried out at to existing borrow pit sites near the village of Musong in the Eastern Cape Province. The proposed borrow pit sites are located in an outcrop area of the fossil-rich, Late Triassic – Early Jurassic Elliot Formation. Results of the assessment indicates that there are no evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape within the vicinity of the respective development footprints at Borrow Pit 1 and Borrow Pit 2. There are also no signs of rock art, prehistoric structures, visible graves or historical structures within the given boundaries of the respective development footprint areas. Provided that all activities are restricted to within its boundaries, the Borrow Pit 1 site, as demarcated for development, is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C). Provided that all activities are restricted to within its boundaries, and the and the rating of Generally Protected C (GP.C).

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# Introduction

A Phase 1 Archaeological Impact Assessment was carried out at to existing borrow pit sites near the village of Musong in the Eastern Cape Province (**Fig. 1**). The National Heritage Resources Act (NHRA) (No 25 of 1999) 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 of the NHRA 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 m<sup>2</sup> 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 m<sup>2</sup>.
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

The significance or sensitivity of heritage resources within a particular area or region can inform the EIA process on potential impacts and whether or not the expertise of a heritage specialist is required. A range of contexts can be identified which typically have high or potential cultural significance and which would require some form of heritage specialist involvement. This may include formally protected heritage sites or unprotected, but potentially significant sites or landscapes. 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). On the other hand, 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.

#### **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.

#### 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, aerial photographs 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. The study areas were 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: 3027CB Sterkspruit

1:250 000 scale geological map 3026 Aliwal North

Site coordinates:

BP 1: 30°30'0.24"S 27°31'49.89"E

BP 2: 30°30'40.13"S 27°33'35.69"E

Borrow Pit 1 (BP1) and Borrow Pit 2 (BP2) are existing borrow pits, located on high relief terrain near the village of Musong (farm Palmietfontein 16) and on the farm Lower Telle 15, respectively (**Fig. 2 & 3**).

#### Geology

The proposed borrow pit sites are located in an outcrop area of the Early Jurassic Massospondylus Range Zone (Kitching and Raath 1984) of the Late Triassic – Early Jurassic Elliot Formation (Visser & Botha 1980; Johnson et al. 2006). The Elliot Formation represents the penultimate phase of Karoo sedimentation (Karoo Supergroup) and is characterized by its fluvially derived red bed deposits that respectively overlies and underlies the Molteno and Clarens Formations. Sedimentation processes were ended with the advent of extensive volcanic eruptions when basaltic lavas of the Drakensberg Formation and the Lebombo Group were deposited during the Jurassic Period (Duncan et al. 2006; Johnson et al. 2006). It is generally accepted that the red bed deposits of the Elliot Formation are indicative of laterally continuous floodplain mudstones and associated fluvial sandstones (Visser and Botha, 1980; Smith et al. 1993; Johnson et al., 1996, 2006). Kitching and Raath (1984) subdivided the Elliot Formation into three lithostratigraphic units (Lower, Middle and Upper Elliot formations), but Bordy et al. (2004) recently suggested that the formation can be subdivided into two informal units, namely the Lower Elliot Formation (LEF) and Upper Elliot Formation (UEF), which have distinct lithologies, resulting from two different sedimentological regimes. The LEF correlates with Kitching and Raath's Lower Elliot Formation, while the new UEF incorporates both the Middle and Upper Elliot formations of these authors. The division also show reasonable correspondence with the biostratigraphic units defined by Kitching and Raath (1984) as the Euskelosaurus and Massospondylus Range Zones, respectively.

The Elliot Formation contains one of richest Late Triassic to Early Jurassic dinosaur faunas that are of international importance and which include early dinosaurs (Massospondylus and *Euskelesaurus*) ornithischians, rare theropods and crocodilomorphs as well as rare amphibians, turtles, fish, advanced mammal-like reptiles and early mammals (Kitching 1979; Kitching & Raath 1984; MacRae, 1999; McCarthy & Rubidge 2005; Reisz et al. 2012). Several early dinosaur localities have been found in the vicinity of Musong in the past so the likelihood is high that vertebrate fossils could be encountered during excavation activities in the area (Fig. 4). Both borrow pits are underlain by potentially fossil-rich bedrock strata and although no fossils were recorded in the existing exposures at the time of the assessment, it is important to note that these fossils are rarely uniformly distributed within the fossil-bearing rock units. It is therefore still highly likely that vertebrate fossil remains might be uncovered during the course of future excavations at the borrow pits. It is proposed that the bedrock palaeontological component of both development footprints is assigned a site rating of Generally Protected A (GP.A). There is currently no record of Quaternary fossil localities in the vicinity of Musong. Given the position of the borrow pits, the likelihood of impact on potential Quaternary fossil exposures is considered very minor.

# **Archaeological Background**

The archaeological footprint in the region is primarily represented by Stone Age and rock art sites, stone-walled remnants and cave dwellings of early indigenous farming communities as well as historical structures related to missionary activities and early trek-farmers.

Later Stone Age stone tool "factory" sites have been recorded in the south-eastern Free State and the upper Orange River valley (e.g. Goedemoed, Weenkop and Wesselsdal near Rouxville, Ventershoek near Wepener and Mooifontein near Zastron, while the original Smithfield material used by Goodwin and Van Riet Low to describe the Smithfield Stone Tool Industry in 1929 was a surface collection retrieved from the banks of a stream running through the town of Smithfield, about 90 km west of Musong (Goodwin and van Riet Lowe 1929) (**Fig. 5**). Rock art localities recorded in the Herschel district include several cave sites containing rock paintings (Van Riet Lowe 1941) (**Fig. 6**).

Evidence of the oldest Later Iron Age stone-walled settlements of early agriculturists are found in south-eastern corner of the southern Highveld, but a number of settlements are found in the Caledon Valley to the north which appear to date from the 17<sup>th</sup> century (Maggs 1974, 1976). Caves and rock shelters were also occupied. Walton (1956) reported on a number of cave dwellings in the region, including a mud-smeared cave at Dili-Dili, about 13 km due south-east from Musong on the Lesotho border. When these agriculturists moved into the eastern Free State they came into contact and San hunter-gatherers (Macquarrie 1962; Wadley 1992).

During the early 1820's, widespread conflict, during a period known as the Difaqane, resulted in a series of raids and wars carried on by whole communities of displaced and wandering Nguni- and Southern Sotho-speaking groups after the rise of Shaka's

Zulu empire, which caused refugee communities to flee over the Drakensberg mountain passes. Southern Sotho and small Nguni communities occupied the Caledon River Valley and the foothills of the Maluti Mountains at the time, but subsequently broke up into numerous antagonistic communities which were scattered along the Caledon River and Upper Orange River Valleys (Lye 1967, 1972; Maggs 1976).

Evidence of colonial expansion into the region is found in the establishment of mission stations (e.g. Morija, Thaba Bosiu, Carmel, Hermon, Hebron, Beerseba, Mekoatleng and Bethulie), as well as the remains of European homesteads when early trekboers crossed the Orange River from the Cape as early as 1819 and settled throughout the south-eastern Free State region during the 1820's and 1830's (Walton 1955).

#### **Field Assessment**

There are no indication of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape within the vicinity of the respective development footprints at Borrow Pit 1 and Borrow Pit 2. There are also no signs of rock art, prehistoric structures, visible graves or historical structures within the boundaries of the respective development footprint areas.

#### **Impact Statement and Recommendations**

The landscape around Musong is culturally and historically highly significant. However, it is unlikely that the proposed developments will result in any significant archaeological impact within the boundaries of the respective development footprint areas. Provided that all activities are restricted to within its boundaries, the Borrow Pit 1 site, as demarcated for development, is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C). Provided that all activities are restricted to within its boundaries, the Borrow Pit 2 site as demarcated for development is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

### References

Bordy, E.M., Hancox, P.J. and Rubidge, B.S. 2004. Fluvial style variations in the Late Triassic–Early Jurassic Elliot formation, main Karoo Basin, South Africa *Journal of African Earth Sciences* 38: 383–400.

Duncan, A.R. and Marsh, J.S. 2006. *The Karoo Igneous Province*. In: M.R. Johnson, *et. al.* (eds). The Geology of South Africa. Geological Society of South Africa.

Goodwin H.J. & Van Riet Lowe, C. 1929. The Stone Age cultures of South Africa. *Annals of the South African Museum* 27: 1 – 289.

Johnson, M.R., Van Vuuren, C.J., Hegenberger, W.F., Key, R., Shoko, U., 1996. Stratigraphy of the Karoo Supergroup in southern Africa: an overview. *Journal of African Earth Sciences* 23(1): 3–15.

Johnson *et al.* 2006. Sedimentary rocks of the Karoo Supergroup. In: M.R. Johnson, et. al. (eds). *The Geology of South Africa*. Geological Society of South Africa.

Macquarrie, J.W. 1962. *The reminiscences of Sir Walter Stanford*, Vol. 2, 1885-1929. Cape Town: Van Riebeeck Society.

MacRae, C. 1999. *Life Etched in Stone*. Fossils of South Africa. The Geological Society of South Africa, Johannesburg.

McCarthy, T. and Rubidge, B.S. 2005. *The Story of Earth and Life*. Struik Publishers, Cape Town.

Kitching, J.W and Raath, M.A. 1984. Fossils from the Elliot and Clarens Formations of the Northeastern Cape, Orange Free State and Lesotho, and a suggested biozonation based on tetrapods. *Palaeontologia africana* 25: 111 – 125.

Kitching, J.W. 1979. Preliminary report on a clutch of six dinosaurian eggs from the Upper Triassic Elliot Formation, Northern Ornage Free State. *Palaeontologia Africana* 125: 41 – 45.

Lye, W.F. 1967. The Difaqane – the Mfecane in the Southern Sotho area, 1822 – 1824. *Journal of African History* 8 (1): 107-131.

Lye, W.F. 1972. *The distribution of the Sotho Peoples after the Difaqane*. In: L. Thompson (ed.) African Societies in Southern Africa. Heinemann. London. 191 – 206.

Maggs, T. O'C. 1976. Iron Age Patterns and Sotho History on the Southern Highveld: South Africa. World Archaeology 7: 18-332.

Macquarrie 1962. *The reminiscences of Sir Walter Stanford, Vol. 2, 1885-1929.* Van Riebeeck Society. Cape Town:

Reisz, R. R, Evans, D. C., Roberts, E. M., Sues, H.-D. and Yates, A. M. 2012. Oldest known dinosaurian nesting site and reproductive biology of the Early Jurassic sauropodomorph *Massospondylus*. *Proceedings of the National Academy of Sciences* 109: 2428 – 2433.

Smith, R.H.M., Eriksson, P.G., Botha, W.J., 1993. A review of the stratigraphy and sedimentary environments of the Karoo-aged basins of Southern Africa. *Journal of African Earth Sciences* 16: 143–169.

Van Riet Lowe, C. 1941. *Prehistoric Art in South Africa*. Archaeological Series No.V. Bureau of Archaeology, Dept. of the Interior. Pretoria.

Wadley, L. 1992. Rose Cottage Cave: The Later Stone Age levels with European and Iron Age artefacts. *South African Archaeological Bulletin* 47:8-12.

Walton, J. 1955. *Vroeë plase en nedersettings in die Oranje Vrystaat*. A.A. Balkema. Cape Town. 36 pp.

Walton, J. 1956. Early Bafokeng settlement in South Africa. *African Studies* 15(1): 37 – 43.

#### Declaration

L. Rossouw does independent specialist consulting and is in no way connected with the proponents of the development, other than delivery of consulting services.

# **Tables and Figures**

Field Rating	Grade	Significance	Mitigation
National	Grade 1	-	Conservation;
Significance (NS)			national site
			nomination
Provincial	Grade 2	-	Conservation;
Significance (PS)			provincial site
			nomination
Local Significance	Grade 3A	High significance	Conservation;
(LS)			mitigation not
			advised
Local Significance	Grade 3B	High significance	Mitigation (part of
(LS)			site should be
			retained)
Generally Protected	-	High/medium	Mitigation before
A (GP.A)		significance	destruction
Generally Protected	-	Medium	Recording before
B (GP.B)		significance	destruction
Generally Protected	-	Low significance	Destruction
C (GP.C)			

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







Figure 2. Aerial view of the proposed borrow pit sites.



Figure 3. General view of Borrow Pit 1, looking southwest (top)and Borrow Pit 2, looking north (bottom)







Figure 5. Examples of Smithfield Industry stone tools described from Ventershoek near Wepener (above) and the Smithfield Townlands (below). Drawings after Goodwin & van Riet Lowe (1929).



